

Monitoring of Indian National Aquatic Resources
Series: MINARS/ 35/ 2013-14

STATUS OF WATER QUALITY IN INDIA- 2011



CENTRAL POLLUTION CONTROL BOARD

Ministry of Environment & Forests

Parivesh Bhawan, East Arjun Nagar,

Delhi-110 032

Website : <http://www.cpcb.nic.in>

FOREWORD

The water quality management is one of the many important environmental issues in India. Increasing demand of water for human consumption, irrigation and industrial activities has impacted the water quality of rivers due to declining flows in rivers and depleting water levels of subsurface resources. Water quality data from 2500 water quality monitoring stations, located on all important rivers, lakes and groundwater during the year 2011 is presented in this treatise for wider circulation and preparation of improvement plans.

The data collected indicates that organic and bacterial pollution, assessed in terms of Biochemical Oxygen Demand (BOD) and Coliform counts, continue to be the major water quality issues. This is mainly due to discharge of untreated domestic wastewater from the urban centres. The municipal corporations at large are not able to treat increasing load of municipal sewage flowing into water bodies, while at the same time the receiving water bodies do not have adequate water for dilution. Therefore, the oxygen demand and bacterial pollution is increasing day by day.

The contribution of Ms. Sandhya Shrivastava (SRF), Ms. Shweta Gaur (SRF), Ms. Alpana Narula (JSA) and Ms. Suniti Parashar (SSA) in compilation of data and preparation of this Report is appreciable. The project study has been coordinated by Shri R.M.Bhardwaj, Scientist, 'D' and Dr.D.D.Basu, Scientist 'E' under overall supervision and guidance of Shri J.S. Kamyotra, Member Secretary. The co-operation extended by State Pollution Control Boards, Pollution Control Committees and Zonal Offices of Central Pollution Control Board in this endeavor is appreciated.

I Hope, this Report will be useful to all concerned in the country with water quality management.

May, 2013


(Ajay Tyagi)

CONTRIBUTIONS

- Supervision and Co-ordination** : Shri J.S. Kamyotra, Member Secretary
Mr. R.M. Bhardwaj, Scientist `D`
- Report Preparation** : Ms. Sandhya Shrivastava, Senior Research Fellow
Ms. Shweta Gaur, Senior Research Fellow
Ms. Alpana Narula, Junior Scientific Assistant
Ms. Suniti Parashar, Senior Scientific Assistant
- Data Entry By** : Ms.Sarita Kumari, Data Entry Operator

CONTENTS

	<u>Page</u>
Executive Summary	I-XIII
Chapter I	Water Availability, Pollution and Water Quality Criteria
1-10	
1.1	Availability of Water Resources
1.1.1	Irrigation Requirement
1.1.2	Industrial Requirement
1.1.3	Municipal Requirement
1.2	Climate Change
1.3	Current and Future Water Requirements
1.3.1	Temporal Distribution
1.3.2	Spatial Distribution
1.4	Population Stress and water insecurity
1.5	Water Needs of Ecosystem
1.6	Water Pollution
1.6.1	Domestic Water Pollution
1.6.2	Industrial Water Pollution
1.6.3	Agricultural Water Pollution
1.7	Approach to Water Quality Management and Water Quality Criteria
Chapter II	Water Quality Monitoring In India
11- 31	
2.1	National Water Quality Monitoring Programme
2.2	Objectives of Water Quality Monitoring
2.3	Monitoring Network, Parameters and Frequency
2.4	State/Union Territory (UT) Level - Water Quality
Chapter III	Water Quality Trend in India
32 - 48	
3.1	Water Quality Trend
3.2	Biochemical Oxygen Demand (BOD)
3.3	Total Coliform (TC)
3.4	Faecal Coliform (FC)
3.5	Water Quality Trend of BOD in Rivers
3.6	Observed Water Quality
Chapter IV	Water Quality of Rivers in Indus Basin
49- 54	
4.1	Indus River System
4.2	Water Quality Monitoring in Indus Basin
4.2.1	Water Quality of River Beas
4.2.2	Water Quality of River Satluj
4.2.3	Water Quality of tributary streams Ravi, Parvati, Largi, Sirsa, Swan, Siuel, Tawi, Chenab, Chunt Kol, Suketikhad, Binwa & Neugal
Chapter V	Water Quality of Rivers in Ganga Basin
55- 76	

	<u>Page</u>	
5.1	Ganga River System	
5.2	Water Quality Monitoring in Ganga Basin	
5.2.1	Water Quality of River Ganga	
5.2.2	Water Quality of River Yamuna	
5.2.2.1	Major Water Quality Segments	
5.2.2.2	Critical Segments	
5.2.2.3	Water Quality of River Yamuna	
5.2.3	Water Quality of tributary streams - Suswa , Gola, Ramganga, Kalinadi (E), Varuna, Sai, Gomti, Rapti, Saryu, Ghaghara, Rihand, Sone, Gandak, Sikrana, Burhi Gandak, Harbora, Kamla, Manusmar, Koshi, Daha, Dhous, Farmar, Ram Rekha and Sirsa	
5.2.4	Water Quality of tributary streams - Tons, Ashwani, Batta, Giri, Pabbar, Kalinadi (W), Hindon, Tons (MP), Betwa, Kaliasot, Kolar, Chambal, Parvati, Khan, Kshipra, Kali Sindh, Sindh, Bichia, Sankh, Banas, Chhapi and Ujad	
5.2.5	Water Quality of tributary streams - Damodar, Barakar, Konar, Rupanarayan, Dwarakeshwar, Dwarka, Silabati, Jalangi, Churni, Matha Bhanga, Kansi, Mayurkashi, Mahananda, Vindhyadhari, Bokaro and Jumar	
Chapter VI	Water Quality of Rivers in Brahmaputra Basin	77 - 80
6.1	Brahmaputra River System	
6.1.1	Water Quality Monitoring in Brahmaputra Basin	
6.1.2	Water Quality of River Brahmaputra	
6.2.1	Water Quality of tributary stream Dhansiri	
6.2.2	Water Quality of tributary streams -Subansiri, Kharsang, Burhidihing, Pagldia, Digboi, Jai Bharali, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Deepar Bill & Kathakal	
6.2.3	Water Quality of tributary streams - Teesta, Dikchu, Maney Khola, Ranichu, Kundli, Dikhow, Kohora, Boginadi, Ranga Nadi, Kapili, Beki, Sankosh, Barak, Sonai, Kushiya, Karola, Kaljani and Panchnai	
Chapter VII	Water Quality of Rivers in Mahi Basin	81 -83
7.1	Mahi River System	
7.2	Water Quality Monitoring in Mahi Basin	
7.2.1	Water quality of River Mahi and tributary streams Shivna, Jammer, Malei, Chillar, Anas and Panam	
Chapter VIII	Water Quality of Rivers in Sabarmati Basin	84 – 85
8.1	Sabarmati River System	
8.2	Water Quality Monitoring in Sabarmati Basin	
8.2.1	Water Quality of River Sabarmati	
Chapter IX	Water Quality of Rivers in Narmada Basin	86 - 88

		<u>Page</u>
9.1	Narmada River System	
9.2	Water Quality Monitoring in Narmada Basin	
9.2.1	Water Quality of River Narmada and tributary streams Gour & Katni	
Chapter X	Water Quality of Rivers in Tapi Basin	89 – 92
10.1	Tapi River System	
10.2	Water Quality Monitoring in Tapi Basin	
10.2.1	Water Quality of River Tapi and tributary streams Girna, Kim, Rangavali, Denwa, Purna, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur	
Chapter XI	Water Quality of Rivers in Mahanadi Basin	93 - 100
11.1	Mahanadi River System	
11.2	Water Quality Monitoring in Mahanadi Basin	
11.2.1	Water Quality of River Mahanadi	
11.2.2	Water Quality of tributary streams Seonath, Kharoon, Hasdeo, Kelo, Ib, Kuakhai, Daya, Kathajodi, Sankha, Tel and Birupa	
Chapter XII	Water Quality of Rivers in Brahmani & Baitarni Basin	101 - 106
12.1	Brahmani and Baitarni River System	
12.2	Water Quality Monitoring in Brahmani & Baitarni Basin	
12.3	Water Quality of River Brahmani and tributary streams Koel, Kharasrota, Aul, Sankh and Karo	
12.4	Water Quality of River Baitarni	
Chapter XIII	Water Quality of Rivers in Subarnarekha Basin	107 - 110
13.1	Subarnarekha River System	
13.2	Water Quality Monitoring in Subarnarekha Basin	
13.3	Water Quality of River Subarnarekha	
Chapter XIV	Water Quality of Rivers in Godavari Basin	111- 117
14.1	Godavari River System	
14.2	Water Quality Monitoring in Godavari Basin	
14.2.1	Water Quality of River Godavari	
14.2.2	Water Quality of tributary streams Indravati, Shankini, Manjeera, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna, Nira, Kinnarsani, Sabari, Bindusara, Darna, Penganga and Wena	
Chapter XV	Water Quality of Rivers in Krishna Basin	118- 124

		<u>Page</u>
15.1	Krishna River System	
15.2	Water Quality Monitoring in Krishna Basin	
15.2.1	Water Quality of River Krishna	
15.2.2	Water Quality of tributary streams Panchganga & Bhima	
15.2.3	Water Quality of tributary streams Ghatprabha, Malprabha, Tunghbhadra, Tungha, Bhadra, Musi, Palleru, Muneru, Kagina, Nakkavagu, Hundri and Kundu in Andhra Pradesh and Karnataka	
15.2.4	Water Quality of tributary streams Nira, Venna, Koyna, Mula, Mula-Mutha, Mutha, Pawana, Indrayani, Chandrabhaga, Ghod, Sina, Urmodi and Vel in Maharashtra	
Chapter XVI	Water Quality of Rivers in Penneru Basin	125 -126
16.1	Penneru River System	
16.2	Water Quality Monitoring in Penneru Basin	
16.2.1	Water Quality of River Penneru	
Chapter XVII	Water Quality of Rivers in Cauvery Basin	127- 131
17.1	Cauvery River System	
17.2	Water Quality Monitoring in Cauvery Basin	
17.2.1	Water Quality of River Cauvery	
17.2.2	Water Quality of tributary streams Amravati, Arkavathi, Bhavani, Hemavati, Kabbani, Lakshmantirtha, Sarabanga, Shimsha, Thirumanimuthar and Yagachi	
Chapter XVIII	Water Quality of Medium & Minor Rivers, Creeks/Sea water and Drains	132- 141
18.1	Medium and Minor River System	
18.2	Water Quality of Medium and Minor Rivers in Gujarat & Daman	
18.3	Water Quality of Medium and Minor Rivers in Goa and Maharashtra	
18.4	Water Quality of Medium and Minor Rivers in Kerala	
18.5	Water Quality of Medium and Minor Rivers in Andhra Pradesh, Karnataka, Orissa, Pondicherry and Tamilnadu	
18.6	Water Quality of Medium and Minor Rivers in Himachal Pradesh, Punjab, Haryana and Rajasthan	
18.7	Water Quality of Medium and Minor Rivers in Manipur, Meghalaya, Mizoram and Tripura	
18.8	Water Quality of Creeks, Sea Water, Canals and Drains	
18.8.1	Water Quality of Creeks and Sea Water	
18.8.2	Water Quality of Canals	
18.8.3	Water Quality of Drains	

	<u>Page</u>
Chapter XIX	142- 147
19.1	Water Quality of Lakes, Tanks & Ponds
19.2	Lantic Water Bodies
19.3	Water Quality of Lakes, Tanks and Ponds in Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Pondicherry and Goa
19.4	Water Quality of Lakes and Ponds in Gujarat, Madhya Pradesh and Rajasthan
19.5	Water Quality of Lakes and Ponds in Haryana, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh and Uttarakhand
19.6	Water Quality of Lakes, Tanks and Ponds in Assam, Manipur, Meghalaya and Tripura
	Water Quality of Lakes and Ponds in Bihar, Jharkhand, Orissa and West Bengal
Chapter XX	148- 154
20.1	Assessment of Groundwater Quality
20.2	Ground Water Quality Monitoring
20.3	State wise Groundwater Quality Monitoring
20.4	Status of Ground Water Quality in Andhra Pradesh
20.5	Status of Ground Water Quality in Assam
20.6	Status of Ground Water Quality in Meghalaya, Manipur, Mizoram and Tripura
20.7	Status of Ground Water Quality in Chhattisgarh and Madhya Pradesh
20.8	Status of Ground Water Quality in Himachal Pradesh and Chandigarh
20.9	Status of Ground Water Quality in Jammu and Kashmir
20.10	Status of Ground Water Quality in Kerala
20.11	Status of Ground Water Quality in Pondicherry and Tamil Nadu
20.12	Status of Ground Water Quality in Daman and Dadra Nagar Haveli
20.13	Status of Ground Water Quality in Maharashtra and Goa
20.14	Status of Ground Water Quality in Gujarat
20.15	Status of Ground Water Quality in Rajasthan
20.16	Status of Ground Water Quality in Uttar Pradesh and Uttarakhand
20.17	Status of Ground Water Quality in Orissa
20.18	Status of Ground Water Quality in Bihar
	Status of Ground Water Quality in West Bengal

Annexure-I	Water Quality Data	Page 1- 44
•	River Basins -Indus, Ganga, Brahmaputra, Mahi, Sabarmati, Narmada, Tapi, Mahanadi, Brahmani and Baitarni, Subarnarekha, Godavari, Krishna, Penneru & Cauvery	
•	Medium and Minor Rivers, Canals, Creeks/Sea water and Drains	
•	Statewise - Lakes, Tanks and Ponds	
•	Statewise – Groundwater	

EXECUTIVE SUMMARY

The water quality data on rivers, lakes, ponds, tanks and groundwater locations being monitored under the network is evaluated against the water quality criteria and the monitoring locations in exceedence with respect to one or more parameters are identified as polluted and require action for restoration of water quality. The locations on rivers, lakes, ponds, tanks and groundwater not meeting the criteria are summarized briefly in this chapter.

The monitoring results obtained during 2011 indicate that organic pollution continues to be the predominant pollution of aquatic resources. The organic pollution measured in terms of bio-chemical oxygen demand (BOD) & Coliform bacterial count gives the indication of extent of water quality degradation in different parts of our country. It is observed that nearly 63% of the observations are having BOD less than 3 mg/l, 19% between 3-6 mg/l & 18% above 6 mg/l. Similarly Total & Faecal coliform which indicate presence of pathogens in water are also a major concern. About 50% observations are having Total Coliforms and 69% observations are having Faecal Coliform less than 500 MPN /100 ml.

WATER QUALITY OF RIVERS

HIMALAYAN RIVERS (SATLUJ-BEAS-GANGA-YAMUNA-BARAK) CATCHMENT

- **Indus Catchment-** Water quality of River Beas at upstream Mandi in Himachal Pradesh and River Satluj at Downstream Budhanala Confluence, Ludhiana; Boat Bridge Dharmkotnakodar Road; Jalandhar; U/s Head works Ropar; Downstream of Zenith; Downstream of East Bein and Upstream Budhanala in Punjab; River Chunt Kol (Maulana Azad Bridge) and River Tawi at Jammu U/s (Tawi Bridge) in Jammu & Kashmir found deteriorated and degraded as compared to stipulated requirement.
- **Ganga Catchment-** The water quality of River Ganga does not meet the criteria at Haridwar D/s; U/s Vindhychal; Kanpur U/s (Ranighat) & D/s (Jajmau Pumping Station); Bithoor (Kanpur); Kannauj U/s (Rajghat) & D/s; Varanasi U/s (Assighat) & D/s (Malviya Bridge); Howrah-Shivpur; A/c R.Song Nr Syanarayan Temple D/s Raiwala; Kachhla Ghat; Narora (Bulandsahar); U/s & D/s Anoopshahar; Allahabad (Rasoolabad); Allahabad D/s (Sangam); Kadaghat, Allahabad; D/s Mirzapur; Garhmukteshwar; Trighat (Ghazipur); Dalmau (Rai Bareilly); Kala Kankar (Raebareli); Baharampore; Diamond Harbour; Dakshineshwar; Uluberia; Garden Reach; Upper River D/s Roorkee; Nabadip and Serampore. The water quality of River Yamuna is not meeting the criteria at Mathura U/s & D/s, Vishramghat (Mathura), Mazawali, Agra U/s & D/s, Okhla Bridge (Inlet of Agra Canal) & Nizamuddin, Bateshwar, Kesighat, Vrindavan, Shahpur, Etawah, Juhika B/c with Chambal (Etawah), Allahabad D/s (Balua Ghat), U/s Dak Patthar, Wazirabad and Sonapat. The water quality of tributary streams River Suswa, Gola, Ramganga, Kalinadi

(E), Varuna, Sai, Gomti, Rapti, Saryu, Ghaghara, Rihand, Sone, Gandak, Sikrana, Burhi Gandak, Harbora, Kamla, Manusmar, Koshi, Daha, Dhous, Farmar, Ram Rekha, Sirsa, Tons, Ashwani, Batta, Giri, Pabbar, Kalinadi (W), Hindon, Tons (MP), Betwa, Kaliasot, Kolar, Chambal, Parvati, Khan, Kshipra, Kali Sindh, Sindh, Bichia, Sankh, Banas, Chhapi, Ujad, Damodar, Barakar, Konar, Rupanarayan, Dwarakeshwar, Dwarka, Silabati, Jalangi, Churni, Matha Bhanga, Kansi, Mayurkashi, Mahananda, Vindhyadhari, Bokaro and Jumar are not conforming to water quality criteria at some of their various monitoring locations.

- **Brahmaputra Catchment-** The mainstream of River Brahmaputra is exceeding the criteria at Kherghat; Jogijhoga near Bridge; Dhenukhpahar; Dibrugarh; Kacharighat (Guwahati); Panbazar; Chandrapur in Assam. River Dhansiri is not meeting the desired criteria at Nuton Basti; Town boundary bridge; Nagaland-Assam Border and Golaghat; River Bharalu (Guwahati); River Kapili at Dharmtul Bridge Nagaon; River Kundli at Sapakhowa; River Dikhow at Dikhow Bridge (Sivasagar); River Deepar Bill and Disang at Gundamghat in Assam, River Subansiri at Gerekamukh; River Pagldia near Nalbari town; River Jai Bharali near Biswanath Chara II, Sonitpur; River Kolong at Marigaon; River Bhogdoi at Jorhat; River Kaljani downstream of Alipurduwar; municipality discharge point; River Sankosh; River Kushiara at Karimganj; River Teesta at Siliguri and River Karola downstream of Jalpaiguri.

WEST FLOWING RIVERS (MAHI-SABARAMATI-NARMADA-TAPI) CATCHMENT

- River Mahi is conforming to the desired water quality at most of the monitoring locations except Mahi A/c Anas at Pardi (Banaswada); Sevalia; Virpur; Near Rajasthan Border at Kadana Dam and Mujpur in Gujarat; Downstream conf with R. Chap (Under Sagwara-Sarhi Rd. Bdg.) in Rajasthan; River Shivna at Ramghat (Mandsaur) in Madhya Pradesh; River Anas at Dahod (Kushalgarh), Dist. Panchmahal & River Panam at Lunawada in Gujarat.
- River Sabarmati is not conforming to the desired water quality criteria at Mahudi Jain Temple, 150 Km. from Origin in Gujarat.
- The mainstream of River Narmada is exceeding the desired water quality criteria at Hoshangabad Downstream & Chandod and River Gour Bhoga Door at Jabalpur. The water quality of River Narmada is broadly meeting the criteria for beneficial uses.
- The water quality of mainstream of river Tapi is exceeding criteria limits at Ajnand Village; Bhusawal Upstream and Uphad village in Maharashtra; ONGC Bridge (Surat); Near Bardoli (Kapp Bridge) Bardoli; Ukai Sherula Bridge in Gujarat whereas water quality of tributary streams River Girna at Malegaon & Jalgaon; River Kim at Sahol Bridge; River Denwa near Sarni Road Bdg and River Purna After confluence of Morna, Nandura Village is also not meeting the desired water quality criteria.

EAST FLOWING RIVERS (MAHANADI-BRAHMANI-BAITARNI-SUBARNAREKHA) CATCHMENT

- The water quality of mainstream of Mahanadi does not meet the criteria at Cuttack Downstream; Sambalpur Downstream; Cuttack FD/s; Paradeep D/s & Sambhalpur FD/s at Huma; Cuttack FD/s (Serua) at Sankhatrasa; Sambalpur U/s & A/c R.Tel (Sonepur D/s); Tikarpada; Paradeep U/s (Before Industrial activity at Paradeep) and A/c R.Tel (Sonepur D/s) in Orissa due to discharge of untreated sewage from cities. The tributary stream Hasdeo and Ib are meeting the the desired water quality criteria in respect of all parameters except Total coliform count in River Ib at Brajrajnagar (Intake) D/s & Sundargarh and Jharsuguda (Intake) in Orissa. The seven tributaries of Mahanadi i.e Kuakhai, Kathajodi, Birupa, Daya, Sankha, Tel and Kelo are not meeting the water quality criteria in River Kathajodi at Cuttack D/s; River Kuakhai at Bhubaneswar U/s & D/s; River Sankha U/s (D/s Mandira Dam); River Birupa at Choudwar and River Daya at Bhubaneswar FD/s-2 Km A/c Gangua Nallah in Orissa.
- The water quality of mainstream Brahmani is not meeting the desired criteria at Panposh U/s & D/s; Rourkela D/s & FD/s at Biritola; Dhenkanal D/s; Pattamundai; Kamalanga; Talcher FD/s; Bhuban; Dharmashala; Kabatabandha (Before Impact of Indl. Activity in Kalinganagar Area) and Bonaigarh in Orissa. The water quality of tributary streams is not meeting the criteria in River Koel at Basia Dam U/s; River Sankh at Bolba; River Karo at Lohojimi U/s in Jharkhand; River Kharasrota at Aul & Khanditara (D/s of Industrial Activities st Kalinga Nagar) and River Koel U/s - A/c River Karo in Orissa.
- The water quality of major tributary stream Baitarni is not complying with the criteria at Dhamra, Chandbali, Anandpur and Jajpur in Orissa.
- The water quality of river Subarnarekha is not meeting the criteria limit at Chandil Dam and Namkum Road Bridge; Gatalsud Dam Ranchi (Tatisilwai); Muri Road Bridge; Hatia Dam; downstream Jamshedpur (Tata Nagar) in Jharkhand and Rajghat near Bihar Border in Orissa.

PENINSULAR RIVERS (GODAVARI-KRISHNA-PENNAR-CAUVERY) CATCHMENT

- The water quality of river Godavari does not meet the criteria at Kapila- Godavari Sangam, Tapovan, Nasik D/s, Jalna Intake Water Pump House (Shahabad), Saikheda, U/s of Aurangabad Reservoir and Hanuman Ghat (Nashik City), Panchavati at Ramkund, Someshwar Temple, Jayakwadi Dam at Aurnagabad & D/s of Paithan at Pathegaon Bridge, Dhalegaon, U/s of Gangapur Dam at Nasik, U/s of Paithan at Jayakwadi, Latur Water Intake Near Pump House at Dhamegaon & Nanded, U/s of Aurangabad Reservoir at Kaigaon Tokka, Raheer and Nandur- Madmeshwar Dam in Maharashtra and Godavarikhani at Karimnagar, D/s of Ramanugundam, Ramagundam D/s Near FCI Intake Well at Karimnagar, Basara at Adilabad, Mancherial & Mancherial B/c of Rallavagu and Kamalpur D/s at Warangal & Ramagundam U/s at Karimnagar in Andhra Pradesh. Tributary streams Maner, Wardha, Wainganga, Bindusara, Manjeera, Kolar,

Purna, Kanhan, Wena, Darna, Nira, Penganga are exceeding the water quality criteria at some locations.

- The water quality of river Krishna does not meet the water quality criteria at Rajapur Weir & Kurundwad (Kolhapur), Krishna Bridge (Karad), Krishna-Venna Sangam at Mahuli, Wai & Kshetra Mahuli, Sangli, D/s of Islampur and Mahabaleshwar Dhom Dam in Maharashtra; Hamsala Deevi, Gadwal Bridge, Thangadi at Mahaboobnagar, Wadapally A/c with River Musi and A/c with Tungabhadra in Andhra Pradesh, D/s of Devasagar Bridge, U/s of Ugarkhurd Barrage & Ankali Bridge in Karnataka. BOD is exceeding the water quality criteria at all the locations on tributaries of River Krishna in Maharashtra. River Panchaganga & Bhima are potentially polluted at all the locations having higher BOD levels in Maharashtra. Total Coliforms and Faecal Coliforms are observed higher in River Bhima at all the locations in Karnataka. The tributary streams Ghatprabha, Malprabha, Musi, Nakkavagu, Hundri, Kundu, Tunghabhadra, Bhadra, Tungha, Kagina, Nira, Mula, Mula-Mutha, Mutha, Pawana, Indrayani, Vel, Ghod, Venna and Sina also not meeting the desired water quality criteria.
- The water quality of river Pennar is meeting the desired water quality criteria with respect to pH, DO, Conductivity, Fecal Coliform and Total Coliform except DO at A/c with Cheyyuru Somasile. BOD is exceeding the desired criteria at all the locations.
- The Water Quality of River Cauvery is not meeting the desired water quality criteria at Erode near Chirapalayam, Pitchavaram, Coleroon, Kumbakonam at Thanjavur, Komarapalayam at Namakal, Thanjavur, Mayiladuthurai at Nagapattinam, Tiruchirappalli D/s, Vairapalayam at Namakal, Mettur and Trichy (Grand Anaicut) in Tamil Nadu. The tributary streams Sarabanga, Thirumanimuthar, Arkavathi, Lakshmantirtha, Bhavani and Shimsha are also not meeting the desired water quality criteria.

MEDIUM & MINOR RIVERS CATCHMENT

- The Water Quality of River Damanganga is not meeting the desired water quality criteria at Kanchigaon D/s in Gujarat, Discharge Point Distillery, Zuari Cause Way Bridge, Daman Jetty, Motidaman and Village Namdha (Vapi) in Daman; River Dhadar at Kothada in Gujarat; River Kolak at Railway Bridge No. 313 Vapi & Patalia Bridge; River Kaveri on Bridge at Billimora-Valsad Road; River Mindhola at State Highway Bridge Sachin; River Ambika at Bilimora & Triveni Sangam near Somnath Temple; River Purna on bridge at Surat-Navsari Highway; River Mapusa on Culvert on Highway Mapusa-Panaji; River Sal near Hotel Leela Mobor Cavelossim & Pazorkhoni Cuncolim; River Bicholim at Varazan Nagar; River Khandepar at Opa- Ponda; River Kushawati near Bund at Kevona; River Patalganga at D/s of Kharpada Bridge; River Vaitarna near Road Bridge Gandhare Village; River Bhatsa at U/s & D/s Liberty Oil Mills and D/s Pise Dam; River Tansa near Road Bridge Village Dakewali; River Vashisti at U/s & D/s Three M Paper Mills Near Chiplun Water Intake Jackwell; River Surya at U/s Surya Dam, MIDC Pumping Station & Intake of Vasai-Virar W/S Scheme; River Kundalika at Salav Bridge, Arekhurd & Roha City; River Mithi; River Savitri at Ursa Kendre Nangalwadi, Shedav Doh, Ovale village, Muthavali village & Dadli Bridge; River Kalu

at Atale Bridge; River Patalganga at Savroli Bridge, D/s Kharpada Bridge & near Intake of MIDC W/W; River Kan near Sakri Water Works; River Muchkundi at Waked; River Kavvai at Kuttiyol Palam; River Puzhackal at Puzhackal Bridge; River Ramapuram at Ramapuram Bridge; River Mogral at Mogral Bridge; River Pamba at Chengannur (Pamba Down) & Thakazhy; River Karuvannur at Karuvannur Bridge; River Meenachil at Kidangoor, River Pullur at Pullur Bridge; River Thirur at Thalakkadathur Bridge; River Kuppam at Thaliparamba & Rayarom; River Manimala at Kalloopara & Thondra; River Achenkoil at Chennithula; River Keecheri at Vadakkanchery Bridge & River Neelaswaram at Nambiarkal Dam & Hosdurg; River Uppala at Uppala Bridge; River Kallai at Kallai Bridge; River Corapuzha at Kanayankode; River Chaliyar at Chungapally; River Periyar near Alwaye-Eloor, Purappallikavu & Kalamassery; River Ancharakandy at Meruvamba; River Karmana at Moonnattumukku; River Kadambayar at Brahmapuram & Manckakadavu; River Chitthrapuzha at Irumpanam; River Manjeswar at Bajrakkara Bridge; River Coringa & Gautami-Godavari in Pondicherry; River Mahe; River Rushikulya at Ganjam D/s in Orissa; River Vasista at Salem in Tamil Nadu; River Tambiraparani at Arumuganeri, Kallidai Kurichi in Tirunelveli, D/s of Palayamkottai & Vellakoil in Tamil Nadu; River Kali at D/s of West Coast Paper Mill in Karnataka; River Palar at Vaniyambadi Water Supply Head Work in Tamil Nadu; River Budhabalanga at U/s & D/s Baripada Town; River Nagavalli at Rayagada D/s, Jaykaypur D/s & Penta U/s Jaykaypur Town; River Kerandi at Intake Well of Nalco Refinery in Hal- Sunabeda; River Vamsadhara at Muniguda D/s in Orissa; River Markanda at D/s Kala Amb in Haryana; River Sukhana at Parwanoo in Himachal Pradesh; Kodra Dam at Mount Abu, River Bandi at Hemawas Dam; River Jawai at Jawai Dam; River Ghaggar When Entering In Rajasthan From Haryana near Rd No. 629 in Rajasthan, U/s & D/s Dhakansu Nallah in Punjab; River Ghaggar at Ottu Weir, Chandarpur Syphon, GH-1 Road Bridge Sirsa & D/s Surajpur in Haryana and at D/s Chhatbir , U/s & D/s Sardulgarh, U/s & D/s Jharmal Nadi, Bankarpur Dera Bassi, Moonak, D/s Patiala, Mubarakpur Rest House & Ratanheri in Punjab; River Kharkhla at Jaintia Hills in Meghalaya; River Nambul at Bishnupur, Hump Bridge, Heirangoithong, Naoremthong, Samusang & Singda Dam; River Imphal at Kangla Moat; River Iril at Lilong; River Lokchao at Bishnupur in Manipur; River Imphal at Kangla Moat; River Barak at Senapati; River Thoubal at Litan, Phadom & Yairipok in Manipur; River Maha at Chandel; River Manipur at Sekmaijan; River Wangjing at Heirok & Wangjing Thoubal; River Umtrew at Byrnihat East; River Haora at Chandrapur; River Gumti at D/s South Tripura in Tripura and River Myntdu in Meghalaya.

WATER QUALITY OF CREEKS/CANALS/LAKES/TANKS/PONDS

- Majority of creeks in Gujarat and (Mumbai) Maharashtra and sea water in the vicinity of Mumbai are having high concentration of BOD due to discharge of waste water from metropolitan region except Sea water at Gopalpur, Puri and Paradeep in Orissa whereas Conductivity is observed very high due to marine water insurgence.

- The Water Quality of W.Yam. Canal at Damla Downstream of Yamuna Nagar & D/s after receiving Industrial & Municipal Sewage effluents in Haryana; Agra Canal (Madanpur Khadar) in Delhi; Kharda Canal (North 24 Parganas) & NOAI Canal (North 24 Parganas) in West Bengal; Gurgaon Canal, GC-1,(Near Badarpur Border) in Haryana; Near Pragati Vidyabhawan (Agartala) in Tripura; Morambamarine, Thoubal in Manipur; Cumberjua Canal Corlim in Goa; Near Ganga Nagar Motibridge in West Bengal; Naubazar (Cuttack City), Atharabanki (Water Intake Point, IFFCO) & Jobra (Origin of Talaganda Canal) in Orissa and Upper Ganga Canal D/s Harikipauri, Haridwar in Uttarakhand.
- Lakes, Tanks and Ponds having high concentration of organic matter and not complying to the standard limits for BOD are Nalla Chevuru, Mallapur Tank, Durgam Chevuru, Laxminarayana Chevuru, Miralam Lake, Pedda Chevuru, Hussain Sagar Lake, Sai Chevuru, Kistareddypet Tank, Noor Md. Kunta, Gandigudem Tank, Saroonagar Lake, Pulicate Lake, Bibinagar Tank, Asani Kunta, Kajipally Tank, Premajipet Tank, Vembanadu Lake, Ashthamudi Lake, Kayamkulam Lake, Paravur Lake , Kodungalloor Lake, Bhadrakali Chevuru, Himayat Sagar Lake, Dharmasagar Tank, Bhadrakali Chevuru in Andhra Pradesh; Udhagamadalem Lake, Pulicate Lake, Kodai Kanal Lake, Porur Lake, Veeranam Lake, Redd Hills Lake & Poondi Lake in Tamil Nadu; Ulsoor Lake & Heballa Valley Lake in Karnataka; Salaulim Lake & Mayem Lake in Goa, Padmanabha Swamy Temple Pond, Punnamada Kayal Lake, Kayamkulam Lake, Kodungalloor Lake, Oruvathilkotta Lake & Vembanadu Lake in Kerala; Pushkar Lake, Jaisamand Lake, Lodha Talab & Jalmahal Lake, Siliserh Lake, Nakki Lake, Jet Sagar Lake & Udaisagar Lake & Gape Sagar Lake, Jaisamand Lake, Siliserh Lake, Jalmahal Lake, Lodha Talab, Fateh Sagar Lake in Rajasthan; Narsimehta Lake, Ajwah Lake & Nalsarovar in Gujarat; Shahpura Lake, Upper Lake at Karbala Talab, Yatch Club, Bairagarh Club & Intake Point Bhopal, Lower Lake, Govindgarh Lake, Janunia Talab, Periat Lake and Kerwa Dam in Madhya Pradesh; Moticher Lake; Laxmi Pond & Maahil Pond, Maahil Pond, Samarpur Jheel in Uttar Pradesh; Riwalsar Lake & Khaziar Lake in Himachal Pradesh; Mansar Lake & Surinsar Lake in Jammu & Kashmir; Harike Lake in Punjab; Subhagya Kunda Pond, Elangabeel System Pond, Bor Beel, Botodriwa Satra Pond, Hardoi Pukhuri, Sivasagar Pond, Goysagar Tank, Gaurisagar Tank & Ganga Pukhuri in Assam; Lilong Pukhuri, Kongba Bazar Pond, Kakwa Bazar Pond, Lalambung Pond, Chanam Pukhuri, Moidangpok Pond, Langmeidong Pukhuri, Hiranmei Pukhuri, Maibam Lokpaching Pond, Nangthem Pukhuri, Lamjao Pukhuri, Bor Pukhuri, Padum Pukhuri, Dighali Pukhuri, Bishnu Puskar Pukhuri, Deepar Beel, Rajadinia Pukhuri, Ganga Pukhuri, Jaipal Pukhuri, Saran Beel, Raja Pukhuri, Mahamaya Mandir Pukhuri, Gala Beel, Gophur Pond, Gaurisagar Pond, Daloni Beel, Baskandi Pond, Rajmaw Pukhuri, Mer Beel; Kongba Bazar Pond, Kakwa Bazar Pond, Pumlun Lake & Ngairangbam Pond in Manipur; Umiam Lake & Ward Lake in Meghalaya and Laxmi Narayan Bari & Rudrasagar in Tripura; Umiam Lake & Ward Lake in Meghalaya;Tarkeshwar Lake at Hanuman Ghat, Hathishala Ghat, Mainh Ghat & Rabindrasarovar in West Bengal; Narendra Pokhari, Swetaganga Pond, Markanda Pokhari, Bindusagar Pond & Indradyumna Pond, Parvati Sagar & Chilka Lake in Orissa and Dimna Lake in Jharkhand.

COMPARATIVE ASSESSMENT OF B.O.D. LEVELS IN RIVERS

- The comparative assessment of rivers exceeding BOD levels are compared with the observations of 2010. The BOD concentration level has increasing trend in 64 rivers and decreasing trend in 59 rivers however River Purna (Tapi) has seen no change in BOD level (Table - I).

Table-I: Comparative Assessment of BOD levels in Rivers							
River	B.O.D. (mg/l)		Trend	River	B.O.D. (mg/l)		Trend
	2011	2010			2011	2010	
Kala Amb	535.0	1025.0	Decreasing	Ghaggar	68.0	70.0	Decreasing
Kundalika	12.0	250	Decreasing	Amravati (Tapi)	10.0	12.0	Decreasing
Hindon	50.0	278	Decreasing	Girna	10.0	12.0	Decreasing
Khan	1.3	120	Decreasing	Gomai	8.0	10.0	Decreasing
Bhavani	6.2	93.0	Decreasing	Wena	12.0	13.6	Decreasing
Mula	19.5	88.5	Decreasing	Gomti	10.5	12.0	Decreasing
Mula-Mutha	21.5	79.0	Decreasing	Hiwara	8.0	9.0	Decreasing
Mutha	23.5	68.0	Decreasing	Kalisot	5.4	6.4	Decreasing
Yamuna	41.0	84.0	Decreasing	Nira (Godavari)	8.5	9.2	Decreasing
Pawana	19.5	58.0	Decreasing	Kharkhla	7.5	7.8	Decreasing
Indrayani	13.0	46.0	Decreasing	Purna (Tapi)	14.0	14.0	Same
Varuna	27.6	54.0	Decreasing	Umtrew	8.8	8.5	Increasing
Godavari	37.0	60	Decreasing	Bindusar	7.4	7.0	Increasing
Urmodi	7.5	28.7	Decreasing	Bichia	8.5	8	Increasing
Venna	10.0	30.0	Decreasing	Mahananda	6.6	5.5	Increasing
Cauvery	7.2	27.0	Decreasing	Kansi	6.1	4.9	Increasing
Kathajodi	3.9	22.5	Decreasing	Brahmani	6.8	5.6	Increasing
Bhima	22.0	38.5	Decreasing	Chandrabhaga	10.5	9.2	Increasing
Wainganga	12.0	28.0	Decreasing	Koyna	9.0	7.5	Increasing
Nira (Krishna)	13.0	28.0	Decreasing	Kuakhai	6.5	5	Increasing
Morna	6.6	20.0	Decreasing	Sonai	6.0	4.5	Increasing
Mahanadi	3.6	14.3	Decreasing	Pennar	6.0	4.4	Increasing
Rapti	7.5	18.0	Decreasing	Teesta	6.2	4.4	Increasing
Kolar	8.0	18.0	Decreasing	Darna	12.0	10.0	Increasing
Bharalu	50.0	58	Decreasing	Waghur	10.0	8.0	Increasing
Satluj	32.0	40.0	Decreasing	Damodar	7.8	5.8	Increasing
Panzara	10.0	18.0	Decreasing	Burhidihing	9.8	7.8	Increasing
Mor	7.0	14.0	Decreasing	Surya	7.0	4.4	Increasing
Manjira	7.6	14.0	Decreasing	Digboi	7.0	4.3	Increasing
Purna (Godavari)	7.7	14.0	Decreasing	Brahmaputra	9.2	6.3	Increasing
Chambal	42.0	48	Decreasing	Kshipra	28.0	25	Increasing
Kan	10.0	16.0	Decreasing	Nakkavagu	18.0	15.0	Increasing

Tapi	10.0	16.0	Decreasing	Vel	14.0	11.0	Increasing
Malei	1.2	6	Decreasing	Karola	6.1	3.1	Increasing
Assonora	2.3	7.0	Decreasing	Disang	6.3	3.2	Increasing
Bicholim	3.9	8.1	Decreasing	Chuntkol	7.0	3.8	Increasing
Kali (M&M)	4.3	8.4	Decreasing	Maner	9.5	6.0	Increasing
Ganga	11.0	15.0	Decreasing	Sina	12.2	8.4	Increasing
Titur	10.0	14.0	Decreasing	Ramganga	12.4	8.6	Increasing
Bori	8.0	12.0	Decreasing	Rihand	7.2	2.9	Increasing
Burai	8.0	12.0	Decreasing	Dhansiri	6.8	2.4	Increasing
Deepar Bill	6.4	10.4	Decreasing	Tambiraparani	8.0	3.1	Increasing
Mindhola	4.0	8	Decreasing	Patalganga	16.0	11.0	Increasing
Dwarka	12.2	15.4	Decreasing	Tungabhadra	8.2	3.0	Increasing
Dhadar	19.0	22	Decreasing	Krishna	16.0	10.0	Increasing
Kanhan	11.0	14.0	Decreasing	Penganga	15.0	9.0	Increasing
Ghod	10.5	13.5	Decreasing	Kadambayar	9.4	3.4	Increasing
Shivna	4.0	7	Decreasing	Vaitarna	10.0	3.5	Increasing
Karmana	18.0	20.4	Decreasing	Bhatsa	10.0	3.4	Increasing
	B.O.D. (mg/l)				B.O.D. (mg/l)		
River	2011	2010	Trend	River	2011	2010	Trend
Sirsa	15.0	8.0	Increasing	Pedhi	46.0	16.4	Increasing
Tansa	11.0	4.0	Increasing	Thirumanimuthar	83.7	54.0	Increasing
Manusmar	10.0	2.7	Increasing	Musi	145.0	110.0	Increasing
Suswa	38.0	30.0	Increasing	Panchaganga	67.5	28.0	Increasing
Harbora	12.0	3.5	Increasing	Churni	64.0	3.7	Increasing
Kalu	15.0	4.0	Increasing	Sarabanga	85.0	5.6	Increasing
Nambul	30.5	19	Increasing	Kali (W)	369.0	287	Increasing
Ram Rekha	15.0	3.5	Increasing	Matha Bhanga	90.0	5.4	Increasing
Kalinadi (E)	161.0	146	Increasing	Wardha	110.0	25.0	Increasing
Budhabalanga	22.0	2.2	Increasing	Mithi	175.0	75.0	Increasing
Vindyadhari	26.8	6.6	Increasing	Damanganga	354.0	32	Increasing
Betwa	104.0	78	Increasing	Vasista	340.0	5.0	Increasing
Jalangi	28.0	1.9	Increasing	Savitri	525.0	5.4	Increasing

The variation in number of rivers exceeding the norm is by virtue of additional monitoring locations taken up during 2011. The rivers identified as polluted in various categories is based on consistently observed higher pollution level in contrast to the water quality criteria. The strengthening of monitoring network has augmented the coverage of rivers not covered in the network previously. It is worthwhile to define a river as polluted if observed consistent exceedences are verified and validated temporally for a considerable period.

COMPARATIVE ASSESSMENT OF B.O.D. LEVELS IN LAKES/PONDS/TANKS

- The comparative assessment of lakes, tanks & ponds exceeding BOD levels are compared with the observations of 2010. The BOD concentration level has increasing trend in 61 lakes, tanks & ponds and decreasing trend in 44 lakes, tanks & ponds however 4 lakes & ponds have seen no change in BOD level (Table – II).

Table-II: Comparative Assessment of BOD levels in Lakes, Tanks & Ponds							
Name of Water Body	B.O.D. (mg/l)		Trend	Name of Water Body	B.O.D. (mg/l)		Trend
	2011	2010			2011	2010	
Asani Kunta in Andhra Pradesh	320	331.0	Decreasing	City Lake of Nadiad in Gujarat	10	24.0	Decreasing
Kajjipally Tank in Andhra Pradesh	115	346.0	Decreasing	Bishnu Puskar Pukhuri Pond in Assam	8.8	11	Decreasing
Mallapur Tank in Andhra Pradesh	70	90.0	Decreasing	Deepar Beel Pond in Assam	8.2	16	Decreasing
Noor Md. Kunta in Andhra Pradesh	43	78.0	Decreasing	Heballa Valley Lake in Karnataka	8	11.0	Decreasing
Sai Chevuru in Andhra Pradesh	25	63.0	Decreasing	Udaisagar Lake in Rajasthan	7.8	9	Decreasing
Kistareddyptet Tank in Andhra Pradesh	24	67.0	Decreasing	Botodriya Satra Pond in Assam	7.8	8	Decreasing
Laxmi Pond at Jhansi in Uttar Pradesh	22	33.0	Decreasing	Bhadrakali Chevuru in Andhra Pradesh	7.2	8.5	Decreasing
Indradyumna Tank in Orissa	13	13.5	Decreasing	Himayat Sagar Lake in Andhra Pradesh	7	8.8	Decreasing
Kodai Kanal in Tamilnadu	12.7	14.1	Decreasing	Ganga Pukhuri in Assam	6.8	8.6	Decreasing
Dighali Pukhuri in Assam	11	24	Decreasing	Jaipal Pukhuri in Assam	6.2	9.8	Decreasing
Name of Water Body	B.O.D. (mg/l)		Trend	Name of Water Body	B.O.D. (mg/l)		Trend
	2011	2010			2011	2010	
Dharmasagar Tank in Andhra Pradesh	6.2	7.3	Decreasing	Durgam Chevuru in Andhra Pradesh	80	34.0	Increasing
Rajapukhuri Pond in Assam	5.2	10.2	Decreasing	Nalla Chevuru in Andhra Pradesh	66	34.0	Increasing
Mahamaya Mandir Pukhuri Pond in Assam	5	9.6	Decreasing	Hussain Sagar Lake in Andhra Pradesh	58	30.0	Increasing
Gala Beel Pond in Assam	4.8	11.2	Decreasing	Elangabeel System Pond in Assam	50	44	Increasing
Sree Padmanabha Swamy Temple Pond in Kerala	4.8	5.6	Decreasing	Narendra Pokhari in Orissa	45	9.5	Increasing
Gophur (Tank) Pond in Assam	4.6	10.8	Decreasing	Ulsoor Lake in Karnataka	43	13.0	Increasing
Bibinagar Tank in Andhra Pradesh	4.6	5.0	Decreasing	Premajipet Tank in Andhra Pradesh	39	32.0	Increasing
Gaurisagar (Tank) Pond in Assam	4.5	5.4	Decreasing	Laxminarayana Chevuru in Andhra Pradesh	37	21.8	Increasing
Oruvathilkotta Lake in	4.4	9.6	Decreasing	Bindusagar Pond in	31	18	Increasing

Kerala				Orissa			
Janunia Talab in Madhya Pradesh	4.3	4.6	Decreasing	Miralam Lake In Andhra Pradesh	26	16.0	Increasing
Daloni Beel Lake in Assam	4.2	6.4	Decreasing	Dudhpukur in West Bengal	24	8.6	Increasing
Rajmaw Pukhuri Pond in Assam	4	5.1	Decreasing	Udhagamadalem Lake in Tamil Nadu	20.6	15.0	Increasing
Moti Jheel in Bihar	3.5	10.0	Decreasing	Maahil Pond in Uttar Pradesh	19	2.1	Increasing
Goysagar Tank in Assam	3.4	7	Decreasing	Khaziar Lake in Himachal Pardesh	18	17.0	Increasing
Fateh Sagar Lake in Rajasthan	3.4	3.45	Decreasing	Riwalsar Lake in Himachal Pardesh	18	12.0	Increasing
Alappuzha Lake in Kerala	3.3	2.8	Decreasing	Markanda Pokhari in Orissa	14	10.5	Increasing
Kayamkulam Lake in Kerala	3.3	3.6	Decreasing	Sursagar Lake in Gujarat	12	10	Increasing
Tighi Talab in Bihar	3	10.0	Decreasing	Umiam Lake in Meghalaya	12	10.0	Increasing
Poondi Lake in Tamilnadu	3	4.0	Decreasing	Subhagya Kunda Pond in Assam	12	9.5	Increasing
Sivasagar Tank in Assam	2.8	8.4	Decreasing	Borpukhuri Pond in Assam	11.6	6.4	Increasing
Chand Dubi Beel in Assam	2.6	3.5	Decreasing	Parvati Sagar in Orissa	11	8.66	Increasing
Dhudhiya Talav in Gujarat	2.2	3.1	Decreasing	Padumpukhuri Pond in Assam	11	8	Increasing
Loktak Lake in Manipur	1.9	12	Decreasing	Pushkar Lake in Rajasthan	9.5	6.16	Increasing
Pulicate Lake in Andhra Pradesh	1.6	3.8	Decreasing	Shahpura Lake in Madhya Pradesh	8.5	3.9	Increasing
Gandigudem Tank in Andhra Pradesh	12	12.0	Same	Rajadinia Pukhuri Pond in Assam	8	6.4	Increasing
Ward Lake in Meghalaya	9	9.0	Same	Mirikh Lake in West Bengal	8	5.9	Increasing
Hordai Pukhuri in Assam	4.2	4.2	Same	Pongdam Lake in Himachal Pardesh	7.9	0.7	Increasing
Rudrasagar in Tripura	3.4	3.4	Same	Rabindrasarovar National Lake in West Bengal	7.6	6.3	Increasing
Swetaganga Pond in Orissa	190	21	Increasing	Belboni Lake in West Bengal	6.8	5.0	Increasing
Saroonagar Lake in Andhra Pradesh	136	30.0	Increasing	Delo Lake in West Bengal	6.8	3.5	Increasing
Pedda Chevuru in Andhra Pradesh	85	36.0	Increasing	Bor Beel Pond in Assam	6.7	5	Increasing
	B.O.D. (mg/l)				B.O.D. (mg/l)		
Name of Water Body	2011	2010	Trend	Name of Water Body	2011	2010	Trend
Kochbihar Lake (Sagar Dighi) in West Bengal	6.7	4.8	Increasing	Baskandi Pond in Assam	4.2	4	Increasing
Sahebbandh in West Bengal	6.4	4.0	Increasing	Mayem Lake in Goa	4.2	3.1	Increasing
Salaulim Lake in Goa	6.3	1.7	Increasing	Veeranam Lake in Tamil Nadu	3.9	1.0	Increasing
Saran Beel Pond in	6.1	2.3	Increasing	Mer Beel Lake in	3.8	3.6	Increasing

Assam				Assam			
Ashthamudi Lake in Kerala	5.9	4.8	Increasing	Laxmi Narayan in Tripura	3.8	3.2	Increasing
Sinchal Lake in West Bengal	5.9	3.2	Increasing	Nakki Lake in Rajasthan	3.8	1.75	Increasing
Anshupa Lake in Orissa	5.7	4.1	Increasing	Chilka Lake in Orissa	3.7	2.3	Increasing
Ramgarh Lake in Uttar Pradesh	5.6	5.4	Increasing	Kawar Lake in Bihar	3.6	3.0	Increasing
Upper Lake in Madhya Pradesh	5.5	2.9	Increasing	Periat Tank in Madhya Pradesh	3.6	2.4	Increasing
Harike Lake in Punjab	5.1	2.6	Increasing	Suraj Kund in Bihar	3.5	3.0	Increasing
Ajwah Lake in Gujarat	5	0.22	Increasing	Naini Lake in Uttarakhand	3.2	2.8	Increasing
Samarpur Jheel Lake in Uttar Pradesh	4.8	4.6	Increasing	Kodungalloor Lake In Kerala	3.2	2.2	Increasing
Lower Lake in Madhya Pradesh	4.5	4.1	Increasing	Renuka Lake in Himachal Pradesh	3.2	0.7	Increasing
Govindgarh Tank in Madhya Pradesh	4.3	4.2	Increasing	Kerwa Dam in Madhya Pradesh	3.1	2.1	Increasing

LOWEST OBSERVED D.O. LEVELS IN RIVERS

- The level of DO is observed more than 4 in river Narmada, Brahmani, Baitarni and Ganga throughout the year to sustain aquatic life whereas, the values less than 4 are observed in stretches of rivers at a number of locations downstream of urban settlements due to discharge of untreated/partially treated municipal wastewater which is responsible for high oxygen demand. During 2011 the lowest DO (one of the most important indicators of pollution) levels observed in rivers are arranged in ascending order are summarised in Table –III.

Table III: Lowest observed DO levels in Rivers			
Rivers	DO (mg/l)	Rivers	DO (mg/l)
Bharalu, Churni, Hindon, Karamana, Mathabhangha, Sirsa & Yamuna	0	Mula-Mutha & Panchaganga	1.3
Nambal & Nuton Basti	0.2	Damanganga & Nira	1.4
Dwarka, Kadambayar & Kalingarayan Canal	0.3	Indrayani & Rihand	1.5
Vindiyadhari	0.4	Kodra Dam & Suswa	1.6
Banas & Vasista	0.5	Cauvery, Krishna, Muneru & Bandi	1.7
Irumpanam, Musi & Sarabanga	0.6	Pedhi & Ghaggar	1.8
Mutha & Kala Amb	0.8	Ram Rekha	2
Thirumanimuthar	0.9	Maner	2.1
Dhansiri, Mula & Pawana	1	Deepar Bill & Vel	2.3
Bhima & Kolak	1.1	Periyar	2.4
Godavari, Kshipra, Mithi & Sukhana	1.2	Gomti & Savitri	2.5
Rivers	DO (mg/l)	Rivers	DO (mg/l)
Rupnarayan	2.6	Mapusa & Ramapuram	3.3
Ghod, Kalu, Manjra & Purna	2.7	Damodar	3.4
Chambal & Manjeswar	2.8	Disang	3.5

Imphal, Kallai, Puzhackal, Venna & Wangjing	2.9	Bhavani, Chathe, Thirur, Waghur & Wardha	3.6
Coringa, Darna, Dzu, Panam & Subarnarekha	3	Kundalika, Lokchao & Ujad	3.7
Arkavathi, Kanhan, Lilong, Parvati & Penganga	3.1	Gour, Patalganga & Satluj	3.8
Jawai Dam, Lakshmantirtha, Kali Sindh, Mahi, Tapi & Wena	3.2	Sal, Pennar, Sina & Wainganga	3.9

HIGHEST OBSERVED COLIFORM LEVELS IN RIVERS

- Total Coliform and Faecal Coliform count (one of the most important indicators of pollution) are observed very high in rivers at a number of locations. The river Mahi and Pennar are relatively clean rivers as the number of Total Coliform and Faecal Coliform count are respectively less than criteria limit of 5000 MPN/100 ml and 2500 MPN/100 ml respectively. The highest TC & FC levels observed in rivers are summarised in Table – IV.

Table-IV: Highest observed Total Coliform & Faecal Coliform levels in Rivers

Rivers	Total Coliform (MPN/100ml)	Faecal Coliform (MPN/100ml)	Rivers	Total Coliform (MPN/100ml)	Faecal Coliform (MPN/100ml)
Yamuna	16×10^8	11×10^8	Ramganga	28×10^3	7×10^3
Kalinadi	11×10^8	11×10^7	Daha	24×10^3	9×10^3
Kalinadi (E)	11×10^8	46×10^7	Dwarakeshwar	24×10^3	21×10^2
Hindon	93×10^5	43×10^6	Mayurakshi	24×10^3	8×10^3
Matha Bhanga	9×10^6	5×10^6	Ram Rekha	24×10^3	9×10^3
Damodar	8×10^6	175×10^4	Rushikulya	24×10^3	13×10^3
Churni	3×10^6	24×10^5	Sirsa	24×10^3	9×10^3
Ganga	25×10^5	11×10^5	Tapi	24×10^3	43×10^2
Karola	22×10^5	26×10^4	Karamana	22×10^3	11×10^3
Mahananda	17×10^5	39×10^4	Birupa & Ib	17×10^3	13×10^3
Kansi	16×10^5	14×10^4	Bhima	16×10^3	16×10^3
Rupnarayan	16×10^5	17×10^4	Irumpanam	16×10^3	35×10^2
Silabati	16×10^5	35×10^4	Kagina, Krishna & Tungabhadra	16×10^3	9×10^3
Thirumanimuthar	16×10^5	92×10^4	Bharalu	15×10^3	2×10^3
Vasista	16×10^5	92×10^4	Bhogdoi	15×10^3	910
Sarabanga	92×10^4	54×10^4	Brahmaputra	15×10^3	730
Suswa	72×10^4	15×10^4	Deepar Bill	15×10^3	3×10^2
Teesta	39×10^4	225×10^3	Kerandi	15×10^3	43×10^2
Kaljani	32×10^4	26×10^4	Kharasrota	14×10^3	94×10^2
Vindiyadhari	28×10^4	22×10^4	Sai	14×10^3	11×10^3
Dwarka	16×10^4	9×10^4	Serua	13×10^3	79×10^2
Barakar	16×10^4	3×10^4	Vansadhara	94×10^2	49×10^2
Betwa	16×10^4	11×10^4	Purna	93×10^2	23×10^2
Rivers	Total Coliform (MPN/100ml)	Faecal Coliform (MPN/100ml)	Rivers	Total Coliform (MPN/100ml)	Faecal Coliform (MPN/100ml)
Kathajodi & Mahanadi	16×10^4	16×10^4	Palar	92×10^2	17×10^2
Gomti	13×10^4	94×10^3	Kadambayar	9×10^3	16×10^2
Alaknanda	11×10^4	46×10^3	Puzhackal	9×10^3	9×10^2

Ghaggar	11×10^4	4×10^4	Harbora	8×10^3	3×10^3
Varuna	11×10^4	79×10^3	Kim	75×10^2	43×10^2
Brahmani & Budhabalanga	92×10^3	35×10^3	Saryu	71×10^2	49×10^2
Kuakhai	92×10^3	54×10^3	Cauvery	62×10^2	340
Chambal	9×10^4	4×10^4	Kusei	54×10^2	23×10^2
Satluj & Jalangi	9×10^4	5×10^4	Dhous	5×10^3	17×10^2
Baitarni	54×10^3	24×10^3	Koshi	5×10^3	3×10^3
Daya & Dhenkanal	54×10^3	35×10^3	Manusmar	5×10^3	13×10^2
Sankha	54×10^3	24×10^3	Periyar	5×10^3	35×10^2
Mandakini	46×10^3	21×10^2	Sone	5×10^3	17×10^2
Subarnarekha	43×10^3	15×10^3	Thaliparamba	5×10^3	240
Aul	35×10^3	24×10^3	Uppala	5×10^3	4×10^3
Koel	35×10^3	17×10^3	Myntdu	35×10^2	28×10^2
Nagavalli	35×10^3	14×10^3			

STATEWISE GROUNDWATER QUALITY

- The groundwater quality assessment in 23 States/UTs with respect to conductivity & nitrate and is summarised in Table-V.

Table-V: Statewise Groundwater Quality Ranges (Conductivity and Nitrate+Nitrite-N)		
States/UTs	Conductivity ($\mu\text{mhos/cm}$)	Nitrate + Nitrite-N (mg/l)
Andhra Pradesh	211-6995	0.2-63.6
Assam, Meghalaya, Mizoram and Tripura	59-348	-34.0
Chattisgarh & Madhya Pradesh	340-2182	0.0-8.5
Himachal Pradesh, Chandigarh and Punjab	226-1409	0.0-6.6
Kerala	54-891	0.1-7.6
Orissa	120-1396	0.5-11.8
Pondicherry and Tamil Nadu	143-3417	0.05-9.4
Daman & Dadra Nagar Haveli	515-2506	0.3-5.1
Maharashtra	50-5670	0.1-23.5
Gujarat	546-12018	0.26-50
Rajasthan	685-21500	0.08-9.8
Uttar Pradesh and Uttarakhand	225-3163	0.0-34.5
Bihar	356-1015	0.0-0.07
West Bengal	123-8600	0.0-25.5

CHAPTER 1

WATER AVAILABILITY, POLLUTION AND WATER QUALITY CRITERIA

1.1 Availability of Water Resources

The availability and the quality of the fresh water resources is the most pressing of the many environmental challenges on the national horizon in India. The stress on water resources is from multiple sources and the impacts can take diverse forms. Geometric increase in population coupled with rapid urbanization, industrialization and agricultural development has resulted in high impact on quality and quantity of water in India. The urban population has increased almost 11 fold in last 100 year period from 26 million to 285 million. Its share in total population has also increased almost 3 fold from 10.84% in 1901 to 28.5% in 2001, which indicates faster growth of urban population. One of the conspicuous features of urbanization in India is the skewed distribution of population with as much 28.3% of urban population in 35 metro cities alone. Unregulated growth of urban areas, particularly over the last two decades, without infrastructural services for proper collection, transportation, treatment and disposal of domestic wastes led to increased pollution & health hazards. The municipalities and such other civic authorities have not been able to cope up with this massive task which could be attributed to various reasons including erosion of authority, inability to raise revenues and inadequate managerial capabilities. That is why it became necessary to launch the Ganga Action Plan and subsequently the National River Action Plan, which is essentially addressed to the task of trapping, diversion and treatment of municipal wastewater. The situation warrants immediate redressal through radically improved water resource and water quality management strategies.

The availability of freshwater resources is declining in India on per capita basis due to increase in population decades from 345 million during 1947 to 1130 million during 2007 in six decades. Depletion of available freshwater resources, falling ground water levels and deteriorating water quality are all posing a variety of challenges in managing India's water resources. Competing demands from the diversified needs of a growing population are quite often leading towards disputes among users. The per capita water availability in India is raising concerns. The annual per capita availability of renewable freshwater in the country has fallen from around 6042 cubic meters in 1947 to 1845 cubic meters in 2007. Given in projected increase in population by the end of 21st century, the per capita availability is likely to drop below 1000 cubic meters a situation labeled as water scarcity. From the East to the West and from the North to the South, water has defined life in the Indian subcontinent for thousands of years. On an average, the combination of rainfall, surface and groundwater resources have been sufficient in providing adequate water to the Indian population. Rise in demand and development pressures are changing the characteristics of water in India. Erosion in the watershed due to the fast growing development and poor land management practices is increasing siltation and changing stream hydraulics. Groundwater reserves are becoming more and more depleted as surface water sources have become too polluted for human use.

Water security is emerging as an increasingly important and vital issue for India. Many Indian cities are beginning to experience moderate to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialization and urbanization. These shortages would be further aggravated by receding of glaciers and dwindling fresh water resources. Population stress, irrigation requirements and industrialization are the major pressures for water insecurity. The environmental challenges of water resource development and management in India are expected to manifest themselves more explicitly and rapidly in the coming years. These environmental challenges may be addressed through four broad approaches (1) Improving efficiencies and minimizing losses (2) Recharging groundwater aquifers (3) Abatement and treatment of water pollution (4) Reuse and recycling of wastewater.

Water security is emerging as an increasingly important and vital issue for India. Many Indian cities are beginning to experience moderate to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialization and urbanization. Another concern in the region is the growing competition over shared water resources. Conflict over freshwater resources can strain relationships between various states sharing these resources.

The two main sources of fresh water in India are rainfall and the snowmelt of glaciers in the Himalaya. Although reliable data on the snow cover in India is not available, it is estimated that some 5,000 glaciers cover about 43,000 sq. km in the Himalayas with a total volume of locked water estimated at 3,870 km³. Considering that about 10,000 sq. km of this is located in Indian Territory, the total water yield from snowmelt contributing to the river run-off in India may be of the order of 200 km³/year. India receives an average annual precipitation of approximately 4,000 bcm in the form of rainfall and snow. After accounting for percolation, evaporation and other losses, less than 50 per cent (1,869 bcm) is the total surface flow, including regenerating flow from groundwater and the flow from neighbouring countries. In view of the constraints of topography, uneven distribution over space and time, water storage technologies, and inter-state issues, the total utilizable quantity of water is estimated to be 1,122 bcm/year, of which 690 bcm and 431 bcm are utilizable surface and groundwater, respectively.

1.1.1 Irrigation Requirement

In India, the primary use of water other than the domestic is for agriculture. As more food will be needed in the future to feed the growing population, there will be greater demands placed on the region's water supply. Requirement is likely to increase in future as agriculture is extremely dependent on adequate freshwater supply. About half of the water that is used for irrigation is lost to seepage and evaporation. Irrigation is also a major concern for India as over 30 per cent of the total cropland is under irrigation. While irrigation is vital for increasing crop yields, it can also be extremely dangerous when mismanaged and could result in erosion, water-logging and salinization of the soil, rendering it less productive or uncultivable. Poorly managed irrigation can also result in water pollution and spread of water-borne diseases.

1.1.2 Industrial Requirement

Another important factor that influences the state of water security in India, is the extent of industrialization. In India, the maximum utilization was 5 per cent in 2000 (FAO 2000). Industrial activity requires large amounts of freshwater for activities such as boiling, cleaning, air-conditioning, cooling, processing, transportation and energy production. As the country rapidly industrializes, greater quantities of water will be required. The positive side of this trend is that water used in industrial processes can be recycled, unlike in agriculture where very little of it is actually consumed.

1.1.3 Municipal Requirement

The water policy has ranked the requirement of water for drinking purposes as prime. It is estimated that about 50 billion litres of municipal water is required every day based on the population figures of urban India which is about 360 million. The urban population may exceed over 800 million by the year 2050 and the resultant municipal water requirement will be of the magnitude of over 110 billion litres per day. Besides the requirement of rural population (1.1 billion) shall be about 44 billion litres per day for the year 2050.

1.2 Climate Change

In the context of anticipated global warming due to increasing atmospheric greenhouse gases, it is necessary to evaluate the possible impact on freshwater resources of the country. Potential impacts of global warming on water resources include enhanced evaporation, geographical changes in precipitation intensity, duration and frequency (together affecting the average run-off), soil moisture, and the frequency and severity of droughts and floods. Future projections using climate models point to an increase in the monsoon rainfall in most parts of India, with increasing greenhouse gases and sulphate aerosols. Relatively small climatic changes can have huge impact on water resources, particularly in arid and semi-arid regions such as North-West India. This will have impacts on agriculture, drinking water, and on generation of hydroelectric power, resulting in limited water supply and land degradation. Apart from monsoon rains, India uses perennial rivers which originate in the Hindukush and Himalayan ranges and depend on glacial melt-waters. Since the melting season coincides with the summer monsoon season, any intensification of the monsoon is likely to contribute to flood disasters in the Himalayan catchment. Rising temperatures will also contribute to a rise in the snowline, reducing the capacity of these natural reservoirs, and increasing the risk of flash floods during the wet season. Increase in temperatures can lead to increased eutrophication in wetlands and fresh water supplies.

1.3 Current and Future Water Requirements

In 1990, the total water withdrawal was estimated at 552 bcm i.e. 30 per cent of the country's renewable water resources (1869 bcm). The contribution from surface water was 362 bcm, while

the groundwater withdrawal was estimated at 190 bcm. Approximately 460 bcm was used for irrigation while 25 bcm was used for domestic needs. About 19 bcm and 15 bcm were used for energy and industrial purposes respectively. Currently, more than 80 per cent of the 750 bcm water used in India is for irrigation. The balance 20 per cent is used to meet domestic, energy, industrial and other requirements. With the rapidly growing population, along with industrial and urbanization activities, the demand for water is expected to increase even faster. Estimates indicate that by the year 2025, the total water demand of 1050 bcm will be very close to the total utilizable water resources of 1,122 bcm in the country. Though projections are not available beyond 2025, it is evident that the country may have to face an acute water crisis unless clear and strategic measures are adopted now. It is pertinent to note that more attention is also required to scientifically assess the water requirements for ecosystems security. Today, approximately 40 per cent (748 bcm) of available water resources is considered to be unutilizable due to a variety of factors. Probably, this is a blessing in disguise since that water must be catering to the requirements of the ecosystems.

1.3.1 Temporal Distribution

Almost 80 per cent of the rainfall occurs in the four monsoon months from June to September. Even within these four months, most of the rainfall occurs as few spells of intense rain. It is estimated that in Himalayan Rivers, where there is some flow due to snowmelt also, about 80 per cent of the total annual flow takes place within these four monsoon months. In peninsular rivers, where there is no contribution from snowmelt, monsoon flow accounts for more than 90 per cent of the annual flow. In this context, retention and storage of water becomes imperative. More important is the scale at which retention or storage activities are undertaken. Large dams have their fair share of adverse social and environmental impacts, besides causing conflicts between riparian States. In today's context, large storage structures may be attempted only after their benefits are weighed carefully against their social and ecological costs. On the other hand, the country has large numbers of traditional water harvesting structures. Unfortunately, most of them are dilapidated, silted or have been encroached upon due to the breakdown of the traditional community-based management systems and neglect by the concerned departments. Revival of these traditional water harvesting structures, coupled with modern watershed management systems including large scale afforestation and regeneration of degraded lands (covering 30 per cent of the country), small structures like check dams, gully plugs and other systems can significantly enhance the surface water retention and storage capacity and also recharge the groundwater aquifers.

1.3.2 Spatial Distribution

Precipitation in India is not uniformly distributed and varies from less than 100 mm/year in Rajasthan to more than 2,500 mm/year in Assam. Consequently, despite the current availability, water is not evenly distributed or used around the country. Brahmaputra and Barak basin, with 7.3 per cent of the geographical area and 4.2 per cent of the country's population, have 31 per cent of the annual water resources.

Population Stress and water insecurity

India's population is around 1.21 billion as on 1st March, 2011. The population of India is expected to stabilize at around 1,640 million by the year 2050. As a result, gross per capita water availability will decline from 1,820 m³/yr in 2001 to as low as 1,140 m³/yr in 2050. Total water requirement of the country for various activities around the year 2050 has been estimated to be 1,450 km³/yr. This is significantly more than the current estimate of utilizable water resource potential (1,122 km³/yr) through conventional development strategies. Therefore, when compared with the availability of approximately 500 km³/yr at present, the water availability around 2050 needs to be almost trebled. Various options have been considered, in quantitative terms, as possible sources to augment the anticipated deficit. It is argued that due to considerations of gestation period and capital requirements, rainwater harvesting and water-conservation measures must receive the highest priority, followed by renovation and recycling to be followed by intra-basin and then inter-basin transfers in the last phase. But, investigations and planning processes for all options must begin immediately.

The environmental challenges of water resources development and management in India are expected to manifest themselves more explicitly and rapidly in the coming years. These environmental challenges may be addressed through four broad approaches:

Improving efficiencies and minimizing losses, Recharging groundwater aquifers, Abatement and treatment of pollution, Reuse and recycling of wastewater, Due to the complexity and urgency of the environmental challenges, these approaches need to be simultaneously pursued. However, it is evident that an essential prerequisite for water and human security is ecological security. Hence, water resource planning in India has to urgently estimate the requirements of water for ecosystem security. In each of these approaches, appropriate policy, institutional, technological and economic interventions and instruments may be adopted. Most of these instruments have fortunately been tried or tested at least on a pilot scale in India. The challenge is to institutionalize systems for these interventions and instruments to work on a large scale.

1.5 Water Needs of Ecosystem

The water needs of ecosystems are not always recognized, since many people do not regard water for eco-systems as a social and economic use. Yet, access to fresh water is an indisputable need for the maintenance and functioning of valuable ecosystems and landscapes in which human activities are an integral part. Ecosystems are also important in securing human health, because they provide services that are fundamental to our life support systems – such as pest control and detoxification and decomposition of waste. They contribute to the production of food (crops and fish), medicines and other goods. They provide water treatment, recreation and waterway transport. Also, terrestrial ecosystems help balance rainwater infiltration, ground water recharge and river flow regimes.

Accelerating population growth and unsustainable consumption and production patterns have increased the demand for water. In the greater competition for water, ecosystems and biodiversity tend to be the losers. But people are the losers too. Activities that reduce biodiversity jeopardize economic development and human health through losses of useful materials, genetic stocks, and potential medicines. As ecosystems and biodiversity get degraded, their ability to lend resilience to the biosphere declines, and communities and human health suffer. The decline in the quantity and quality of water flow has reduced the productivity of many terrestrial, aquatic, and coastal zone ecosystems and led to loss of biodiversity. In remote areas, the degradation of ecosystems has devastated fishing, agriculture, and grazing and undermined the survival potential of rural communities relying on these activities.

Against a national per capita annual availability of 2,208 m³ of water, the average availability in Brahmaputra and Barak is as high as 16,589 m³, while it is as low as 360 m³ in the Sabarmati basin. The per capita annual water availability for the rest of the country, excluding Brahmaputra and Barak basin, works out to about 1,583 m³ (3.3.1).

Water availability less than 1,000 m³ per capita is considered by international agencies as indicating scarcity conditions. Cauvery, Pennar, Sabarmati, east flowing rivers and west flowing rivers are some of the basins with scarcity conditions. In majority of river basins, current utilization is significantly high and is in the range of 50-95 per cent of utilizable surface resources. But, in rivers such as Narmada and Mahanadi, percentage utilization is only 23 and 34 per cent respectively. In several basins, there is also an overdrawal of groundwater leading to lowering of groundwater tables and even salt water incursions. If the average national per capita availability of 2,000 m³ is to be maintained, given the burgeoning population, the only river in North India with significant surplus water to meet future needs of the country is the Brahmaputra. Since Bangladesh also draws water from this river, it may not be easily possible to tap its full potential. In peninsular India, the Godavari, Brahmani, Mahanadi and Narmada, besides regions of Tapti and Tadri may have surplus water. Inter-linking of rivers has been proposed to address the spatial challenge of water availability. Besides its questionable techno-economic feasibility, the associated ecological damages of river linking may be irreversible. While at the country level, there may not appear to be an immediate problem of water availability, several basins (e.g. Sabarmati) are already under severe stress and face scarcity situations. With increasing demands, the situation is only going to be aggravated unless appropriate basin level measures are attempted now.

1.6 Water Pollution

The key challenges to better management of the water quality in India are temporal and spatial variation of rainfall, uneven geographic distribution of surface water resources, persistent droughts, overuse of ground water and contamination, drainage & salinisation and water quality problems due to treated, partially treated and untreated wastewater from urban settlements,

industrial establishments and runoff from irrigation sector besides poor management of municipal solid waste and animal dung in rural areas.

It is estimated that about 38,000 million litres per day (mld) of wastewater are generated in the urban centres having population more than 50,000 in India (housing more than 70% of urban population). The municipal wastewater treatment capacity developed so far in India is about 11,000 mld accounting for 29% of wastewater generation in these two classes of urban centers. In view of population increase, demand of freshwater for all the uses will be unmanageable. It is estimated that the projected wastewater from urban centres may cross 1,00,000 mld by 2050 and the rural India will also generate not less than 50,000 mld in view of water supply designs for community supplies in rural areas. However, waste water management is not addresses to that pace.

Most human activities whether domestic, agricultural or industrial have an impact on water and the ecosystems. World Health Organization statistics indicate that half of India's morbidity is water related. Water borne diseases can be, to a large extent, controlled by managing human consumption and production patterns. It is therefore pertinent to have an understanding of human activities, including water management initiatives, and their impacts on water and the environment.

1.6.1 Domestic Water Pollution

Waste management systems have not been able to keep pace with the huge volumes of organic and non-biodegradable wastes generated daily. As a consequence, garbage in most parts of India is unscientifically disposed and ultimately leads to increase in the pollutant load of surface and groundwater courses. On the other hand, the large population of the poor in India does not have much choice but to live off the natural resource base and pollute the environment in the process. They deforest for food, fuel, fodder and fibre and pollute the water sources on which they depend, since they cannot afford access to sanitation services. Domestic water use today, though a small fraction of the total water requirement, is under-priced for political reasons. This leads to a considerable waste of the precious resource and inadequate revenues for operation and maintenance. Low revenues result in deterioration of the supply infrastructure and further loss of the resource due to system inefficiencies. In most parts of the country, waste water from domestic sources is hardly treated, due to inadequate sanitation facilities. This waste water, containing highly organic pollutant load, finds its way into surface and groundwater courses, very often close to dense pockets of human habitation from where further water is drawn for use. Considerable investments will be required to install treatment systems in at least the 500 major cities and towns of the country. Coupled with investment requirements, are the difficulties of mobilizing consumers to pay for centralized systems. Estimates indicate that it is viable to set up decentralized treatment systems for clusters of approximately 100 to 200 households where it is possible to convince users to pay for efficient services. Incentives like soft loans may be provided to these initiatives.

Industrial Water Pollution

The Industrial sector, contributing to about 20 per cent of the national income, accounts for about 8 per cent of the current water use. With rapid industrialization and urbanization, the water requirement for energy and industrial use is estimated to rise to about 18 per cent (191 bcm) of the total requirements in 2025. Poor environmental management systems, especially in industries such as thermal power stations, chemicals, metals and minerals, leather processing and sugar mills, have led to discharge of highly toxic and organic wastewater. This has resulted in pollution of the surface and groundwater sources from which water is also drawn for irrigation and domestic use. The enforcement of regulations regarding discharge of industrial wastewater and limits to extraction of groundwater needs to be considerably strengthened, while more incentives are required for promoting waste water reuse and recycling.

1.6.3 Agricultural Water Pollution

Two-thirds of India's farm production comes from one-third of its land which is irrigated. The rest is from rainfed areas that employ large populations. In order to meet the increasing demand for food and farm employment, India has to increase the area under irrigation, and enhance productivity in both irrigated and rainfed areas. For the agricultural sector, water and electricity for irrigation are subsidized for political reasons. This leads to wasteful flood irrigation rather than adoption of more optimal practices such as sprinkler and drip irrigation. Cropping patterns and farming practices also do not necessarily encourage the judicious use of water. Conservative estimates indicate that the same quantity of irrigation water used today can irrigate double the current area with optimized irrigation and farming practices. With limited revenues and budgetary support, the state engineering departments are unable to operate and maintain the irrigation systems efficiently, leading to increasing deterioration of the structures and systems over time. Consequently, there are further water losses due to breaches and seepage, resulting in water logging and salinity. Water quality is further affected due to the overuse of chemical fertilizers and pesticides.

1.7 Approach to Water Quality Management and Water Quality Criteria

The water quality management in India is accomplished under the provision of Water (Prevention and Control of Pollution) Act, 1974. The basic objective of this Act is to maintain and restore the wholesomeness of national aquatic resources by prevention and control of pollution. It was considered ambitious to maintain or restore all natural water body at pristine level. Planning pollution control activities to attain such a goal is bound to be deterrent to developmental activities and cost prohibitive. Since the natural water bodies have got to be used for various competing as well as conflicting demands, the objective is aimed at restoring and/or maintaining natural water bodies or their parts to such a quality as needed for their best uses.

Thus, a concept of “designated best use” (DBU) was developed. According to this concept, out of several uses a water body is put to, the use which demands highest quality of water is termed as “designated best use”, and accordingly the water body is designated. Primary water quality criteria

for different uses have been identified. A summary of the use based classification system is presented in Table 1.1.

Table-1.1 Use based classification of surface waters in India

DESIGNATED-BEST-USE	CLASS OF WATER	CRITERIA
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organised)	B	Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max. 2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l

The water resources of the country were classified according to their designated best uses and a “Water Use Map” was prepared. In order to identify the water bodies or their parts where water quality is at variance with water quality criteria, it was felt important to measure water quality of that water body or its part. It would help in preparation of “Water Quality Map” of India. The idea was to superimpose “Water Quality Map” on “Water Use Map” to identify the water bodies or their parts, which are in need of improvement (restoration). Subsequently through a wide network of water quality monitoring, water quality data are acquired. A large number of water bodies were identified as polluted stretches for taking appropriate measures to restore their water quality. Today almost all policies and programmes on water quality management are based on this concept including the Ganga Action Plan and National River Action Plans.

Water Quality Criteria for bathing reaches in Rivers is notified by Ministry of Environment & Forests (MoEF) and is given in Table 1.2.

Table-1.2 Primary Water Quality Criteria for Bathing

CRITERIA	RATIONALE
Faecal Coliform 500 (desirable) MPN/100ml : 2500 (Maximum Permissible) Faecal Streptococci 100 (desirable) MPN/100ml : 500 (Maximum Permissible)	To ensure low sewage contamination. Faecal coliform and faecal streptococci are considered as they reflect the bacterial pathogenicity. The desirable and permissible limits are suggested to allow for fluctuation in environmental conditions such as seasonal changes, changes in flow conditions etc.
pH: Between 6.5-8.5	The range provides protection of the skin and delicate organs like eyes, nose, ears etc. which are directly exposed during outdoor bathing.
Dissolved Oxygen: 5 mg/l or more	The minimum dissolved oxygen concentration of 5 mg/l ensures reasonable freedom from oxygen consuming organic pollution immediately U/s which is necessary for preventing production of anaerobic gases (obnoxious gases) from sediments
Biochemical Oxygen Demand 3 mg/l or less Demand 3 day, 27°C:	The Biochemical Oxygen Demand of 3 mg/l or less of the water ensures reasonable freedom from oxygen demanding pollutants and prevent production of obnoxious gases.

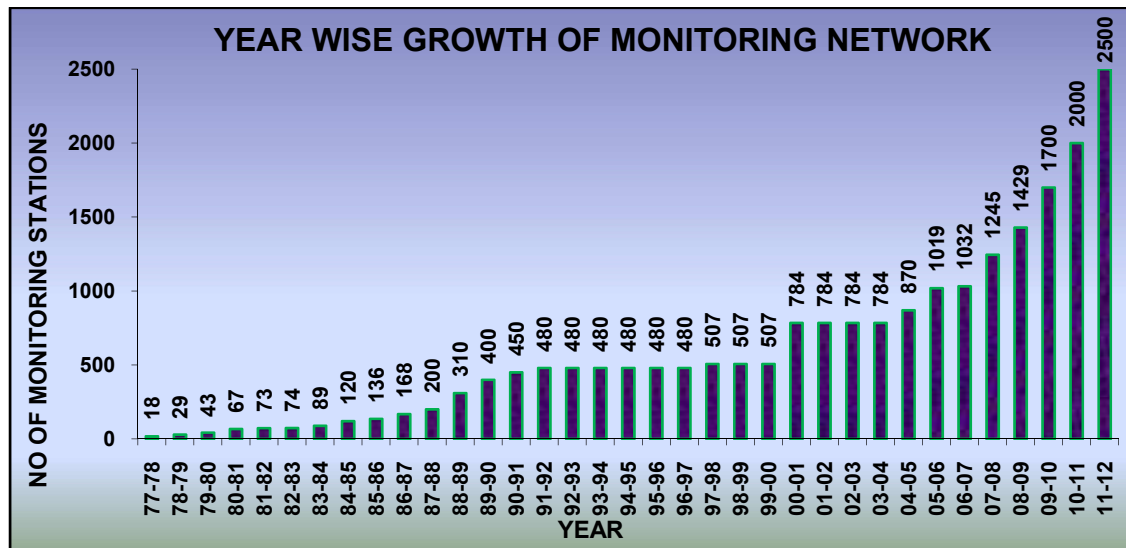
CHAPTER-II

WATER QUALITY MONITORING IN INDIA

2.1 National Water Quality Monitoring Programme

The Central Pollution Control Board (CPCB) has established a network of monitoring stations on aquatic resources across the country. The monitoring of water quality initiated during 1977-78 under Global Environmental Monitoring System (GEMS) and gradually increased the network to cover all the aquatic resources. The year wise growth of monitoring network is depicted in Graph 2.1.

Graph 2. 1: Year Wise Growth of Monitoring Network



Objectives of Water Quality Monitoring

The preamble of Water (prevention and control of pollution) Act, 1974 stated that pollution control board both at States and Central level to restore and maintain the wholesomeness of water bodies in India. Water quality monitoring is therefore an imperative prerequisite in order to assess the extent of maintenance and restoration of water bodies. The water quality monitoring is performed with following main objectives in mind.

- Rational planning of pollution control strategies and their prioritisation
 - To assess nature and extent of pollution control needed in different water bodies or their part
 - To evaluate effectiveness of pollution control measures already in existence
 - To evaluate water quality trend over a period of time
 - To assess assimilative capacity of a water body thereby reducing cost on pollution control
 - To understand the environmental fate of different pollutants
- To assess the fitness of water for different uses

2.3 Monitoring Network, Parameters and Frequency

The present network comprises of 2500 stations in 28 States and 6 Union Territories spread over the country. The monitoring network covers 445 Rivers, 154 Lakes, 12 Tanks, 78 Ponds, 41 Creeks/Seawater, 25 Canals, 45 Drains, 10 Water Treatment Plant (Raw Water) and 807 Wells. Among the 2500 stations, 1275 are on rivers, 190 on lakes, 45 on drains, 41 on canals, 12 on tanks, 41 on creeks/seawater, 79 on ponds, 10 Water Treatment Plant (Raw Water) and 807 are groundwater stations (Table 2.1). Presently the inland water quality-monitoring network is operated under a three-tier programme i.e. Global Environmental Monitoring System (GEMS), Monitoring of Indian National Aquatic Resources System (MINARS) and Yamuna Action Plan (YAP). The water samples are analysed for 9 core parameters and 19 general parameters. The monitoring agencies have also analysed the trace metals at few locations. The list of parameters identified under the National Water Quality Monitoring Programme is given in Table 2.2. The monitoring is done on monthly basis in surface waters comprising of Rivers, lakes, tanks, ponds, creeks/sea water, canals & drains and on half yearly basis in case of ground water. The frequency of monitoring stations in each State/Union Territory is given in Table 2.3. In the present report data on core parameters is incorporated for interpretation and drawing inferences based on primary water quality criteria.

Table- 2.1: Water Body Wise Number of Stations

TYPE OF WATER BODIES	NUMBER OF WATER BODIES	NUMBER OF STATIONS
RIVERS	445	1275
LAKES	154	190
TANKS	12	12
PONDS	78	79
CANALS	25	41
CREEKS/SEA WATER	41	41
DRAINS	45	45
WELLS	807	807
WATER TREATMENT PLANT	10	10
TOTAL		2500

Table-2.2 List of Parameters under National Water Quality Monitoring Programme

FIELD OBSERVATIONS (7)	CORE PARAMETERS (9)	GENERAL PARAMETERS (19)	BIO-MONITORING (3)	TRACE METALS (9)	PESTICIDES (15)
<ul style="list-style-type: none"> • Weather • Depth of main stream/depth of water table • Colour and intensity • Odour • Visible effluent discharge • Human activities around station • Station detail 	<ul style="list-style-type: none"> • PH • Temperature • Conductivity, $\mu\text{mhos/cm}$ • Dissolved Oxygen, mg/L • BOD, mg/L • Nitrate – N, mg/L • Nitrite – N, mg/L • Faecal Coliform, MPN/100 ml • Total Coliform, MPN/100 ml 	<ul style="list-style-type: none"> • Turbidity, NTU • Phenolphthalein Alkalinity, as CaCO_3 • Total Alkalinity, as CaCO_3 • Chlorides, mg/L • COD, mg/L • Total Kjeldahl - N, as N mg/L • Ammonia - N, as N mg/L • Hardness, as CaCO_3 • Calcium, as CaCO_3 • Sulphate, mg/L • Sodium, mg/L • Total Dissolved Solids, mg/L • Total Fixed Dissolved Solids, mg/L • Total suspended Solid, mg/L • Phosphate, mg/L • Boron, mg/L • Magnesium, as CaCO_3 • Potassium, mg/L • Fluoride, mg/L 	<ul style="list-style-type: none"> • Saprobity Index • Diversity Index • P/R Ratio 	<ul style="list-style-type: none"> • Arsenic, $\mu\text{g/L}$ • Cadmium, $\mu\text{g/L}$ • Copper, $\mu\text{g/L}$ • Lead, $\mu\text{g/L}$ • Chromium (Total), $\mu\text{g/L}$ • Nickel, $\mu\text{g/L}$ • Zinc, $\mu\text{g/L}$ • Mercury, $\mu\text{g/L}$ • Iron (Total), $\mu\text{g/L}$ 	<ul style="list-style-type: none"> • Alpha BHC, $\mu\text{g/L}$ • Beta BHC, $\mu\text{g/L}$ • Gamma BHC (Lindane), $\mu\text{g/L}$ • O P DDT, $\mu\text{g/L}$ • P P DDT, $\mu\text{g/L}$ • Alpha Endosulphan, $\mu\text{g/L}$ • Beta Endosulphan, $\mu\text{g/L}$ • Aldrin, $\mu\text{g/L}$ • Dieldrin, $\mu\text{g/L}$ • Carbaryl (Carbamate), $\mu\text{g/L}$ • 2-4 D, $\mu\text{g/L}$ • Malathian, $\mu\text{g/L}$ • Methyl Parathian, $\mu\text{g/L}$ • Anilophos, $\mu\text{g/L}$ • Chloropyriphos, $\mu\text{g/L}$

Table: 2.3 Frequency of monitoring stations in States/UTs

<p>ANDHRA PRADESH</p> <ul style="list-style-type: none"> MONTHLY: 108 HALF YEARLY: 32 	<p>ARUNACHAL PRADESH</p> <ul style="list-style-type: none"> MONTHLY: 18 	<p>ASSAM</p> <ul style="list-style-type: none"> MONTHLY: 69 HALF YEARLY: 32
<p>BIHAR</p> <ul style="list-style-type: none"> MONTHLY: 66 HALF YEARLY: 70 	<p>CHANDIGARH</p> <ul style="list-style-type: none"> MONTHLY: 4 HALF YEARLY: 7 	<p>CHHATTISGARH</p> <ul style="list-style-type: none"> MONTHLY: 31 HALF YEARLY: 8
<p>DAMAN, DIU, DADRA & NAGAR HAVELI</p> <ul style="list-style-type: none"> MONTHLY: 12 HALF YEARLY: 12 	<p>DELHI</p> <ul style="list-style-type: none"> MONTHLY: 32 HALF YEARLY: 70 	<p>GOA</p> <ul style="list-style-type: none"> MONTHLY: 40 HALF YEARLY: 10

<p>GUJARAT</p> <ul style="list-style-type: none"> MONTHLY — 82 HALF YEARLY — 83 	<p>HARYANA</p> <ul style="list-style-type: none"> MONTHLY — 23 	<p>HIMACHAL PRADESH</p> <ul style="list-style-type: none"> MONTHLY — 60 HALF YEARLY — 41 YEARLY — 3
<p>JAMMU & KASHMIR</p> <ul style="list-style-type: none"> MONTHLY — 70 HALF YEARLY — 12 	<p>JHARKHAND</p> <ul style="list-style-type: none"> MONTHLY — 36 	<p>KARNATAKA</p> <ul style="list-style-type: none"> MONTHLY — 63
<p>KERALA</p> <ul style="list-style-type: none"> MONTHLY — 94 HALF YEARLY — 34 	<p>LAKSHADWEEP</p> <ul style="list-style-type: none"> MONTHLY — 1 HALF YEARLY — 15 	<p>MADHYA PRADESH</p> <ul style="list-style-type: none"> MONTHLY — 123 HALF YEARLY — 32
<p>MAHARASHTRA</p> <ul style="list-style-type: none"> MONTHLY — 200 HALF YEARLY — 50 	<p>MANIPUR</p> <ul style="list-style-type: none"> MONTHLY — 60 HALF YEARLY — 10 	<p>MEGHALAYA</p> <ul style="list-style-type: none"> MONTHLY — 47 HALF YEARLY — 7
<p>MIZORAM</p> <ul style="list-style-type: none"> MONTHLY — 4 HALF YEARLY — 2 	<p>NAGALAND</p> <ul style="list-style-type: none"> MONTHLY — 18 HALF YEARLY — 10 	<p>ORISSA</p> <ul style="list-style-type: none"> MONTHLY — 78 HALF YEARLY — 15
<p>PONDICHERY</p> <ul style="list-style-type: none"> MONTHLY — 7 HALF YEARLY — 15 	<p>PUNJAB</p> <ul style="list-style-type: none"> MONTHLY — 47 HALF YEARLY — 22 	<p>RAJASTHAN</p> <ul style="list-style-type: none"> MONTHLY — 36 HALF YEARLY — 87
<p>SIKKIM</p> <ul style="list-style-type: none"> MONTHLY — 14 	<p>TAMILNADU</p> <ul style="list-style-type: none"> MONTHLY — 53 HALF YEARLY — 2 	<p>TRIPURA</p> <ul style="list-style-type: none"> MONTHLY — 42 HALF YEARLY — 21
<p>UTTAR PRADESH</p> <ul style="list-style-type: none"> MONTHLY — 71 HALF YEARLY — 40 	<p>UTTARAKHAND</p> <ul style="list-style-type: none"> MONTHLY — 28 HALF YEARLY — 19 YEARLY — 3 	<p>WEST BENGAL</p> <ul style="list-style-type: none"> MONTHLY — 50 HALF YEARLY — 49

2.4 State/Union Territory (UT) Level - Water Quality

The water quality monitoring and its management are governed at State/Union Territory level in India. The monitoring network covers 28 States and 6 Union Territories. Distribution of Water Quality Monitoring Stations on State/Union Territory/Water body is presented in Table 2.4. The assessment of water quality through monitoring, analysis of samples and processing of data with respect to water quality criteria provides glimpse of compliance for particular parameter. The aquatic resources monitored for water quality at State/UT level are assessed for compliance of pollutants to their desired levels such as pH, Conductivity, Dissolved Oxygen, Bio chemical Oxygen Demand, Total Coliform and Fecal Coliform. The statewise assessment is summarised in para 2.4.1 to 2.4.31 and presented in Appendix-I.

Table-2.4: Distribution of Water Quality Monitoring Stations -State/Union Territory/Water body

<p>ANDHRA PRADESH (TOTAL-140)</p> <ul style="list-style-type: none"> •RIVERS :54 •LAKES :15 •TANKS :10 •PONDS :10 •CANALS :3 • DRAIN/INDUSTRIAL DRAIN : 16 •GROUND WATER:32 	<p>ARUNACHAL PRADESH (TOTAL-18)</p> <ul style="list-style-type: none"> •RIVERS :18
<p>ASSAM (TOTAL-101)</p> <ul style="list-style-type: none"> •RIVERS :43 •LAKES :2 •TANKS :1 •PONDS :23 •GROUND WATER:32 	<p>BIHAR (TOTAL-136)</p> <ul style="list-style-type: none"> •RIVERS :62 •LAKES :2 •PONDS :2 •GROUND WATER:70
<p>CHANDIGARH (TOTAL-11)</p> <ul style="list-style-type: none"> •LAKES :1 •DRAIN/INDUSTRIAL DRAIN :3 •GROUND WATER:7 	<p>DAMAN, DIU & DADRA NAGAR HAVELI (TOTAL-24)</p> <ul style="list-style-type: none"> •RIVERS :12 •GROUND WATER:12
<p>DELHI (TOTAL-102)</p> <ul style="list-style-type: none"> •RIVERS :5 •LAKES :5 •PONDS :3 •CANALS :3 •DRAIN/INDUSTRIAL DRAIN :10 • WATER TREATMENT PLANT: 6 • GROUND WATER : 70 	<p>GOA (TOTAL-50)</p> <ul style="list-style-type: none"> •RIVERS :28 •LAKES :8 •CANALS :3 •CREEK/SEA WATER:1 •GROUND WATER:10

GUJARAT
(TOTAL-165)

- RIVERS :53
- LAKES :21
- TANKS :1
- PONDS :2
- CANALS :2
- CREEK/SEA WATER:3
- GROUND WATER:83

HARYANA
(TOTAL-23)

- RIVERS :8
- LAKES :2
- CANALS :11
- GROUND WATER:2

HIMACHAL PRADESH
(TOTAL-104)

- RIVERS :58
- LAKES :5
- GROUND WATER:41

JAMMU & KASHMIR
(TOTAL-82)

- RIVERS :45
- LAKES :25
- GROUND WATER:12

JHARKHAND
(TOTAL-36)

- RIVERS :31
- LAKES :4
- PONDS :1

KARNATAKA
(TOTAL-63)

- RIVERS :61
- LAKES :2

KERALA
(TOTAL-128)

- RIVERS :73
- LAKES :16
- PONDS :2
- CANAL :3
- GROUND WATER:34

LAKSHADWEEP
(TOTAL-16)

- PONDS :1
- GROUND WATER:15

MADHYA PRADESH
(TOTAL-155)

- RIVERS :96
- LAKES :19
- POND :8
- GROUND WATER:32

MAHARASHTRA
(TOTAL-250)

- RIVERS :156
- CREEK/SEA WATER:34
- DRAIN/INDUSTRIAL DRAIN :10
- GROUND WATER:50

MANIPUR
(TOTAL-70)

- RIVERS :41
- LAKES :5
- PONDS :13
- CANALS :1
- GROUND WATER:10

MEGHALAYA
(TOTAL-54)

- RIVERS :40
- LAKES :7
- GROUND WATER:7

MIZORAM
(TOTAL-6)

- RIVERS :4
- GROUND WATER:2

NAGALAND
(TOTAL-28)

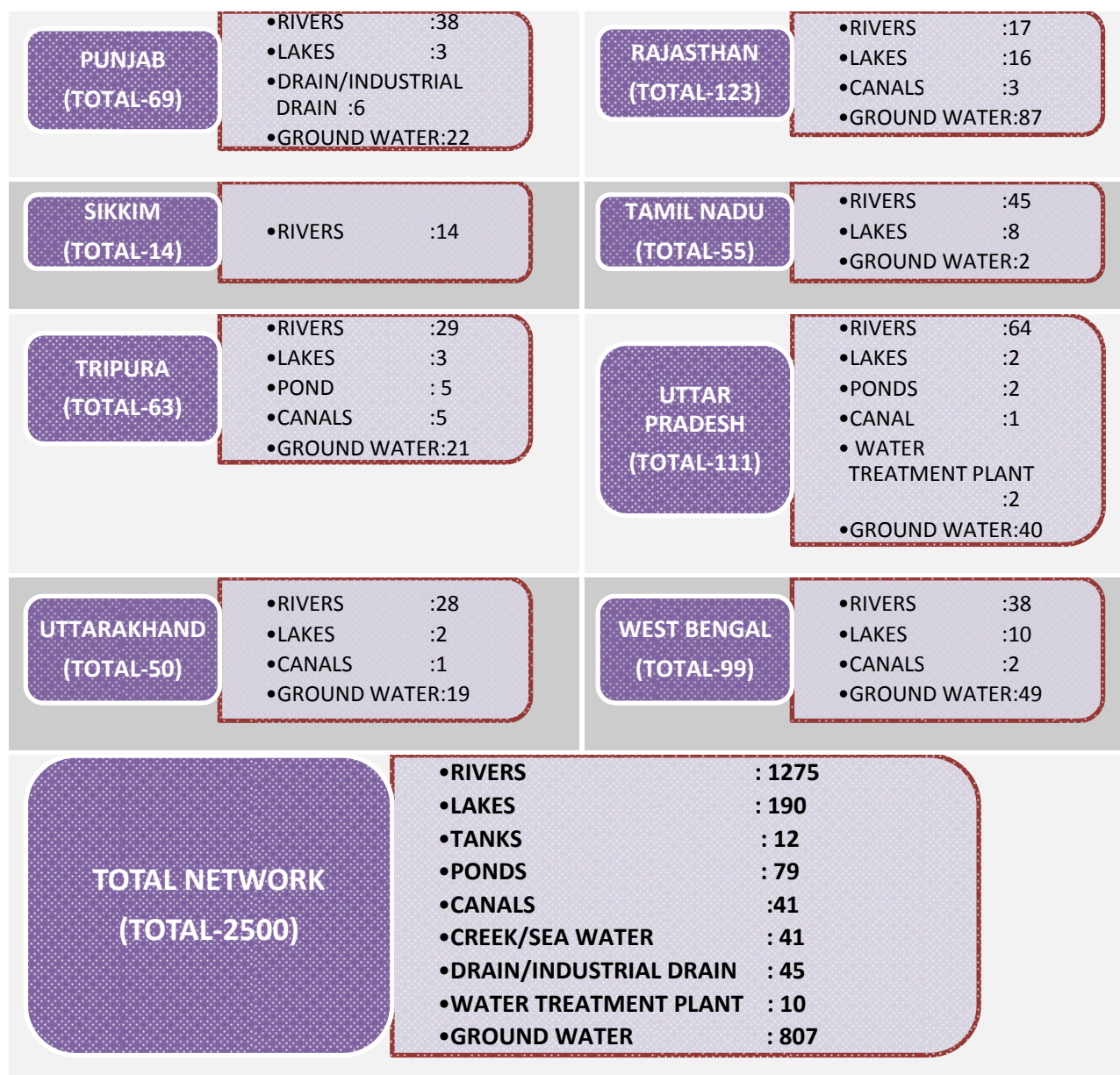
- RIVERS :16
- LAKES :2
- GROUND WATER:10

ORISSA
(TOTAL-93)

- RIVERS :64
- LAKES :2
- PONDS :6
- CANALS :3
- CREEK/SEA WATER:3
- GROUND WATER:15

PONDICHERRY
(TOTAL-22)

- RIVERS :5
- LAKES :2
- GROUND WATER:15



2.4.1. ANDHRA PRADESH – Water Quality (surface water) data analysis of 735 observations points out that 8 % are violating to DO, Out of 762 observations 11 % are violating to Conductivity, Out of 822 observations 8 % are not complying to pH, Out of 787 observations 36% are not confirming to BOD whereas FC and TC is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 84 observations points out that 16 % are violating to Conductivity, 1.2 % are not complying with pH and Nitrate +Nitrite-N, Out of 82 observations 7% are not confirming to BOD whereas FC and TC is confirming to the desired levels required. Water Quality of river water data analysis of 563 observations points out that 2 % are violating to DO, 1% is not confirming with Conductivity, 7 % are not complying to pH, 22% are not confirming to BOD whereas FC and TC is confirming

to the desired levels require in riverine environment. Water Quality of lake water data analysis of 93 observations points out that 24% are violating to DO, 24% is not confirming with Conductivity, 13 % are not complying to pH, 64% are not confirming to BOD whereas FC and TC is confirming to the desired levels. Water Quality of pond water data analysis of 67 observations points out that 33 % are not complying to DO, 12 % are violating to pH, 49 % are not complying to conductivity, 93 % are not complying to BOD whereas FC and TC is complying to the desired levels. Water Quality of tank water data analysis of 69 observations points out that 27 % are not complying to DO, 13 % are violating to pH, 44 % are not complying to conductivity, 83 % are not complying to BOD whereas TC and FC is complying to the desired levels.

2.4.2. ASSAM – Water Quality (surface water) data analysis of 320 observations points out that 5 % are violating to DO, Out of 320 observations 1 % is not complying to Conductivity, Out of 320 observations 37% are not confirming to BOD, Out of 320 observations 10% are not confirming to pH, Out of 272 observations 3% are not confirming to TC whereas FC is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 59 observations points out that 42 % are not complying with pH, 24% are not confirming to BOD whereas Conductivity, Nitrate +Nitrite-N, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 218 observations points out that 3 % are violating to DO, 5 % are not complying to pH, 24% are not confirming to BOD, 3 % are not complying to TC whereas Conductivity and FC and is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 8 observations points out that 25 % are not complying to pH, 50% are not confirming to BOD whereas DO, Conductivity, FC and TC is confirming to the desired levels. Water Quality of pond water data analysis of 90 observations points out that 9 % are not complying to DO, 18 % are violating to pH, 3 % are not complying to conductivity, 66 % are not complying to BOD whereas FC and TC is complying to the desired levels. Water Quality of tank water data analysis of 4 observations points out that 50% are not confirming to DO and pH, 25 % are not complying with BOD whereas conductivity, FC and TC is complying with the desired levels.

2.4.3. BIHAR – Water Quality (surface water) data analysis of 212 observations points out that 1 % is violating to DO, 37 % and 34% are not complying to FC and TC respectively, Out of 213 observations 4% are not confirming to BOD and 6% are not confirming to pH whereas conductivity are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 84 observations points out that 5 % are not complying to pH, Out of 71 observations 1.4% are not confirming to Conductivity whereas Nitrate +Nitrite-N, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 200 observations points out that 1 % are violating to DO, 6 % are not complying to pH, 3% are not confirming to BOD, 38% is not confirming with FC and 34% is not confirming with TC whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 7 observations points out that 29% is not confirming with

BOD, FC and TC whereas DO, pH and Conductivity is confirming to the desired levels. Water Quality of pond water data analysis of 6 observations points out that 17 % are not complying to BOD and pH, 33% are not confirming with FC and 50% are not complying with TC whereas DO and Conductivity is complying to the desired levels.

2.4.4. CHANDIGARH – Water Quality (surface water) data analysis of 140 observations points out that except 1% violation to pH all parameters viz. DO, BOD, Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 5 observations points out that pH, Conductivity, BOD, Nitrate+Nitrite are confirming to the desired levels as required.

2.4.5. CHHATISSGARH – Water Quality (surface water) data analysis of 140 observations points out that except 1% violation to pH all parameters viz. DO, BOD, Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 10 observations points out that pH, conductivity, Nitrate and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 140 observations points out that except pH which is not confirming to 1% all are confirming to the desired levels require in riverine environment.

2.4.6. DAMAN, DIU, DADRA AND NAGAR HAVELI – Water Quality (surface water) data analysis of 24 observations points out that 8 % is violating to DO and 13 % is not complying to pH, 26 % is not complying to Conductivity, out of 10 observations 100% are not confirming to BOD whereas FC and TC is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 39 observations points out that 8 % are violating to Conductivity, 100% are not confirming to BOD whereas pH, Nitrate and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 24 observations points out that 8 % are violating to DO, 26 % are not complying to Conductivity, 100 % are not confirming to BOD, 13 % are violating to pH whereas FC and TC is confirming to the desired levels require in riverine environment.

2.4.7. DELHI – Water Quality (surface water) data analysis of 52 observations points out that 77 % is violating to DO and 94% is not complying to TC, out of 119 observations 89 % is not confirming to BOD, out of 42 observations 88 % is not complying to FC, out of 120 observations 1 % is not complying to pH whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality of river water data analysis of 32 observations points out that 63 % are violating to DO, 3 % are violating to pH, 61% are not confirming to BOD, 85% is not confirming with FC and 91% is not confirming with TC whereas Conductivity is confirming to the desired levels require in riverine environment.

2.4.8. GOA – Water Quality (surface water) data analysis of 176 observations points out that 2 % is violating to DO and 13% is not confirming to BOD, out of 178 observations 70 % is not complying to pH whereas Conductivity, FC and TC is confirming to the desired levels require in

riverine environment. Water Quality (ground water) data analysis of 12 observations points out that 83 % are not complying with pH whereas Conductivity, BOD, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 124 observations points out that 2 % are violating to DO, 73% are not complying to pH, 8% are not confirming to BOD whereas conductivity, TC & FC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 23 observations points out that 61 % are not complying to pH, 14% are not confirming to BOD whereas DO, Conductivity, FC and TC is confirming with the desired levels.

2.4.9. GUJARAT - Water Quality (surface water) data analysis of 167 observations points out that 5 % is violating to DO and 11 % is violating to pH, out of 165 observations 13 % is not complying to Conductivity, out of 164 observations 38 % is not confirming to BOD, out of 159 & 160 observations 4% are not complying to FC and TC respectively to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 22 observations points out that 26 % are violating to Conductivity, 11% are not confirming to BOD whereas pH, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 136 observations points out that 4 % are violating to DO, 2 % are not complying to pH, 14% is not confirming with conductivity, 38% are not confirming to BOD, 3% is not confirming with FC and 4% is not confirming with TC to the desired levels require in riverine environment. Water Quality of lake water data analysis of 16 observations points out that 13% are violating to DO, 25 % are not complying to pH, 63% are not confirming to BOD, 6% are not complying with FC and TC, 19 % are not complying to Conductivity to the desired levels. Water Quality of pond water data analysis of 4 observations points out that all parameters viz. DO, pH, Conductivity, BOD, FC and TC are confirming with the desired levels.

2.4.10. HARYANA- Water Quality (surface water) data analysis of 75 observations points out that 9% is violating to DO and 1 % is not confirming to conductivity, out of 70 observations 36 % is not confirming to BOD, out of 29 observations 62 % and 69% are not complying to FC and TC respectively, out of 74 observations 4% is not confirming to pH to the desired levels require in riverine environment. Water Quality of river water data analysis of 48 observations points out that 6 % are violating to DO, 6 % are not complying to pH, 42% are not confirming to BOD, 62% is not confirming with FC and 72% is not confirming with TC, 2 % are not complying to Conductivity as desired levels require in riverine environment. Water Quality of lake water data analysis of 2 observations points out that DO, pH, Conductivity and BOD is complying to the desired levels.

2.4.11. HIMACHAL PRADESH-Water Quality (surface water) data analysis of 652 observations points out that 2% is violating to DO and 4 % is not confirming to BOD, out of 656 observations 4 % is not complying to pH whereas Conductivity, FC and TC is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 93 observations points out that 7 % are not complying with pH, 11% are not confirming to BOD

whereas Conductivity, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 604 observations points out that 4 % are not complying to pH, 2% are not confirming to BOD whereas DO, Conductivity, FC and TC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 52 observations points out that 23 % are violating to DO, 10 % are not complying to pH, 29% are not confirming with BOD whereas Conductivity, FC and TC is confirming with the desired levels.

2.4.12. JAMMU & KASHMIR - Water Quality (surface water) data analysis of 52 observations points out that 12 % are violating to pH, 54% are not confirming to BOD, 8 % are violating to DO whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 4 observations points out that 75 % are not complying with pH, 50% are not confirming to BOD whereas Conductivity and Nitrate are confirming to the desired levels as required. Water Quality of river water data analysis of 43 observations points out that 12 % are not complying to pH, 56% are not confirming with BOD, 2 % are not complying to DO whereas Conductivity is confirming to the desired levels require in riverine environment.

2.4.13. JHARKHAND - Water Quality (surface water) data analysis of 267 observations points out that 0.4 % are violating to pH, 19% are not confirming to BOD, 2 % are violating to DO whereas Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality of river water data analysis of 248 observations points out that 2 % are not complying with DO, 17% are not confirming with BOD whereas pH, conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 19 observations points out that 5 % are violating to DO and pH, 37% are not confirming with BOD whereas Conductivity, FC and TC is confirming with the desired levels.

2.4.14. KARNATAKA - Water Quality (surface water) data analysis of 575 observations points out that pH is not confirming to 8% and 7% are not complying to TC, out of 574 observations 1 % is violating to DO, out of 482 observations 0.2 % is not complying to Conductivity, out of 571 observations 11 % is not confirming to BOD whereas out of 570 observations 7% is not complying to FC to the desired levels require in riverine environment. Water Quality of river water data analysis of 568 observations points out that 1% is not confirming with DO, 7 % are not complying to pH, 10% are not confirming to BOD, 7% is not confirming with FC and 7% is not confirming with TC whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 7 observations points out that 43 % are not complying to pH, 71% are not confirming with BOD whereas DO, Conductivity, FC and TC is confirming to the desired levels.

2.4.15. KERALA- Water Quality (surface water) data analysis of 447 observations points out that 11 % is violating to DO, pH is not confirming to 7%, 10 % is not complying to

Conductivity, 8 % is not confirming to BOD whereas 4 % and 3 % are not complying to FC and TC respectively to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 70 observations points out that 52 % are not complying with pH whereas Conductivity, BOD, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 376 observations points out that 13 % are violating to DO, 7 % are not complying to pH, 6 % is not confirming with conductivity, 6% are not confirming to BOD, 4% is not confirming with FC and 3% is not confirming with TC. Water Quality of lake water data analysis of 59 observations points out that 2 % are violating to DO, 10 % are not complying to pH, 32% are not complying to Conductivity, 9% are not confirming to BOD, 3% are not complying to TC whereas FC is confirming with the desired levels. Water Quality of pond water data analysis of 12 observations points out that except BOD which is violating to 58 % all parameters viz. DO, pH, Conductivity, FC and TC are confirming with the desired levels.

2.4.16. MADHYA PRADESH- Water Quality (surface water) data analysis of 311 observations points out that 2 % is violating to DO, out of 304 observations 3 % is not complying to Conductivity, out of 325 observations 3 % is not complying to pH, out of 300 observations 26% is not confirming to BOD whereas FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 16 observations points out that 7 % are violating to Conductivity, 23% are not confirming to BOD whereas pH, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 289 observations points out that 2 % are violating to DO, 4 % are not complying to pH, 3% is not confirming with conductivity, 25% are not confirming to BOD whereas FC and TC are confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 36 observations points out that except BOD which is violating the criteria at 40 % all parameters viz. DO, pH, Conductivity, FC and TC are confirming with the desired levels.

2.4.17. MAHARASHTRA - Water Quality (surface water) data analysis of 2175 observations points out that 13 % is violating to DO, out of 2263 observations 20 % is not complying to Conductivity, out of 2268 observations 7 % is not complying to pH, out of 2267 observations 78% is not confirming to BOD whereas FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 94 observations points out that 16 % are violating to Conductivity, 11 % are not complying with pH, 66 % are not confirming to BOD, 1 % are violating to Nitrate whereas FC and TC is confirming to the desired levels required. Water Quality of river water data analysis of 1759 observations points out that 12 % are violating to DO, 7 % are not complying to pH, 2% is not confirming with conductivity, 75% are not confirming to BOD whereas FC and TC are confirming to the desired levels require in riverine environment.

2.4.18. MEGHALAYA- Water Quality (surface water) data analysis of 93 observations points out that 13 % is not complying to pH, 51% is not confirming to BOD, FC is violating to 15% whereas Conductivity, DO and TC are confirming to the desired levels require in riverine

environment. Water Quality (ground water) data analysis of 10 observations points out that 60 % are not complying with pH, 20% are not confirming to BOD whereas Conductivity, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 57 observations points out that 21% are not complying to pH, 42% are not confirming to BOD, 5% is not confirming with FC whereas DO, Conductivity and TC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 36 observations points out that 64 % are not complying to BOD and 31% are not confirming with FC whereas DO, pH, Conductivity and TC is confirming with the desired levels.

2.4.19. MANIPUR - Water Quality (surface water) data analysis of 116 observations points out that 19 % is not complying to DO, 8 % is not complying to pH, 24% is not confirming to BOD whereas Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 1 observation points out that all parameters viz. Conductivity, Nitrate and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 74 observations points out that 14 % are violating to DO, 5 % are not complying to pH, 27% are not confirming to BOD whereas Conductivity and TC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 15 observations points out that 13 % are violating to pH, 7% are not confirming to BOD whereas DO, Conductivity and TC is confirming to the desired levels. Water Quality of pond water data analysis of 25 observations points out that 44% are not confirming with DO, 8 % are violating to pH, 24 % are not complying to BOD whereas Conductivity and TC is confirming with the desired levels.

2.4.20. MIZORAM - Water Quality (surface water) data analysis of 36 observations points out that all parameters viz. DO, pH, Conductivity, BOD, FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 18 observations points out that 33 % are not complying with pH whereas Conductivity, BOD, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 36 observations points out that all parameters are confirming to the desired levels require in riverine environment.

2.4.21. NAGALAND - Water Quality (surface water) data analysis of 32 observations points out that except 50% violation to DO and 10% violation to BOD all parameters viz. pH, and Conductivity are confirming to the desired levels require in riverine environment. Water Quality of river water data analysis of 32 observations points out that except DO which is not complying 50 % and 9 % BOD which is not complying all parameters are confirming to the desired levels require in riverine environment.

2.4.22. ORISSA- Water Quality (surface water) data analysis of 924 observations points out that 15 % is not confirming to BOD, 25 % and 28 % are not complying to FC and TC respectively, out of 921 observations 1 % is violating to DO, out of 914 observations 10 % is not complying to Conductivity to the desired levels require in riverine environment. Water Quality (ground water)

data analysis of 26 observations points out that 19 % are not complying with pH whereas Conductivity, BOD, Nitrate, FC and TC are confirming to the desired levels required. Water Quality of river water data analysis of 760 observations points out that 6% is not confirming with conductivity, 8% are not confirming to BOD, 23% is not confirming with FC and 27% is not confirming with TC whereas DO and pH is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 24 observations points out that 50 % are not complying to conductivity, 8% are not confirming with BOD, 4 % are violating to FC and TC whereas DO and pH is confirming to the desired levels. Water Quality of pond water data analysis of 72 observations points out that 6% are not confirming with DO, 1% is violating to pH, 93 % are violating to BOD, 40% and 43% are not confirming with FC and TC respectively whereas Conductivity is complying to the desired levels.

2.4.23. PONDICHERY- Water Quality (surface water) data analysis of 10 observations points out that 30 % is not complying to pH and Conductivity, 10% is not confirming to DO whereas BOD is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 27 observations points out that 44 % are not complying with pH whereas 4 % are not complying with Conductivity whereas BOD and Nitrate are confirming to the desired levels as required. Water Quality of river water data analysis of 6 observations points out that 17 % are not complying to DO, 50% are not confirming to Conductivity whereas pH and BOD is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 4 observations points out that except pH which is violating the criteria to 75% all parameters viz.DO, BOD and Conductivity is confirming with the desired levels.

2.4.24. PUNJAB - Water Quality (surface water) data analysis of 140 observations points out that 5 % is violating to DO, out of 138 observations 44 % is not confirming to BOD, out of 134 observations 37 % are not complying to FC and out of 139 observations 40 % are not complying to TC whereas pH and Conductivity is confirming to the desired levels require in riverine environment. Water Quality of river water data analysis of 136 observations points out that 5 % are violating to DO, 45% are not confirming to BOD, 38% is not confirming with FC and 40% is not confirming with TC whereas pH and Conductivity is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 4 observations points out that 25 % are violating to BOD, FC and TC whereas parameters viz.DO, pH and Conductivity is confirming with the desired levels.

2.4.25. RAJASTHAN - Water Quality (surface water) data analysis of 387 observations points out that 12 % is violating to DO, out of 389 observations 19 % is not complying to pH, out of 388 observations 16% is not confirming to BOD whereas FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 143 observations points out that 49 % are violating to Conductivity, 6 % are not complying with pH, 15% are not confirming to BOD whereas Nitrate, FC and TC is confirming to the desired levels required. Water Quality of river water data analysis of 191 observations points out that 13 % are violating to DO, 9 % are not complying to pH, 12% are not confirming to BOD whereas

Conductivity, TC and FC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 169 observations points out that 13 % are violating to DO, 31 % are not complying to pH, 1 % are not complying with conductivity, 24% are not confirming with BOD whereas FC and TC is confirming with the desired levels.

2.4.26. SIKKIM- Water Quality (surface water) data analysis of 108 observations points out that 49 % is not complying to pH, 75% is not confirming to BOD whereas DO, Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality of river water data analysis of 108 observations points out that 49 % are not complying to pH, 75% are not confirming to BOD whereas DO, Conductivity, TC and FC is confirming to the desired levels require in riverine environment.

2.4.27. TAMIL NADU- Water Quality (surface water) data analysis of 593 observations points out that 4 % is violating to DO, out of 617 observations 6 % is not complying to pH, out of 618 observations 14% is not confirming to BOD, 8 % are not complying to FC and TC, out of 615 observations 6% is not confirming to conductivity is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 2 observations points out that all parameters are complying with pH, Conductivity, BOD, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 533 observations points out that 4 % are violating to DO, 4 % are not complying to pH, 5 % are violating to Conductivity, 12% are not confirming to BOD, 7% is not confirming with FC and TC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 85 observations points out that 7 % are violating to DO, 18 % are not complying to pH, 12 % are violating to Conductivity, 25% are not confirming with BOD, 15% are not complying to FC and 14 % are violating to TC.

2.4.28. TRIPURA- Water Quality (surface water) data analysis of 28 observations points out that 11 % is violating to DO and pH, 61% is not confirming to BOD whereas Conductivity, FC and TC are confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 25 observations points out that all parameters viz. pH, BOD, Conductivity, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 15 observations points out that 60% are not confirming to BOD whereas DO, pH, Conductivity, TC and FC is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 10 observations points out that except BOD which is violating to 50 % all parameters viz. DO, pH, conductivity, FC and TC are confirming with the desired levels.

2.4.29. UTTAR PRADESH - Water Quality (surface water) data analysis of 497 observations points out that 12 % is violating to DO, out of 553 observations 7 % is not complying to pH, out of 547 observations 66% is not confirming to BOD, out of 499 observations 54 % and 59 % are not complying to FC and TC respectively whereas conductivity is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 58

observations points out that 7 % are violating to Conductivity, 3 % are not complying with pH, 10 % are not confirming to BOD, 4 % are violating to TC whereas Nitrate and FC is confirming to the desired levels required. Water Quality of river water data analysis of 537 observations points out that 11 % are violating to DO, 6 % are not complying to pH, 65% are not confirming to BOD, 54% is not confirming with FC and 59% is not confirming with TC whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 9 observations points out that 44% are not complying to pH, 89% are not confirming with BOD, 44% are not complying to FC and TC whereas DO and Conductivity is confirming with the desired levels. Water Quality of pond water data analysis of 8 observations points out that 50% are not confirming with DO and pH, 14 % are violating to Conductivity, 100 % are not complying to BOD, 63% and 75% are not confirming with FC and TC respectively.

2.4.30. UTTARAKHAND - Water Quality (surface water) data analysis of 142 observations points out that 4 % is violating to DO, 6 % is not complying to pH, out of 101 observations 43% is not confirming to BOD, out of 25 observations 36 % and out of 89 observations 18 % are not complying to FC and TC respectively whereas conductivity is confirming to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 2 observations points out that all parameters viz. pH, BOD, Conductivity, Nitrate, FC and TC are confirming to the desired levels as required. Water Quality of river water data analysis of 119 observations points out that 5 % are violating to DO, 8 % are not complying to pH, 46% are not confirming to BOD, 38% is not confirming with FC and 21% is not confirming with TC whereas Conductivity is confirming to the desired levels require in riverine environment. Water Quality of lake water data analysis of 11 observations points out that except BOD which is violating to 9% all parameters viz.DO, pH and Conductivity is confirming with the desired levels.

2.4.31. WEST BENGAL - Water Quality (surface water) data analysis of 536 observations points out that 12 % is violating to DO, out of 542 observations 5% is not confirming to pH, out of 495 observations 7 % is not complying to Conductivity, out of 538 observations 44 % is not confirming to BOD whereas out of 529 observations 80 % and out of 531 observations 85 % are not complying to FC and TC respectively to the desired levels require in riverine environment. Water Quality (ground water) data analysis of 98 observations points out that 6 % are violating to Conductivity, 8 % are not complying with pH, 5 % are not confirming to BOD whereas Nitrate, FC and TC is confirming to the desired levels required. Water Quality of river water data analysis of 410 observations points out that 11% are violating to DO, 3 % are not complying to pH, 8% is not confirming with conductivity, 35% are not confirming to BOD, 81% is not confirming with FC and 86% is not confirming with TC. Water Quality of lake water data analysis of 110 observations points out that 2 % are not complying to DO, 11 % are violating to pH, 69 % are not complying to BOD, 73% and 75% are not confirming with FC and TC respectively whereas Conductivity is complying to the desired levels.

Table 2.5: SURFACE WATER- Percent Violation (States/UT wise)

State Name	DO			pH			Conductivity			BOD			FC			TC		
	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation
Andhra Pradesh	56	735	7.6	68	822	8.3	81	762	10.6	282	787	35.8	0	612	0	0	616	0
Assam	16	320	5	31	320	9.7	3	320	0.9	117	320	36.6	0	272	0	7	272	2.6
Bihar	2	212	0.9	13	213	6.1	0	206	0	9	213	4.2	79	212	37.3	72	212	34
Chandigarh	3	10	30	1	14	7.1	0	14	0	9	14	64.3						
Chhattisgarh	0	140	0	1	140	0.7	0	121	0	0	61	0	0	4	0	0	136	0
Daman, Diu, Dadra Nagar Haveli	2	24	8.3	3	24	12.5	6	23	26.1	10	10	100	0	1	0		1	0
Delhi	40	52	76.9	1	120	0.8	0	42	0	106	119	89.1	37	42	88.1	49	52	94.2
Goa	4	176	2.3	124	178	69.7	0	176	0	22	176	12.5	0	133	0	0	168	0
Gujarat	8	167	4.8	18	167	10.8	22	165	13.3	62	164	37.8	6	159	3.8	7	160	4.4
Haryana	7	75	9.3	3	74	4.1	1	75	1.3	25	70	35.7	18	29	62.1	20	29	69
Himachal Pradesh	14	652	2.1	27	656	4.1	0	656	0	25	652	3.8	2	544	0.4	2	577	0.3
Jammu & Kashmir	4	52	7.7	6	52	11.5	0	52	0	28	52	53.8						
Jharkhand	5	267	1.9	1	267	0.4	0	69	0	48	260	18.5	0	14	0	0	14	0
Karnataka	6	574	1	45	575	7.8	1	482	0.2	60	571	10.5	41	570	7.2	39	575	6.8
Kerala	48	447	10.7	32	447	7.2	43	446	9.6	36	447	8.1	16	447	3.6	14	447	3.1
Madhya Pradesh	5	311	1.6	11	325	3.4	8	304	2.6	79	300	26.3	0	145	0	0	177	0
Maharashtra	290	2175	13.3	154	2268	6.8	441	2263	19.5	1774	2267	78.3	0	2198	0	0	2198	0
Manipur	22	116	19	9	116	7.8	0	114	0	28	116	24.1	0	1	0	0	115	0
Meghalaya	0	93	0	12	93	12.9	0	93	0	47	93	50.5	14	93	15.1	0	93	0
Mizoram	0	36	0	0	36	0	0	36	0	0	36	0	0	36	0	0	36	0
Nagaland	16	32	50	0	32	0	0	32	0	3	32	9.4						
Orissa	9	921	1	1	923	0.1	88	914	9.6	141	924	15.3	228	924	24.7	260	924	28.1
Pondicherry	1	10	10	3	10	30	3	10	30	0	3	0						
Punjab	7	140	5	0	140	0	0	139	0	61	138	44.2	50	134	37.3	55	139	39.6
Rajasthan	46	387	11.9	72	389	18.5	1	390	0.3	62	388	16	0	390	0	0	390	0
Sikkim	0	108	0	53	108	49.1	0	108	0	81	108	75	0	108	0	0	108	0
Tamil Nadu	26	593	4.4	35	617	5.7	34	615	5.5	85	618	13.8	48	618	7.8	50	618	8.1
Tripura	3	28	10.7	3	28	10.7	0	28	0	17	28	60.7	0	28	0	0	28	0
Uttar Pradesh	58	497	11.7	38	553	6.9	1	498	0.2	360	547	65.8	269	499	53.9	295	499	59.1
Uttaranchal	6	142	4.2	9	142	6.3	0	142	0	43	101	42.6	9	25	36	16	89	18
West Bengal	65	536	12.1	25	542	4.6	32	495	6.5	238	538	44.2	422	529	79.8	449	531	84.6

Table 2.6: GROUND WATER- Percent Violation (States/UT wise)

State Name	pH			Coundctivity			BOD			NitrateN+NitriteN			FecalColiform			TotalColiform		
	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation
Andhra Pradesh	1	84	1.2	13	84	15.5	6	82	7.3	1	84	1.2	0	73	0	0	78	0
Assam	25	59	42.4	0	59	0	14	59	23.7	0	59	0	0	48	0	0	48	0
Bihar	4	84	4.8	1	71	1.4				0	84	0	0	84	0	0	84	0
Chandigarh	0	5	0	0	5	0	0	5	0	0	5	0						
Chhattisgarh	0	10	0	0	10	0				0	10	0				0	8	0
Daman, Diu, Dadra Nagar Haveli	0	39	0	3	39	7.7	4	4	100	0	39	0				0	8	0
Goa	10	12	83.3	0	12	0	0	12	0	0	12	0	0	1	0	0	9	0
Gujarat	0	22	0	5	19	26.3	2	19	10.5	0	22	0	0	19	0	0	19	0
Himachal Pradesh	6	93	6.5	0	93	0	9	84	10.7	0	93	0	0	60	0	0	71	0
Jammu & Kashmir	3	4	75	0	4	0	2	4	50	0	4	0						
Kerala	36	69	52.2	0	70	0	0	70	0	0	70	0	0	70	0	0	70	0
Madhya Pradesh	0	16	0	1	14	7.1	3	13	23.1	0	16	0	0	2	0	0	4	0
Maharashtra	10	94	10.6	15	93	16.1	62	94	66	1	94	1.1	0	84	0	0	84	0
Manipur				0	1	0				0	1	0				0	1	0
Meghalaya	6	10	60	0	10	0	2	10	20	0	10	0	0	10	0	0	10	0
Mizoram	6	18	33.3	0	18	0	0	18	0	0	18	0	0	18	0	0	18	0
Orissa	5	26	19.2	0	26	0	0	26	0	0	26	0	0	26	0	0	26	0
Pondicherry	12	27	44.4	1	27	3.7	0	12	0	0	27	0						
Rajasthan	9	142	6.3	70	143	49	21	143	14.7	0	143	0	0	143	0	0	143	0
Tamil Nadu	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	2	0
Tripura	0	25	0	0	25	0	0	25	0	0	25	0	0	23	0	0	23	0
Uttar Pradesh	2	58	3.4	4	57	7	4	42	9.5	0	58	0	0	18	0	1	25	4
Uttaranchal	0	2	0	0	2	0	0	2	0	0	2	0						
West Bengal	8	97	8.2	6	96	6.3	5	98	5.1	0	98	0	0	31	0	0	33	0

Table 2.7: RIVERS- Percent Violation (States/UT wise)

StateName	DO			pH			Conductivity			BOD			FC			TC		
	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation
Andhra Pradesh	9	539	1.7	38	563	6.7	4	532	0.8	121	557	21.7	0	453	0	0	455	0
Assam	6	218	2.8	11	218	5	0	218	0	53	218	24.3	0	187	0	6	187	3.2
Bihar	2	199	1	12	200	6	0	196	0	6	200	3	75	199	37.7	67	199	33.7
Chhattisgarh	0	140	0	1	140	0.7	0	121	0	0	61	0	0	4	0	0	136	0
Daman, Diu, Dadra Nagar Haveli	2	24	8.3	3	24	12.5	6	23	26.1	10	10	100	0	1	0	0	1	0
Delhi	20	32	62.5	1	32	3.1	0	32	0	19	31	61.3	27	32	84.4	29	32	90.6
Goa	3	123	2.4	91	124	73.4	0	122	0	10	123	8.1	0	100	0	0	117	0
Gujarat	6	136	4.4	3	136	2.2	19	134	14.2	51	133	38.3	4	128	3.1	5	129	3.9
Haryana	3	48	6.3	3	47	6.4	1	48	2.1	18	43	41.9	18	29	62.1	21	29	72.4
Himachal Pradesh	2	600	0.3	22	604	3.6	0	604	0	10	600	1.7	2	500	0.4	2	533	0.4
Jammu & Kashmir	1	43	2.3	5	43	11.6	0	43	0	24	43	55.8						
Jharkhand	4	248	1.6	0	248	0	0	59	0	41	241	17	0	13	0	0	13	0
Karnataka	6	568	1.1	42	568	7.4	1	475	0.2	55	564	9.8	41	563	7.3	39	568	6.9
Kerala	47	376	12.5	26	376	6.9	24	375	6.4	24	376	6.4	14	376	3.7	12	376	3.2
Madhya Pradesh	5	276	1.8	11	289	3.8	8	269	3	65	264	24.6	0	112	0	0	141	0
Maharashtra	200	1723	11.6	129	1759	7.3	48	1753	2.7	1313	1758	74.7	0	1688	0	0	1688	0
Manipur	10	74	13.5	4	74	5.4	0	73	0	20	74	27	0	1	0	0	73	0
Meghalaya	0	57	0	12	57	21.1	0	57	0	24	57	42.1	3	57	5.3	0	57	0
Mizoram	0	36	0	0	36	0	0	36	0	0	36	0	0	36	0	0	36	0
Nagaland	16	32	50	0	32	0	0	32	0	3	32	9.4						
Orissa	0	760	0	0	760	0	44	759	5.8	57	761	7.5	175	761	23	202	761	26.5
Pondicherry	1	6	16.7	0	6	0	3	6	50	0	1	0						
Punjab	7	136	5.1	0	136	0	0	135	0	60	134	44.8	49	130	37.7	54	135	40
Rajasthan	24	190	12.6	18	191	9.4	0	191	0	22	189	11.6	0	191	0	0	191	0
Sikkim	0	108	0	53	108	49.1	0	108	0	81	108	75	0	108	0	0	108	0
Tamil Nadu	20	508	3.9	20	532	3.8	24	530	4.5	64	533	12	35	533	6.6	38	533	7.1
Tripura	0	15	0	0	15	0	0	15	0	9	15	60	0	15	0	0	15	0
Uttar Pradesh	54	479	11.3	30	536	5.6	0	482	0	346	532	65	260	482	53.9	285	482	59.1
Uttaranchal	6	119	5	9	119	7.6	0	119	0	36	78	46.2	9	24	37.5	16	77	20.8
West Bengal	43	407	10.6	13	410	3.2	32	401	8	140	406	34.5	323	401	80.5	346	401	86.3

Table 2.8: LAKES- Percent Violation (States/UT wise)

State Name	DO			pH			Conductivity			BOD			FC			TC		
	violating Records	Count	% violation	violating Records	Count	% violation	violating Records	Count	% violation	violating Records	Count	% violation	violating Records	Count	% violation	violating Records	Count	% violation
Andhra Pradesh	15	63	23.8	12	93	12.9	19	80	23.8	52	81	64.2	0	51	0	0	51	0
Assam	0	8	0	2	8	25	0	8	0	4	8	50	0	7	0	0	7	0
Bihar	0	7	0	0	7	0	0	4	0	2	7	28.6	2	7	28.6	2	7	28.6
Chandigarh	0	6	0	1	7	14.3	0	7	0	2	7	28.6						
Goa	0	22	0	14	23	60.9	0	23	0	3	22	13.6	0	12	0	0	22	0
Gujarat	2	16	12.5	4	16	25	3	16	18.8	10	16	62.5	1	16	6.3	1	16	6.3
Haryana	0	2	0	0	2	0	0	2	0	0	2	0						
Himachal Pradesh	12	52	23.1	5	52	9.6	0	52	0	15	52	28.8	0	44	0	0	44	0
Jammu & Kashmir	3	9	33.3	1	9	11.1	0	3	0	0	3	0						
Jharkhand	1	19	5.3	1	19	5.3	0	10	0	7	19	36.8	0	1	0	0	1	0
Karnataka	0	6	0	3	7	42.9	0	7	0	5	7	71.4	0	7	0	0	7	0
Kerala	1	59	1.7	6	59	10.2	19	59	32.2	5	59	8.5	2	59	3.4	2	59	3.4
Madhya Pradesh	0	35	0	0	36	0	0	35	0	14	36	38.9	0	33	0	0	36	0
Manipur	0	15	0	2	15	13.3	0	14	0	1	15	6.7				0	15	0
Meghalaya	0	36	0	0	36	0	0	36	0	23	36	63.9	11	36	30.6	0	36	0
Orissa	0	24	0	0	24	0	11	22	50	2	24	8.3	1	24	4.2	1	24	4.2
Pondicherry	0	4	0	3	4	75	0	4	0	0	2	0						
Punjab	0	4	0	0	4	0	0	4	0	1	4	25	1	4	25	1	4	25
Rajasthan	22	168	13.1	52	169	30.8	1	170	0.6	40	170	23.5	0	170	0	0	170	0
Tamil Nadu	6	85	7.1	15	85	17.6	10	85	11.8	21	85	24.7	13	85	15.3	12	85	14.1
Tripura	0	10	0	0	10	0	0	10	0	5	10	50	0	10	0	0	10	0
Uttar Pradesh	0	9	0	4	9	44.4	0	9	0	8	9	88.9	4	9	44.4	4	9	44.4
Uttaranchal	0	11	0	0	11	0	0	11	0	1	11	9.1						
West Bengal	2	109	1.8	12	110	10.9	0	72	0	76	110	69.1	77	106	72.6	81	108	75

Table 2.9: PONDS- Percent Violation (States/UT wise)

State Name	DO			pH			Conductivity			BOD			FC			TC		
	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation
Andhra Pradesh	15	46	32.6	8	67	11.9	28	57	49.1	52	56	92.9	0	31	0	0	32	0
Assam	8	90	8.9	16	90	17.8	3	90	3.3	59	90	65.6	0	75	0	0	75	0
Bihar	0	6	0	1	6	16.7	0	6	0	1	6	16.7	2	6	33.3	3	6	50
Gujarat	0	4	0	0	4	0	0	4	0	0	4	0	0	4	0	0	4	0
Kerala	0	12	0	0	12	0	0	12	0	7	12	58.3	0	12	0	0	12	0
Manipur	11	25	44	2	25	8	0	25	0	6	25	24				0	25	0
Orissa	4	70	5.7	1	72	1.4	0	70	0	67	72	93.1	28	72	38.9	31	72	43.1
Uttar Pradesh	4	8	50	4	8	50	1	7	14.3	6	6	100	5	8	62.5	6	8	75

Table 2.10: TANKS- Percent Violation (States/UT wise)

State Name	DO			pH			Conductivity			BOD			FC			TC		
	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation	Violating Records	Count	% violation
Andhra Pradesh	17	63	27	10	75	13.3	30	9	43.5	57	69	82.6	0	53	0	0	54	0
Assam	2	4	50	2	4	50	0	4	0	1	4	25	0	3	0	0	3	0

CHAPTER III

Water Quality Trend in India

3.1 Water Quality Trend

The water quality monitoring results obtained during 1995 to 2011 indicate that the organic and bacterial contamination are continued to be critical in water bodies. This is mainly due to discharge of domestic wastewater mostly in untreated form from the urban centres of the country. The municipal corporations at large are not able to treat increasing load of municipal sewage flowing into water bodies without treatment. Secondly the receiving water bodies also do not have adequate water for dilution. Therefore, the oxygen demand and bacterial pollution is increasing day by day.

The water quality monitoring results were analysed with respect to indicator of oxygen consuming substances (Bio-chemical Oxygen Demand) and indicator of pathogenic bacteria (Total coliform and Faecal coliform). The result of such analysis shows that there is gradual degradation in water quality. The number of observations having BOD and Coliform density has increased during 1995 to 2011. The water quality status for the period 1995 to 2011 in terms of number of observations having values of parameters in different ranges are given in the figure 2 to figure 4.

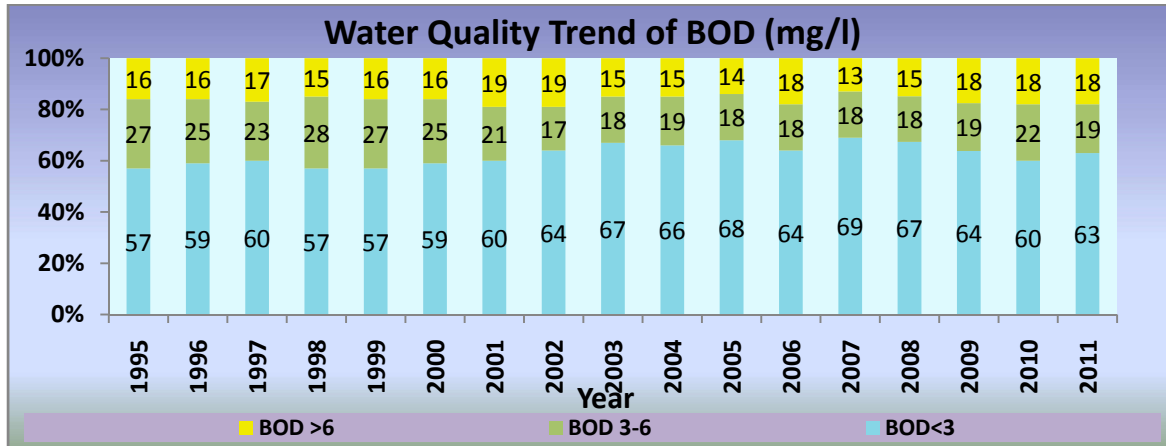
3.2 Biochemical Oxygen Demand (BOD)

The numbers of observed BOD values less than 3 mg/l were between 57-69% during year 1995 to 2011. The maximum value of 69% was observed during 2007. It was observed that there was a gradual decrease in number of observations having BOD < 3.

The number of observed BOD values ranges from 3-6 mg/l was between 17-28% during year 1995 to 2011, the maximum value of 28% was observed in the year 1998. It was observed that there was a gradual decrease in number of observations having BOD between 3-6 mg/l.

The numbers of observed BOD value > 6 mg/l were between 13 and 19% during year 1995-2011 and the maximum value of 19% was observed in the year 2001 and 2002. It was observed that there was a gradual decrease and in 2011 the percentage observation was 18 % having BOD >6.

Figure 2: Water Quality Trend (BOD, mg/l)



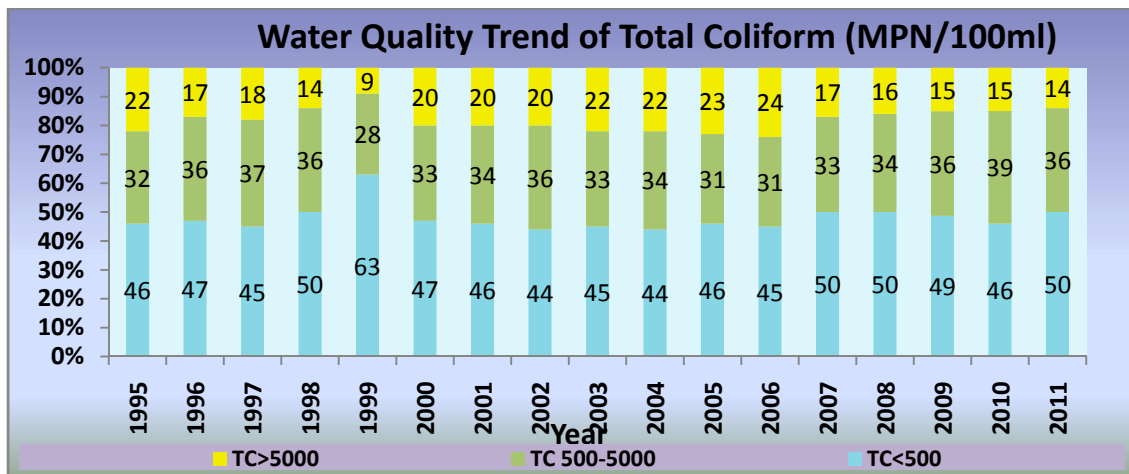
3.3 Total Coliform (TC)

The numbers of observed TC values < 500 MPN/100 ml were between 44-63% during 1995-2011. The highest percentage of observations was observed as 63% in year 1999 which decreases to 50% during 2011.

The numbers of observed TC values ranges from 500-5000 were between 28-39% during year 1995-2011 the maximum value of 39% was observed in 2010.

The numbers of observed TC values > 5000 were between 9-24% during year 1995-2011. Minimum value of 9% was observed during the year 1999. The maximum value of 24% was observed in the year 2006. During 2011 it was observed as 14% indicating decreasing trend.

Figure 3: Water Quality Trend (Total Colliform, MPN/100 ml)



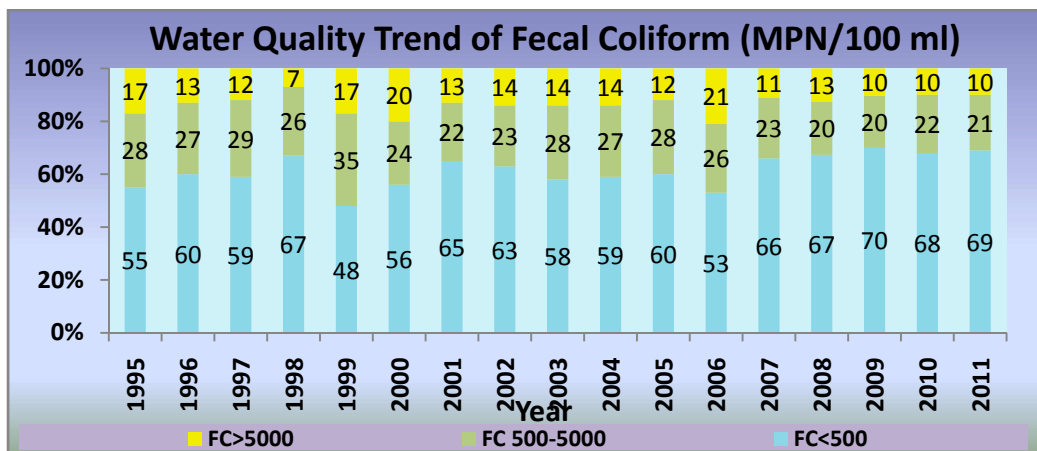
3.4 Faecal Coliform (FC)

The numbers of observed FC values <500 MPN/100 ml was between 48-70% during year 1995-2011. The maximum value of 70% was observed in the year 2009.

The numbers of observed FC values ranges from 500-5000 MPN/100 ml was between 20-35% during year 1995 to 2011. The maximum value of 35% was observed in the year 1999, which decreases to 21% in the year 2011.

The numbers of observed FC values > 5000 MPN/100 ml was between 7-21% during year 1995-2011. The maximum value of 21% was observed in 2006, which decreases to 10% in the year 2011.

Figure 4: Water Quality Trend (Faecal Colliform, MPN/100 ml)



3.5 Water Quality trend of BOD in Rivers

The Water Quality trend of BOD in River Ganga, Yamuna, Sabarmati, Mahi, Tapi, Narmada, Godavari, Krishna, Cauvery, Mahanadi, Brahmani, Baitarni, Subarnarekha, Brahmaputra, Satluj, Beas, Pennar and Ghaggar depicting the data from 2002 to 2011 is presented in figure 3.2 to 3.19.

Figure 3.2: Water Quality Trend of BOD in River Ganga

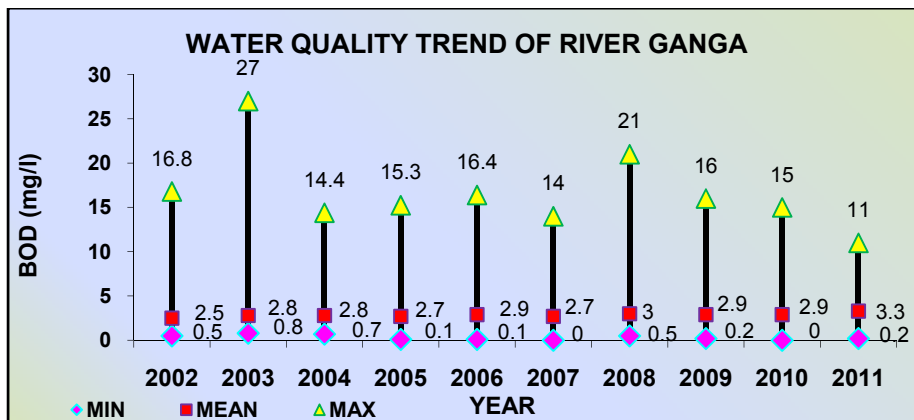


Figure 3.3: Water Quality Trend of BOD in River Yamuna

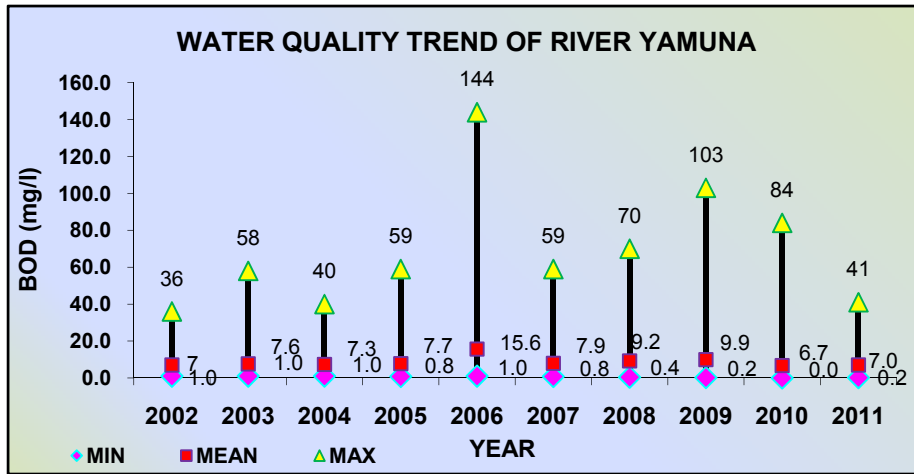


Figure 3.4: Water Quality Trend of BOD in River Sabarmati

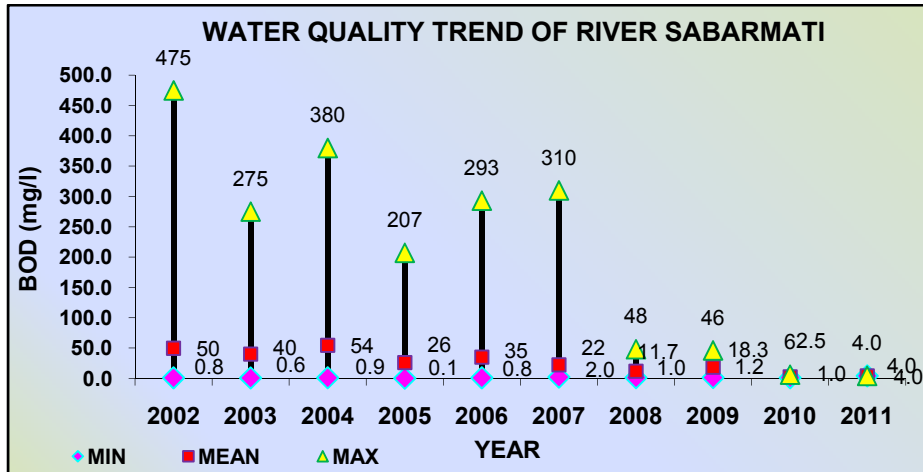


Figure 3.5: Water Quality Trend of BOD in River Mahi

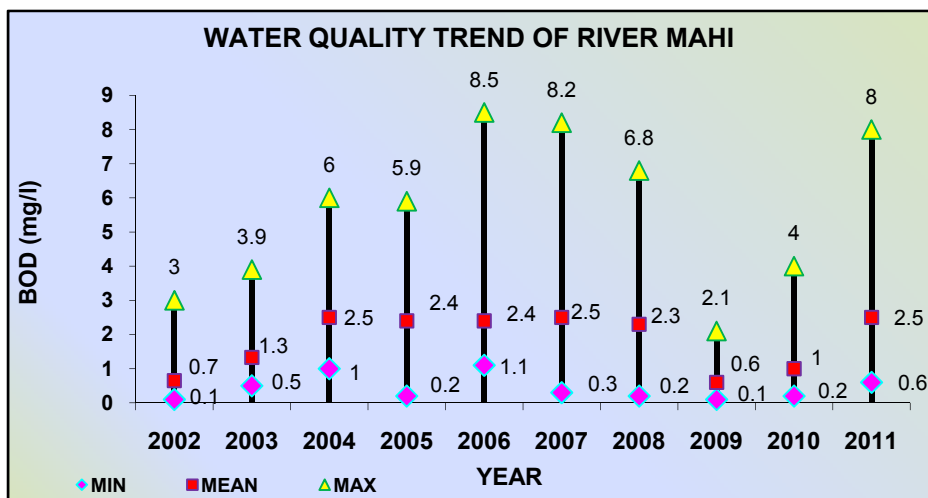


Figure 3.6: Water Quality Trend of BOD in River Tapi

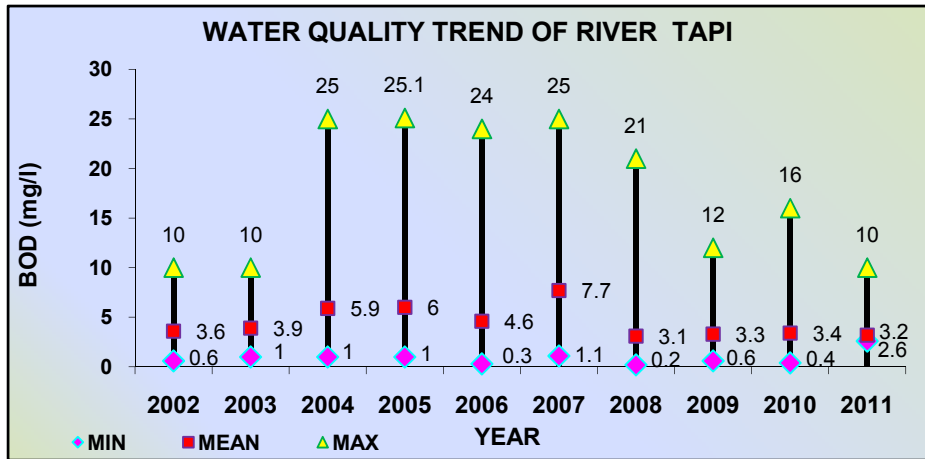


Figure 3.7: Water Quality Trend of BOD in River Narmada

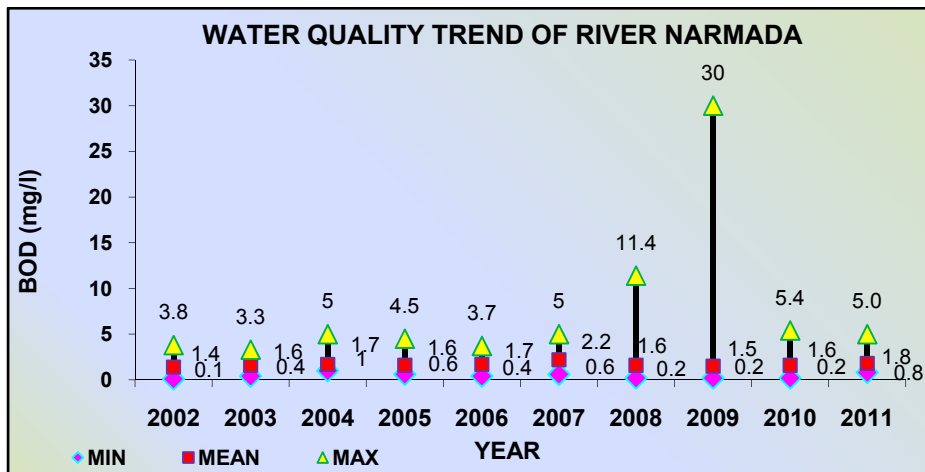


Figure 3.8: Water Quality Trend of BOD in River Godavari

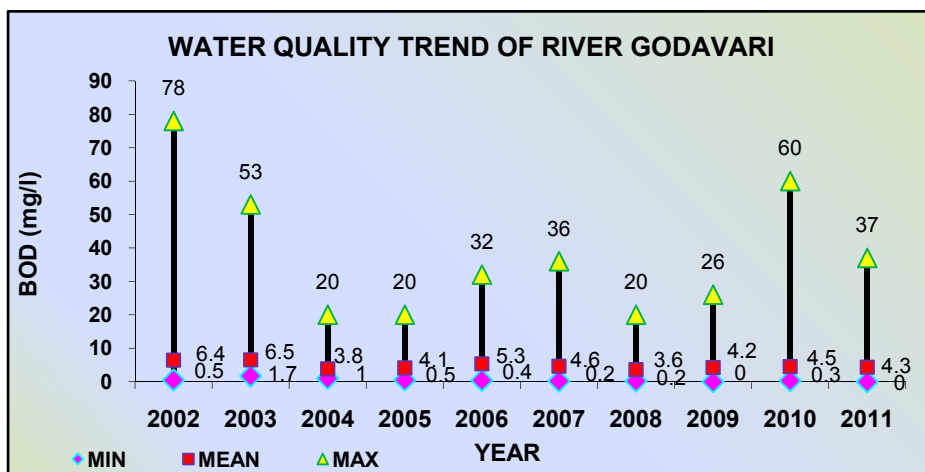


Figure 3.9: Water Quality Trend of BOD in River Krishna

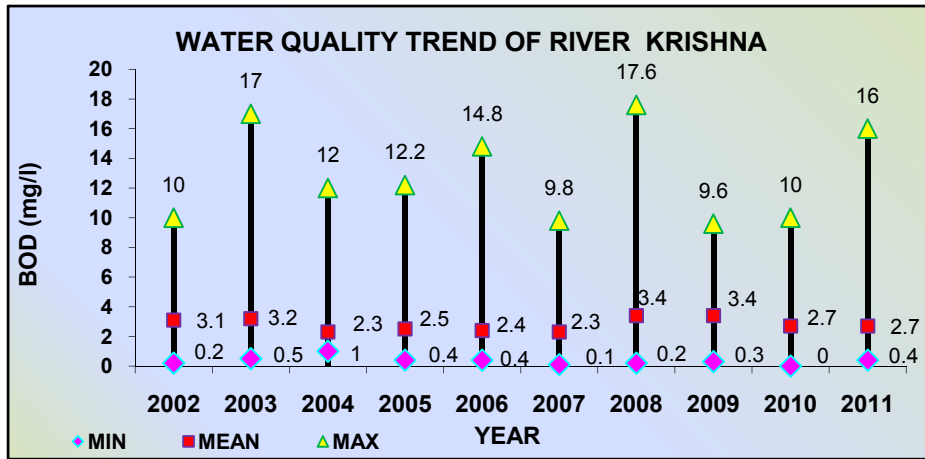


Figure 3.10: Water Quality Trend of BOD in River Cauvery

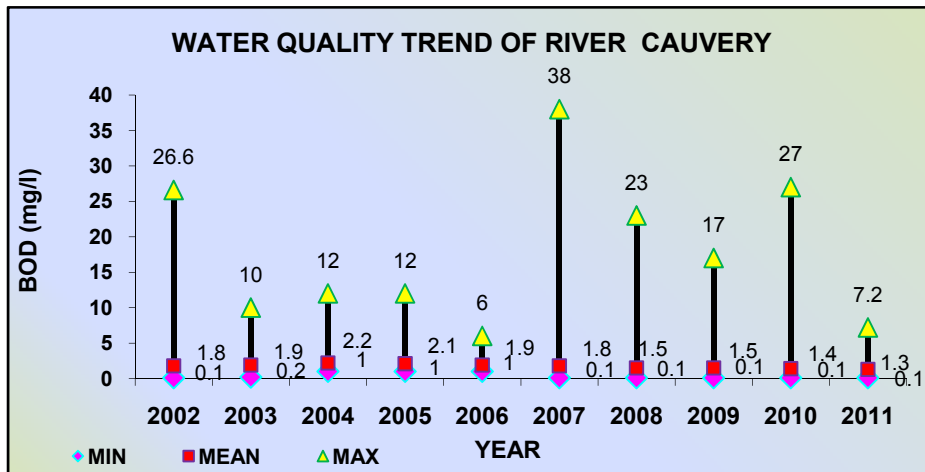


Figure 3.11: Water Quality Trend of BOD in River Mahanadi

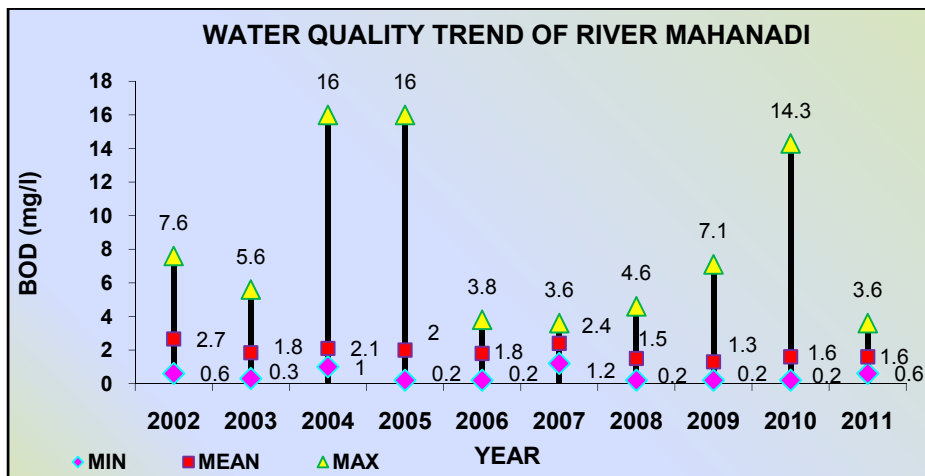


Figure 3.12: Water Quality Trend of BOD in River Brahmani

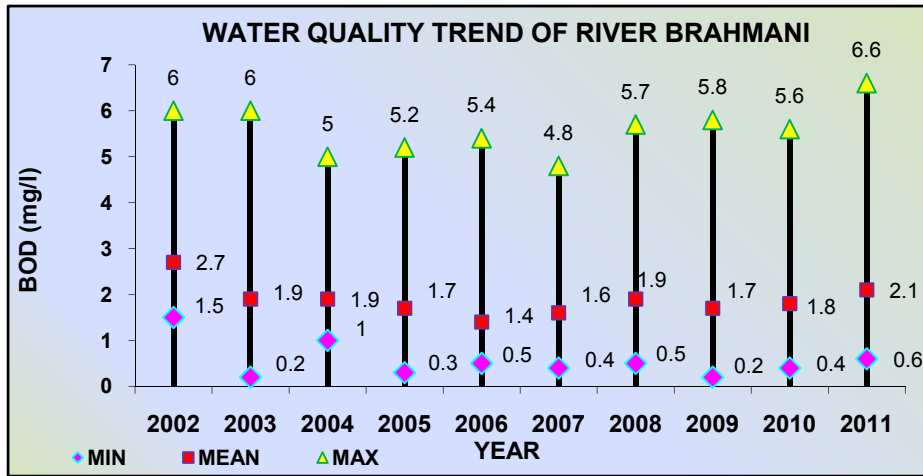


Figure 3.13: Water Quality Trend of BOD in River Baitarni

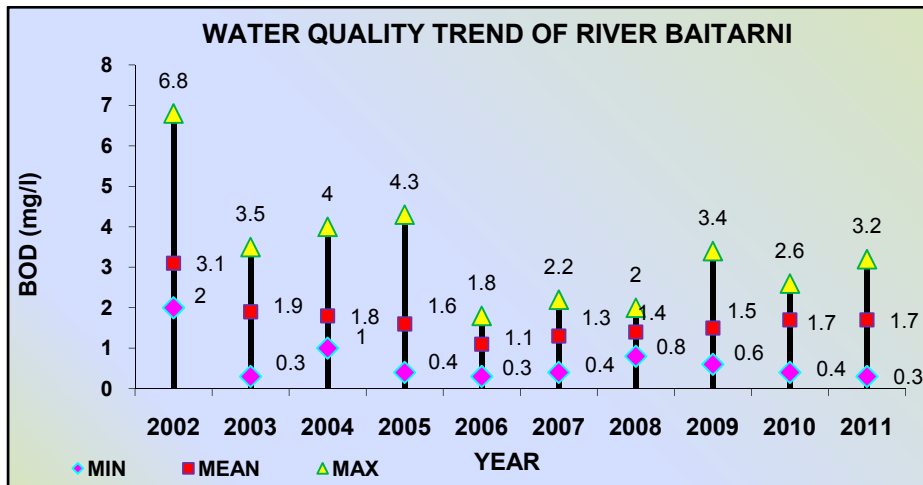


Figure 3.14: Water Quality Trend of BOD in River Subarnarekha

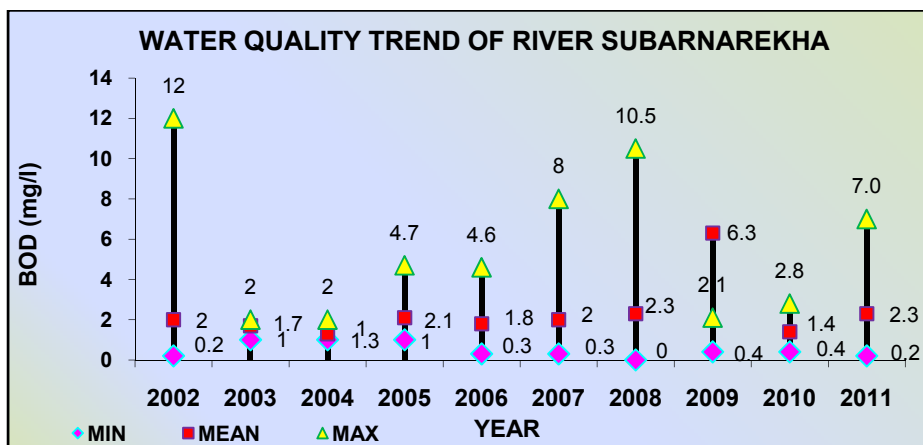


Figure 3.15: Water Quality Trend of BOD in River Brahmaputra

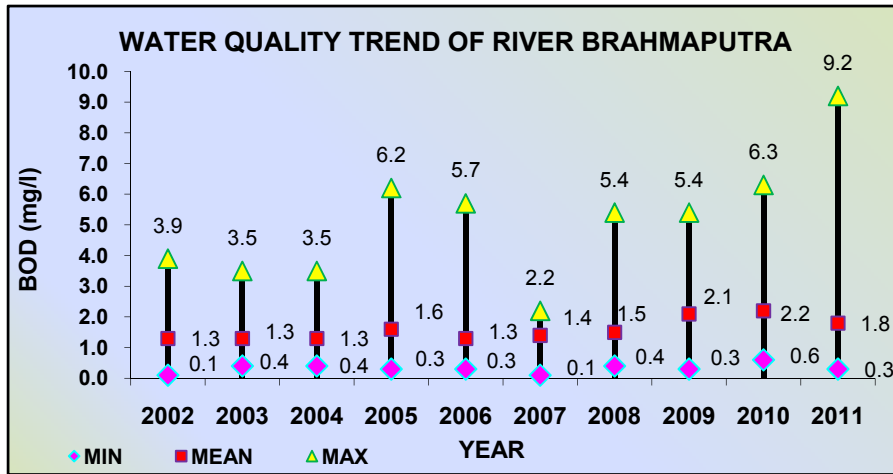


Figure 3.16: Water Quality Trend of BOD in River Satluj

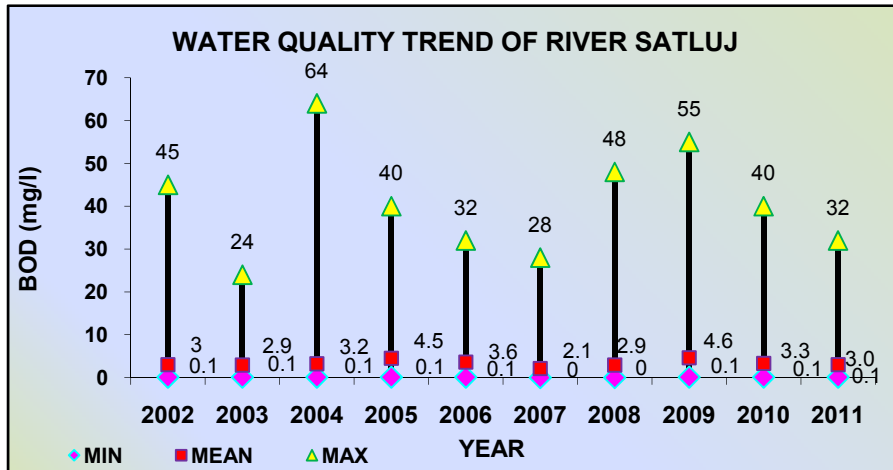


Figure 3.17: Water Quality Trend of BOD in River Beas

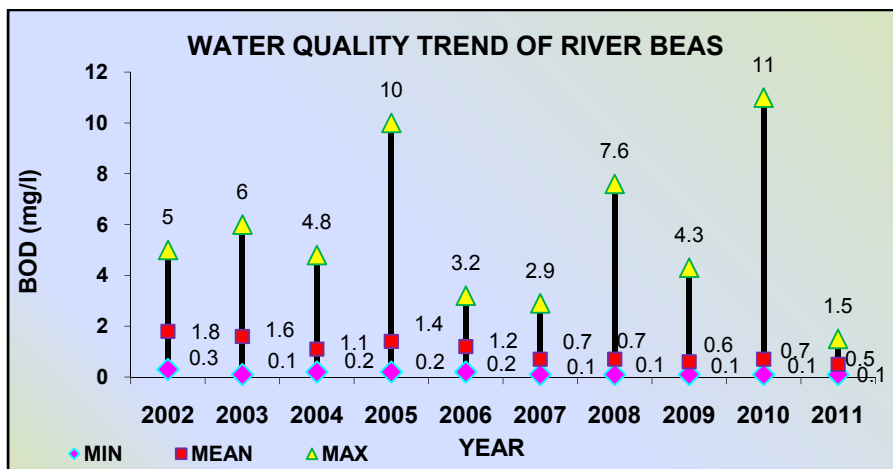
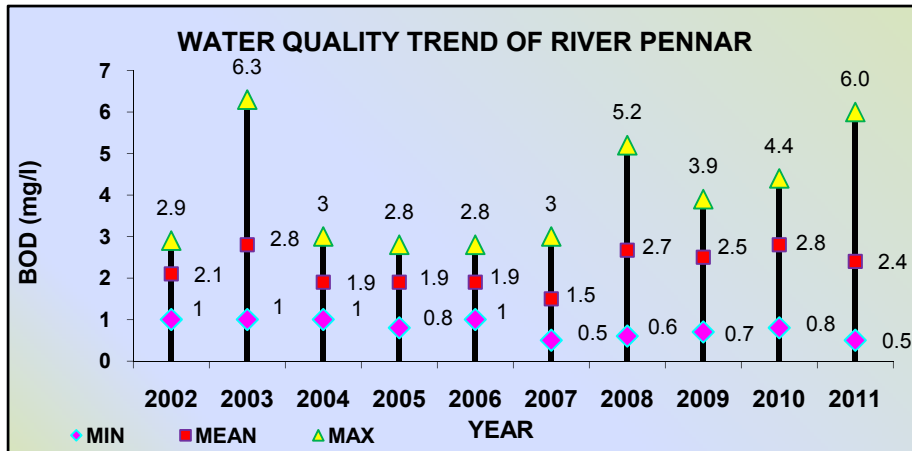


Figure 3.18: Water Quality Trend of BOD in River Pennar



3.6 Observed Water Quality

Water Quality of Rivers at a Glance

The monitoring results obtained during 2011 under National Water Quality Monitoring Programme reflect that organic matter & bacterial population of faecal origin continue to dominate the water pollution problem in India. The major water quality concerns as revealed from the monitoring results are pathogenic pollution as reflected through indicators i.e. Total Coliforms (TC) & Faecal Coliform (FC), organic matter as reflected through Biochemical Oxygen Demand (BOD) and salinity as reflected through conductivity. The observed range of water quality parameters in major Indian rivers for the year 2011 along with summary for the year 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 and 2010 is given in Table 3.1 for comparative assessment of water quality trend between the years.

Table 3.1: Water Quality in Indian Rivers during the years – 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010 and 2011

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
<i>Ganga</i>	2525	34	2002	3-34	6.4-9.0	19-2720	2.7-11.5	0.5 – 16.8	300-25x10 ⁵	20-11x10 ⁵
		34	2003	4-34	6.8-8.9	49-1323	4-11	0.8-27	47-45x10 ⁵	26-12x10 ⁵
		34	2004	5-35	7-8.8	72-4080	0.3-13.2	0.7-14.4	11-45x10 ⁵	11-7x10 ⁵
		39	2005	4-39	6.1-9	23-1696	3.2-12.8	0.1-15.2	13-45x10 ⁵	13-11x10 ⁵
		39	2006	9-33	7.0-8.88	97-5620	2.2-11.9	0.1-16.4	1-25x10 ⁵	17-11x10 ⁵
		39	2007	4-33	6.1-8.8	23-5040	1.4-11	0-14	0-28x10 ⁵	0-7 x10 ⁵
		39	2008	2.5-35.5	6.1-8.9	39-6320	1.2 - 11.6	0.5-21.0	0- 101 x10 ⁵	0 - 85 x10 ⁴
		57	2009	4-37	6.5-8.9	68-4460	4.3-11.2	0.2-16	2-65 x10 ⁴	0-4 x10 ⁵
		57	2010	4-35	6.7-9.0	21-5250	3.6-12	0.2-15	3-14 x10 ⁵	2-4 x10 ⁵
		61	2011	3-37	6.7-9.1	49-10240	4-14.3	0.2-11	5-25 x10⁵	5-11 x10⁵
<i>Yamuna</i>	1376	23	2002	3-34	6.7-9.8	56-1959	0.1-22.7	1.0 – 36	27-26.3x10 ⁶	11-17.2x10 ⁵
		23	2003	2-38	6.6-10	45-3500	0.3-22.8	1-58	110-171x10 ⁷	40-203x10 ⁶
		23	2004	7-35	6.8-9	76-2150	0.3-19.5	1-40	21-1103x10 ⁶	18-62x10 ⁶
		23	2005	11-37	6.8-9.1	90-2290	0.5-17.3	0.8-59	14-307x10 ⁶	11-52x10 ⁵
		23	2006	4-34	7.14-9.5	220-1876	1.3-18.8	1.0-144	7-231x10 ⁷	2-13x10 ⁶
		23	2007	6.5-34	5-8.4	57-1940	0-17.7	0-93	0-32 x10 ⁷	0-23 x10 ⁶
		23	2008	7.5-32	6.8 - 9.5	40-3340	0.0 - 20.6	0.4-70.0	0 - 103x10 ⁶	11 -109x10 ⁵
		27	2009	5-35	7.0 - 8.8	80 - 3040	0.0 - 17.9	0.2 - 103	4 - 23 x10 ⁹	9 - 21 x10 ⁸

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		27	2010	5-35	6.1-9.4	100-2220	0.0-21.1	08-84	13 - 39x10 ⁷	9 - 29x10 ⁶
		32	2011	4-38	6.9-8.8	60-1905	0-17	0.2-41	10-16 x10⁸	4-11 x10⁸
Mahi	583	7	2002	19-34	7.1-9.2	175-5720	0.2-8.5	0.1 – 3.0	3-2400	3-75
		7	2003	18-34	7-8.8	97-750	2.9-10.1	0.5-3.9	4-2400	2-28
		7	2004	20-34	7.4-9.2	166-650	2.7-8.7	0.3-4.9	4-1600	2-28
		9	2005	20-32	7.5-9	182-7080	4.1-11.1	0.2-5.9	3-14x10 ³	2-1x10 ³
		9	2006	16-28	7.2-8.9	263-580	7.3-12.1	1.1-8.5	3-180	2-9
		9	2007	20-31	7.6-8.89	234-3720	0.4-10.7	0.3-5.7	4-160	0-11
		9	2008	20- 32	7.2-8.9	225-1660	4.6-13	0.2-6.8	0-210	0- 18
		9	2009	22-32	7.1-10	160-766	3.5-8.6	0.1-4.0	3-170	0-9
		9	2010	20 - 34	7.4 – 8.7	230-7234	3.5 – 9.9	0.22- 4.0	4 - 110	0 -7
		11	2011	18-36.5	7.1-9.1	256 -1310	3.2-8.9	0.6 -8.0	7-28	2-9
Tapi	724	10	2002	20-40	7.4-9.0	76-700	4.8-8.8	0.6 – 10.0	40-2100	2-210
		10	2003	18-36	3.1-9.2	119-1130	3.1-10.4	1-10	30-930	2-230
		10	2004	13-39	3.1-9.5	190-790	1.2-8.7	0.7-36	3-5X10 ⁵	2-9X10 ⁴
		13	2005	26-30	7.2-9.4	186-1084	4-8.4	1-25.1	2-46X10 ⁴	2-15X10 ⁴
		13	2006	14-31	7.7-9.28	161-923	4.6-9.7	0.3-24	5-11X10 ⁴	2-11X10 ⁴
		14	2007	23-39	7.3-8.5	210-581	3.7-8.7	1.1-25	17-46 x10 ³	7-15 x10 ³
		14	2008	19-41	6.6-8.9	132-26000	2.1- 8.8	0.1-21	0-46 X10 ⁴	0-24 X10 ⁴

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		14	2009	18-42	6.2-8.9	173-45400	3.7-8.2	0.6-12	14-39000	0-14000
		14	2010	15 - 42	7.0-8.7	125- 39400	1 -8.1	0.4 - 16	9- 9300	0 - 4300
		14	2011	24-41.5	7.0-8.7	172-41836	3.2-7.6	1.2-10	22-24000	9 -9000
Narmada	1312	14	2002	-	6.9-9.3	102-1341	5.8-9.8	0.1 – 3.8	9-2400	2-64
		14	2003	12-31	7.1-8.5	95-441	4.5-9.5	0.4-3.3	4-1600	1-110
		14	2004	15-34	7-8.6	181-815	5.5-9.6	0.2-3.8	3-2400	2-15
		15	2005	21-30	3.3-9	190-1746	4.8-10.9	0.6-4.5	3-2400	2-210
		15	2006	9-32	7.1-8.6	188-682	6.2-11	0.4-3.7	3-2400	0-39
		15	2007	19-31	7.5-8.8	244-1629	6.2-10.4	1.2-3.5	7-1600	0-15
		21	2008	14-32	6.8-10	180-853	4.9- 13	0.2 -11.4	0-2400	0-140
		21	2009	17-33	6.5-8.9	178-1930	4.2-11.5	0.2-30	2-1600	0-90
		21	2010	19 - 39	7.2 – 8.5	194 -727	4.8 - 11	0.21- 5.4	4 - 11000	0 - 4600
		26	2011	14.7-38	7.1- 8.6	217-651	6.2- 9.9	0.8- 5.0	4-1600	0-17
Godavari	1465	11	2002	22-35	7.0-9.0	118-1400	3.1-10.9	0.5 – 78.0	8-5260	2-3640
		11	2003	22-37	7.1-8.7	115-1350	3.2-9.3	1.7-53	70-68200	3-1400
		11	2004	21-35	6.5-9	86-1290	2.4-9.2	0.2-15	4-22 x 10 ⁴	2-5 x 10 ⁴
		18	2005	23-32	6.7-9.1	121-1300	0.8-8.7	0.5-20	2-33 x 10 ³	1-10 x 10 ³
		18	2006	19-34	6.65-9.11	75-691	1.1-9.6	1.2-32	2-31 x 10 ³	2-6 x 10 ³
		18	2007	20-37	5.9-8.9	126-918	3.2-7.5	0.2-36	0-2200	5-36 x10 ³

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		35	2008	13-35	5.2-9.6	114-3994	1.2-11.3	0.2-20	3-28 x 10 ³	0-800
		35	2009	15-41	6-9.2	115-3169	3.2-12.3	0.0-26	5-16000	0-340
		35	2010	12-40	5.4-8.9	91-1670	1.8-14.2	0.3-60	2-2400	1-1600
		35	2011	18-40	6.4-9.1	132-1959	1.2-12.2	0.0-37	7-2400	1-500
Krishna	1401	17	2002	18-33	6.8-9.5	28-11050	2.9-10.9	0.2 – 10.0	17-33300	3-1 x 10 ³
		17	2003	18-35	6.7-8.9	36-40000	0.7-12.6	0.5-17	6-7 x 10 ⁴	2-2 x 10 ⁴
		17	2004	18-38	6.7- 9	71-44000	0.4-9.2	0.3-9	15-124 x 10 ³	3-28 x 10 ³
		21	2005	24-37	6.5-9.9	69-43300	1.4-8.8	0.4-40	17-84 x 10 ³	1-34 x 10 ³
		19	2006	15-40	6.32-9.30	76-2580	3.0-8.5	0.4-14.8	4-86 x 10 ³	1-6 x 10 ³
		19	2007	13-38	6.2-9.1	69-23400	3.0-10	0.1-9.8	0-71x10 ³	0-1600
		22	2008	17.3-39	5.8-8.9	44-14290	1.1-9.8	0.2-17.6	8-16 x 10 ³	0-3 x 10 ³
		22	2009	18.4-41	6.7-9.0	75-19960	0-12.6	0.3-9.6	8-170000	0-1400
		24	2010	17-39	6.5-9.1	42-16720	1.5-11.8	0-10	2-4000	0-1600
		26	2011	19.2-38	6.9-8.7	99-8570	1.7-15.8	0.4-16	4-16000	2-9000
Cauvery	800	20	2002	21-37	2.0-9.2	31-53100	0.1-12.6	0.1 – 26.6	39-16 x 10 ³	2-28 x 10 ³
		20	2003	8-34	7-9.2	42-57200	2.1-13.5	0.2-10	4-22 x 10 ³	2-4 x 10 ³
		20	2004	19- 35	6.6-9	35-39720	3.3-9.9	1-9	2-5 x 10 ⁴	2-17 x 10 ³
		20	2005	20-37	6.2-9.5	28-48700	0.3-9.8	1-12	2-9500	1-3 x 10 ³
		20	2006	20-34	7.0-9.3	26-1694	2.7-8.9	1-6	90-3500	3-1400

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		20	2007	19-32	6.5-8.8	28-56500	0-12.4	0.1-38	40-28 x10 ³	4-17 x10 ³
		20	2008	20-35	6.5-8.8	27-28700	0.6-14	0.1-23	27-5400	0-3500
		20	2009	20-34	6.5-8.9	65-81800	1.5-10.3	0.1-17	7-9200	2-5400
		29	2010	21-30	6.5-8.9	18-8430	0.4-12.2	0.1-27	70-15000	20-12000
		31	2011	20-34	4.3-8.9	7-3640	1.7-10.9	0.1-7.2	90-6200	20-2200
Mahanadi	851	16	2002	18-38	7.3-8.9	114-15940	1.3-10.4	1.0 – 7.6	15-30000	50-17000
		16	2003	17-37	6.5-8.6	77-83600	4.7-10.1	0.3-5.6	4-35X10 ³	50-28X10 ³
		16	2004	17- 34	6.3-8.8	105-20700	4.4- 9.4	0.2-4	3-92X10 ³	27-24X10 ³
		21	2005	22-34	6.1-8.7	75-36279	4.5-10	0.2-16	3-92X10 ³	78-54X10 ³
		21	2006	20-32	6.97-8.9	113-34587	4.7-8.5	0.2-3.8	14-92X10 ³	68-54X10 ³
		21	2007	26-33	7.3-8.54	102-813	6.2-8.9	1.2-3.6	27-35 x10 ³	700-17 x10 ³
		22	2008	18-36	6.7-8.8	109-29400	0.8-8.9	0.2-4.6	15-16 x10 ⁴	310- 54 x10 ³
		22	2009	17-39	6.7-8.8	103-48830	0.2-11	0.2-7.1	5-1600000	110-160000
		22	2010	17-39	7.0 – 9.3	92 - 42350	4.4-11	0.2 – 14.3	10 - 160000	45 - 92000
		23	2011	18-36	7.1–8.5	90 - 13190	4.9 -10.5	0.6 -3.6	10- 160000	78-160000
Brahamani	799	11	2002	20-38	7.0-8.4	81-376	5.2-9.8	1.5 – 6.0	80-90000	40-60000
		11	2003	17-35	6.6-8.4	69-501	6.1-10.2	0.2-6	90-24x10 ³	60-14x10 ³
		11	2004	16-28	6.3-8.4	47-402	6-9.6	0.2-7	490-28x10 ³	22-13x10 ³
		11	2005	16-34	6.3-8.7	65-850	5.1-13.8	0.3-5.2	490-16x10 ⁴	330-16x10 ⁴

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		11	2006	18-32	6.9-8.4	102-380	4.6-8.9	0.3-5.4	940-5400	630-2400
		15	2007	20-40	6.7-8.5	91-582	1.9-8.9	0.3-4.9	210-54 x10 ³	110-22 x10 ³
		16	2008	18-38	6.4-8.4	93- 664	5.3- 9.7	0.4-6.2	750-21 x10 ³	110- 14 x10 ³
		16	2009	12-40	6.6-8.5	70-431	4.5-18.3	0.2-5.8	940-22000	460-13000
		16	2010	17-37	6.6-8.5	97-623	5.6-12	0.4-5.6	330-92000	130-35000
		16	2011	15-38	6.7-8.5	93 - 458	5.0 - 9.9	0.6 - 6.6	330-92000	170-35000
Baitarni	-	5	2002	24-36	7.3-8.3	54-78400	6.8-9.3	2.0 – 6.8	900-22000	700-11000
		5	2003	18-36	6.7-7.8	75-54802	5.4-11.3	0.3-3.5	330-16x10 ³	230-9x10 ³
		5	2004	18-32	6.6-8.1	64-29118	5.9-9.8	0.4-2.6	640-92000	310-35x10 ²
		5	2005	24-34	7-8.6	68-42257	5.2-8.8	0.4-4.3	790-24x10 ³	3330-11x10 ³
		5	2006	15-25	7.6-8.4	90-2287	7.4-8.0	0.3-1.8	1400-4300	790-1700
		5	2007	22-35	7.3-8.2	136-19450	5.6-8.8	0.4-2.2	330-5400	170-2200
		5	2008	22-36	7.5-8.2	75-48400	6.3-9.2	0.8-2	940-5400	700-3500
		5	2009	25-38	6.7-8.4	69-28400	6.1-9.0	0.6-3.4	630-5400	230-2800
		5	2010	18 - 36	6.6-8.3	98 - 33320	5.6 – 8.8	0.4 – 2.6	470 - 16000	210 - 5400
		5	2011	15-36	7.1-8.4	83- 32540	5.2-11.9	0.3- 3.2	350 - 54000	140 - 24000
Subarnarekha	395	6	2002	18-36	6.5-8.0	113-355	5.2-8.5	0.2 – 12.0	150-1800	70-540
		6	2003	22-35	7.3-8.3	133-346	6.4-8.4	1-2	300-7900	130-3300
		6	2004	24-28	7.8-8.3	152-623	7.1-7.5	0.4-2.5	470-2200	270-700

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		6	2005	20-36	6.8-8.3	130-405	5.5-8.6	1.0-4.7	110-1400	78-700
		6	2006	19-34	6.9-7.9	192-15013	5.8-8.2	0.3-4.6	2200	1300
		6	2007	19-37	6-8.1	134-740	4.6-8.7	0.9-8.0	540-2400	200-920
		12	2008	19-35.5	6.5-8.0	119-332	5.1-8.9	0.0-10.5	540-3500	200-1700
		12	2009	19.5-40	6.4-8.4	164-717	4.0-8.5	0.4-6.3	280-2400	70-1300
		12	2010	19-38	6.8-8.0	152-244	5.9-8.2	0.4-2.8	-	-
		12	2011	15-38	6.5-8.4	126-408	3.0-8.6	0.2-7.0	750-43000	110-15000
<i>Brahmaputra</i>	916	6	2002	15-32	6.5-9.0	104-684	1.1-10.5	0.1 – 3.9	360-240000	300-24000
		6	2003	14-32	6.4-8.4	77-570	1.2-11.5	0.4-3.5	360-24x10 ⁴	300-24x10 ⁴
		6	2004	15-34	5.2-9	91-445	1.1-9.4	0.4-4.3	360-24x10 ⁴	300-24x10 ⁴
		10	2005	-	5.9-7.6	20-408	2-10.5	0.3-6.2	300-24x10 ⁴	150-24x10 ⁴
		10	2006	18-30	6.9-8.0	55-485	4.2-10.2	0.3-5.7	1-24x10 ⁴	300-24x10 ⁴
		10	2007	18-32	5.9-7.9	76-645	5.1-10	0.1-3.4	0-24 x10 ⁴	0-24 x10 ⁴
		10	2008	12-32	6.1-8.1	75-460	3.3-9.6	0.4-5.4	1-24 x10 ⁴	0-24 x10 ³
		10	2009	17-31	6.1-8.1	69-303	4.4-10.5	0.3-5.4	1-24000	0-1100
		10	2010	18-32	6.5-8.1	49-371	3.6-9.4	0.6-6.3	0-3000	0-360
		10	2011	17-32	6.1-8.5	68-238	4.4-30	0.3-9.2	0-15000	0-1500
Satluj	1078	20	2002	9-32	6.8-8.8	131-819	3.8-11.4	0.1 – 45.0	8-35000	2-3500
		20	2003	5-30	6.9-8.9	164-1226	3.4-11.5	0.1-24	3-3x10 ⁴	1-1300

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters						
				Temp.(°C)	pH	Conductivity(µmhos/cm)	DO(mg/l)	BOD(mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		20	2004	9-29	7.1-8.3	144-694	1.6-10.3	0.1-64	7-2x10 ⁵	2-9x10 ⁴
		21	2005	10-28	7.1-8.3	150-818	2.8-14.2	0.1-40	1-35x10 ⁴	1-11x10 ⁴
		21	2006	7-28	7.1-8.26	160-958	2.8-10.6	0.1-32	1-17x10 ⁴	1-5x10 ⁴
		21	2007	2-26	7-8.6	145-865	3.2-11.9	0-28	3-17 x10 ⁴	0-9 x10 ⁴
		21	2008	4.5-23	7.0-8.5	162-843	1.2 - 12.4	0.0-48	12- 11 x10 ⁴	0 - 10 x10 ³
		22	2009	7.5-26	6.3-8.5	124-932	0.6-11.4	0.1-55	4-250000	0-110000
		23	2010	4-27	4.2-8.6	155-982	4.1-11.1	0.1-40	6 -1 x10 ⁵	2-5 x10 ⁴
		23	2011	1.8-25	6.8-8.69	87-1022	3.8-12	0.1-32	4-90000	2 - 50000
Beas	460	19	2002	3-32	7.1-8.7	53-517	5.2-11.5	0.3 – 5.0	2-2400	2-1600
		19	2003	4-29	7.3-8.9	76-559	7-12	0.1-6	2-2400	2-1600
		19	2004	2-29	6.9-8.5	60-396	6.8-11.8	0.2-4.8	2-5x10 ⁴	2-3500
		19	2005	4-27	7-8.8	54-395	4.8-13	0.2-10	2-11x10 ³	2-1100
		19	2006	4-27	7.0-8.2	94-395	5.8-11.0	0.2-3.2	2-11x10 ³	2-1100
		19	2007	2-22	6.2-8.9	86-470	5.9-12.8	0.1-2.9	0-2400	0-2400
		19	2008	1.5-22	7.0-8.4	53-432	3.8-12.5	0.1-7.6	2-1600	2-1600
		23	2009	5- 26	7.1-8.5	46-338	6.4-11.8	0.1-4.3	7-2400	2-1600
		23	2010	5-26	6.2-8.8	63-548	5.8-11.2	0.1-2.8	7-39000	2-7000
		23	2011	2.5-24	6.5-8.87	49-638	5-12.5	0.1-1.5	8-2400	0 - 920

CHAPTER IV

Water Quality of Rivers in Indus Basin

4.1 Indus River System

The Indus Basin is bounded on the east by the Great Himalayas, on the north by the Karakoram and Haramosh ranges, on the west by the Sulaiman and Kirthar ranges and on the south by the Arabian Sea. The basin in Indian Territory has a maximum east-west length of about 855 km and maximum north south width of about 560 km.

The Indus rises near Manasarowar Lake in Tibet Plateau (China). The river has five tributaries in India; they are the Jhelum, the Chenab, the Ravi, the Beas, and the Sutlaj. The Jhelum, the Ravi and the Sutluj rivers each have a considerable length running along the international boundary.

The basin area of Indus is covering the States of Jammu & Kashmir, Haryana, Himachal Pradesh, Punjab, Chandigarh and Rajasthan., The important urban centres in these States are Ambala, Shimla, Jalandhar, Moga, Pathankot, Ludhiana, Batala, Patiala, Hoshiarpur, Amritsar, Bathinda, Abohar, Ganganagar, Chandigarh, Barnala, Faridkot, Fazilka, Firozpur, Firozpur Cantt., Gurdaspur, Kapurthala, Khanna, KotKapura, Malerkotla, Malout, Mansa, Muktsar, Phagwara, Rajpura, S.A.S.Nagar, (Mohali), Sangrur, Nabha, Panchkula Urban Estate, Hanumangarh.

4.2 Water Quality Monitoring in Indus Basin

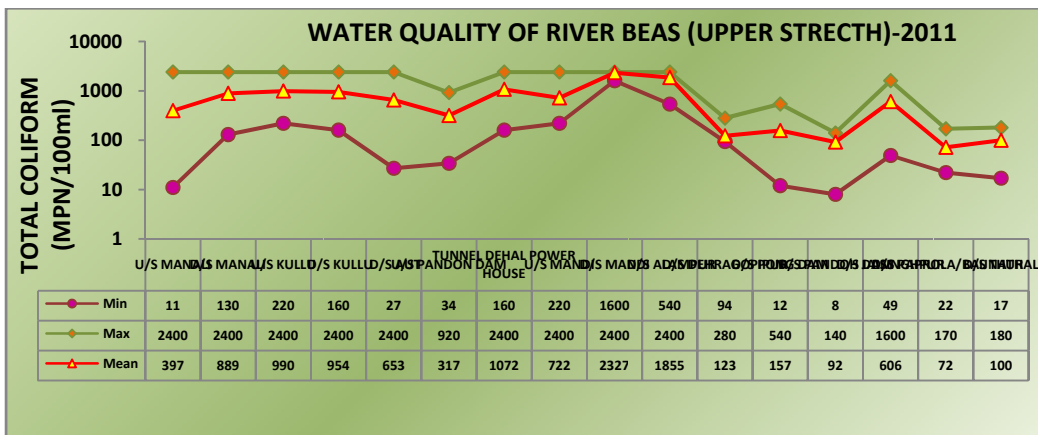
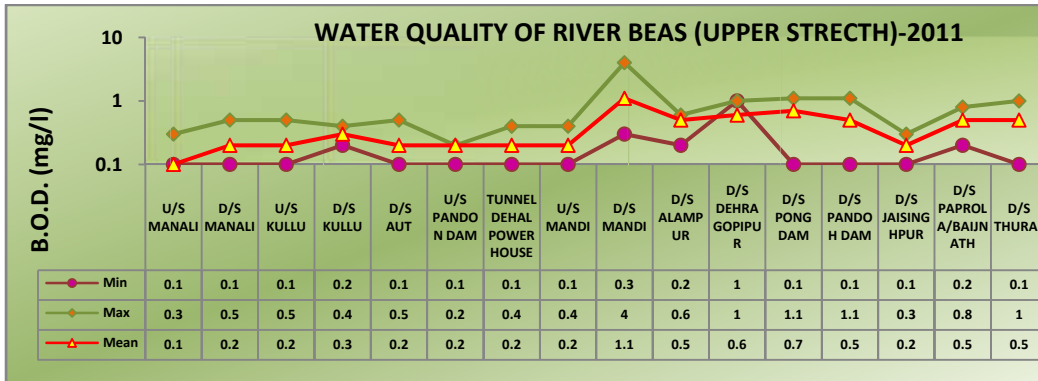
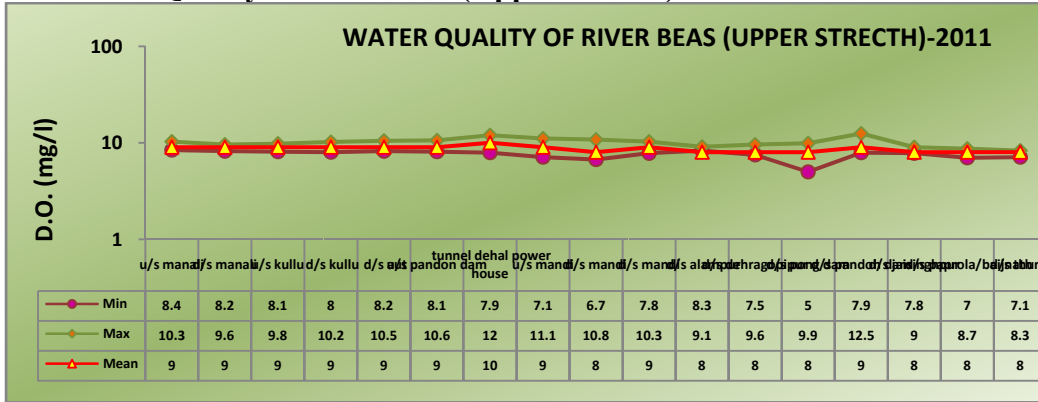
The State Pollution Control Boards of Himachal Pradesh, Punjab, Haryana and Rajasthan carry out the water quality monitoring of tributaries of River Indus in the basin. The tributary streams covered under the monitoring programme are Beas, Satluj, Sirsa, Swan, Largi, Parvati, Tawi, Gawkadal, Chuntkol, Jhelum, Chenab, Baspa, Binwa, Neugal, Siuel, Spiti, Suketi Khad, Basanter, Devak, Banganga, Ujh, Kali bein and Ravi. The ranges of water quality observed with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate+Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

4.2.1 Water Quality of River Beas

The Water quality of River Beas indicates that pH, conductivity, BOD, DO and TC are meeting the water quality criteria at all locations. With respect to Faecal Coliform & Total coliform the river is complying with the permissible limit of water quality criteria for bathing except U/S Mandi. The BOD value ranges from 0.1-2.7 mg/l. The count of Faecal Coliforms ranges from 2 to 7000 MPN/100ml whereas Total Coliforms ranges from 3-29000 MPN/100ml. The Water Quality of

River Beas is given in Annexure-I (Table 4.1). The water quality status of River Beas with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in Fig.4.1 & 4.2

Figure 4.1: Water Quality of River Beas (Upper Stretch)



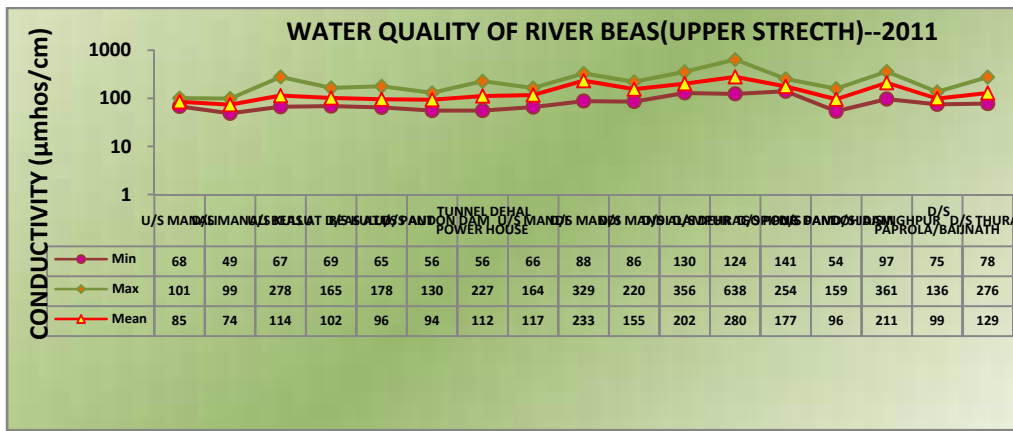
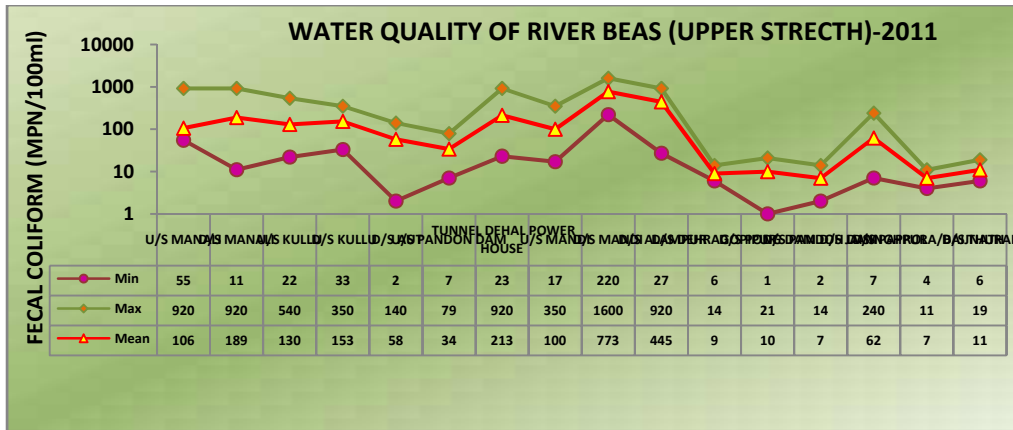
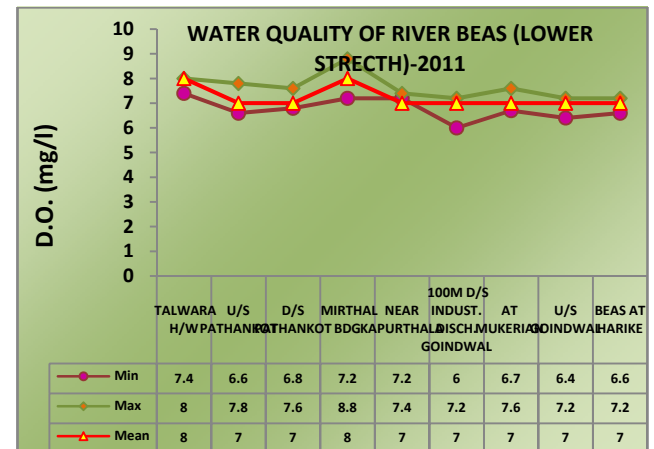
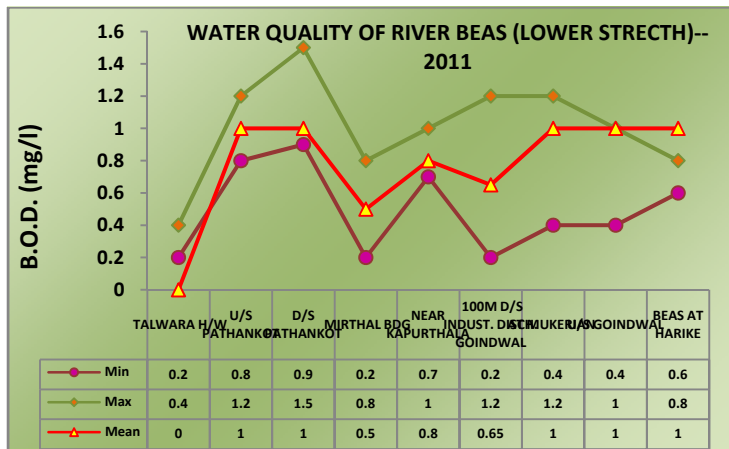
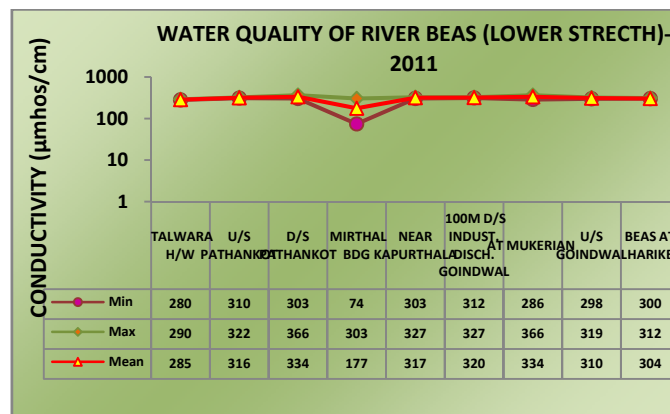
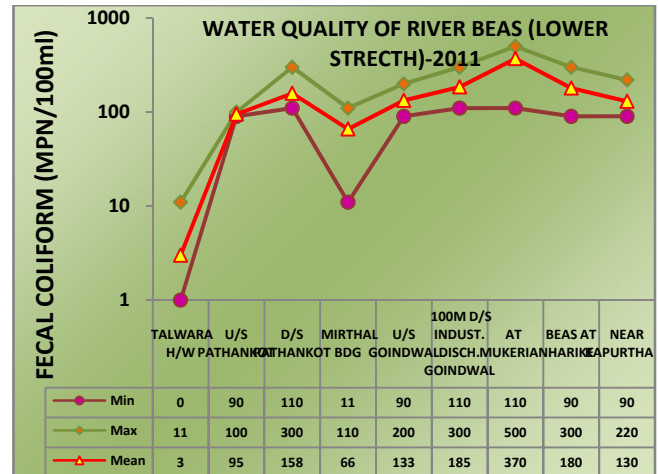
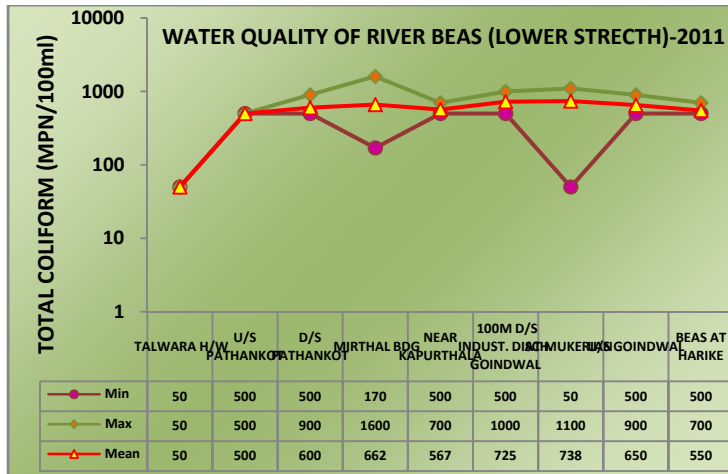


Figure 4.2: Water Quality of River Beas (Lower Stretch)





4.2.2 Water Quality of River Satluj

The water quality of River Satluj is conforming to water quality criteria with respect to pH at most of the locations whereas conductivity and DO is meeting with the criteria at all the locations. The DO varies from 4 to 10 mg/l and the BOD ranges from 0.1-22 mg/l. The maximum value 22 mg/l of BOD is observed at D/s Budhanala Confluence at Ludhiana. The other locations having high level of BOD are at 1 km D/s of Zenith (11 mg/l), D/s of East Bein (5 mg/l). The Faecal coliform value ranges from 3 to 29,000 MPN/100ml whereas the Total Coliform value ranges from 47 to 50,000 MPN/100ml. The Faecal Coliform and Total coliform count is not complying with the permissible limit of water quality criteria for bathing at D/s Budha Nala Confl., Boat Bridge Dharmkotnakodar Road, U/s Head works Ropar, U/s Buddha Nala and D/s of East Bein in Punjab. The concentration of Nitrate (NO₃⁻) is observed in the range of 0.3 -12 mg/l. The water quality of River Satluj with respect to Temperature, DO, pH, Conductivity, BOD, Nitrate +Nitrite-N, Faecal Coliform and Total Coliform is given in Annexure-I (Table 4.2). The water quality status of River Satluj with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in Fig. 4.3 & 4.4.

Figure 4.3: Water Quality of River Satluj (Upper Stretch)

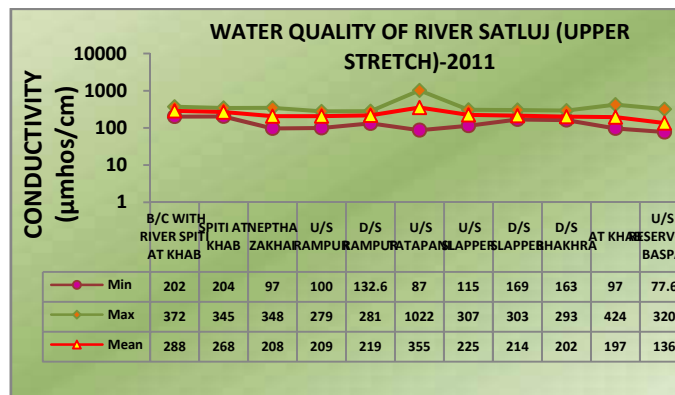
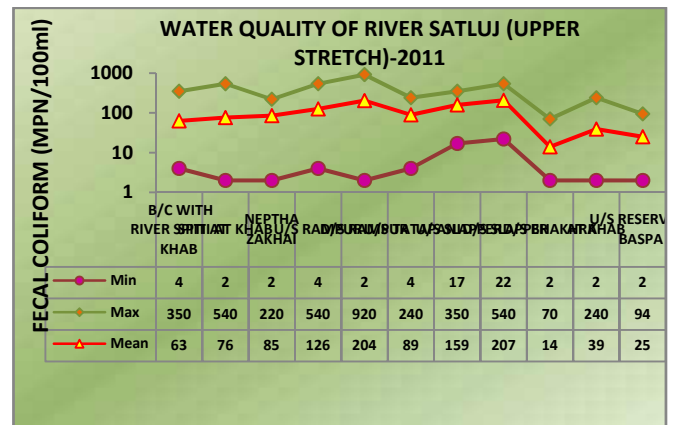
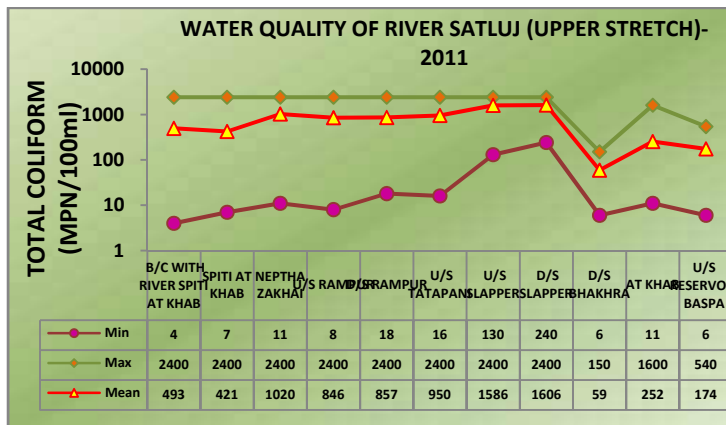
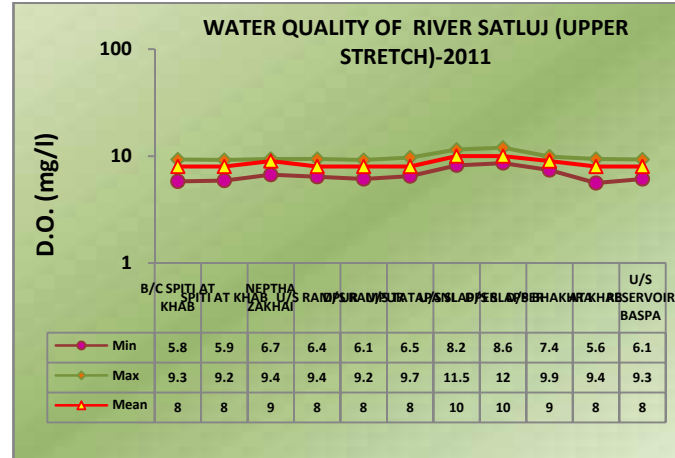
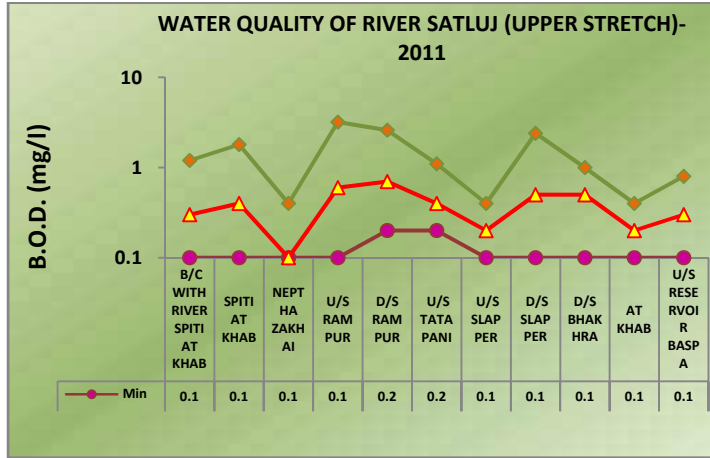
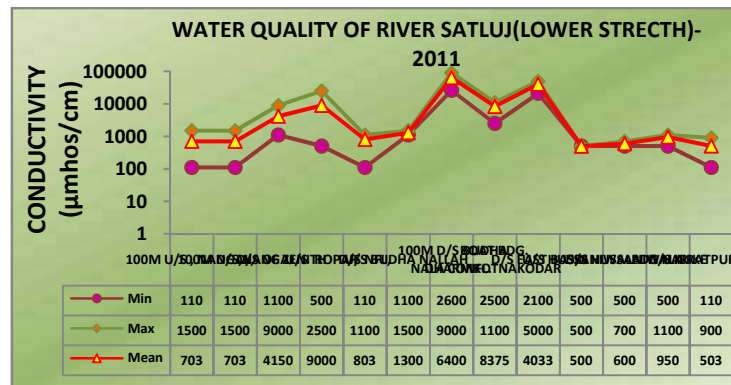
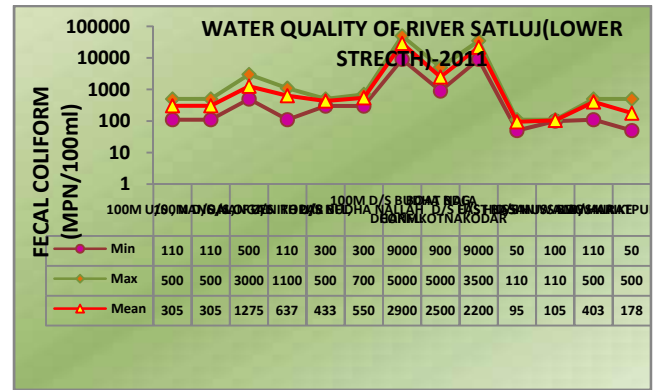
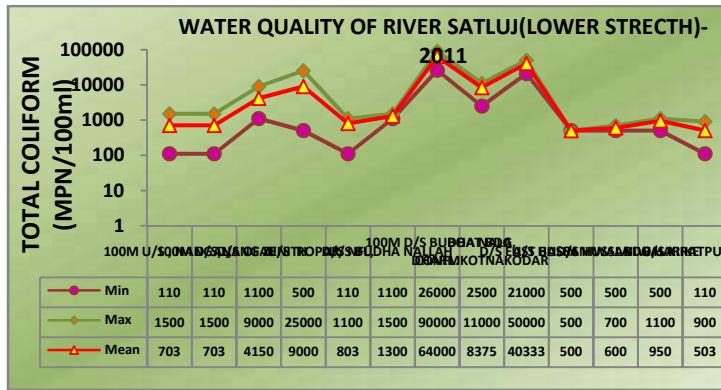
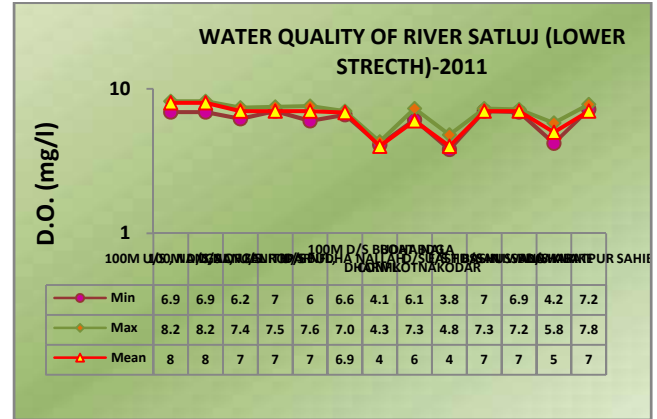
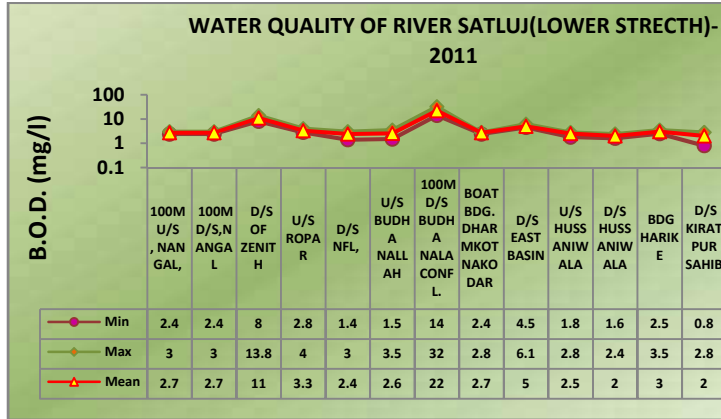


Figure 4.4: Water Quality of River Satluj (Lower Stretch)



4.2.3 Water Quality of Ravi, Parvati, Largi, Sirsa, Swan, Siuel, Tawi, Chenab, Chunt Kol, Suketikhad, Binwa & Neugal

The water quality of River Ravi, Parvati, Largi, Chenab, Siuel, Swan, Sirsa, Tawi and Chunt Kol are meeting the water quality criteria for pH, DO, Conductivity, BOD, TC and FC at all locations except Chunt Kol (Maulana Azad Bridge), J&K and Tawi at Jammu U/s, (Tawi Bridge) in the year during the period of monitoring. The Water Quality of river(s) Ravi, Parvati, Largi, Sirsa, Swan, Siuel, Tawi, Chenab, Chunt Kol, Suketikhad, Binwa & Neugal is given in Annexure-I (Table 4.3).

CHAPTER V

Water Quality of Rivers in Ganga Basin

5.1 Ganga River System

The Ganga basin covers slightly more than one-fourth (26.3 per cent) of the country's total geographical area, and is the biggest river basin. In India the basin covers the whole of Uttarakhand, Uttar Pradesh, Bihar and the Union Territory of Delhi and parts of Punjab, Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh and West Bengal. The main river, rising in the northern most part of Uttarakhand, flows through Uttar Pradesh, Bihar and West Bengal and finally falls into the Bay of Bengal. The Ganga Basin is bound on the north by the Himalayas and on the south by the Vindhyas. The ridge between the Indus system and the Ganga system, the Great desert of Rajasthan and the Aravalli hills form the boundary on the west. After traversing a length of 1450 km in Uttarakhand and Uttar Pradesh and 110 km in the boundary between U.P. and Bihar the river then enters Bihar and flows 445 km more or less through the middle of the State. The length of the river measured along the Bhagirathi and the Hugli during its course in West Bengal is about 520 km.

The Ganga has a large number of tributaries. Some of these are of Himalayan origin having considerably large water wealth. The important tributaries within India are the Kali, the Ramganga, the Yamuna, the Gomti, the Ghaghara, the Gandak and the Kosi. The Yamuna although a tributary of the Ganga, is virtually a river by itself. Its major tributaries are the Chambal, the Sind, the Betwa and the Ken. The main plateau tributaries of the Ganga are the Tons, the Son, the Damodar and the Kasai-Haldi.

5.2 Water Quality Monitoring in Ganga Basin

The water quality monitoring of the River Ganga and its several tributaries are being done in the basin by the State Pollution Control Boards of Uttarakhand, Uttar Pradesh, Bihar, West Bengal, Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh and Central Pollution Control Board at 242 locations. The ranges of water quality observed in rivers in Ganga Basin with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

5.2.1 Water Quality of River Ganga

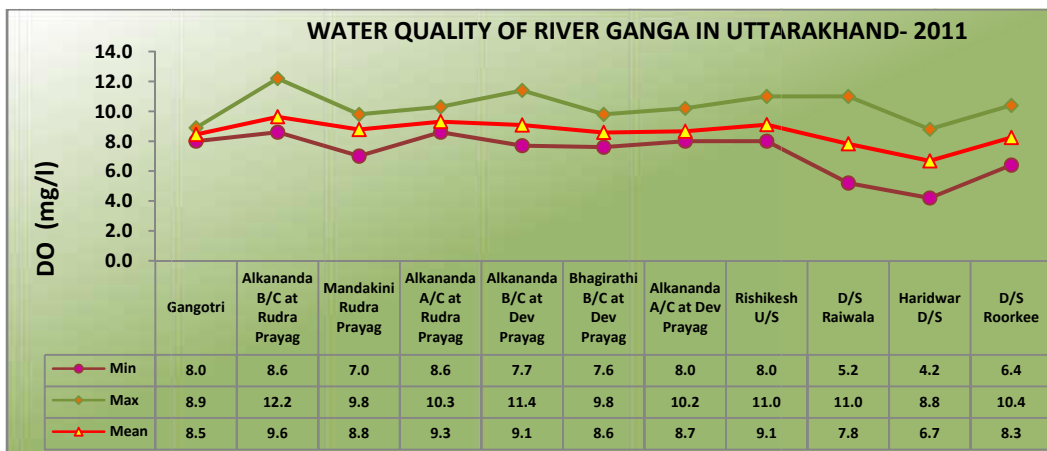
The Water quality of River Ganga indicates that pH, conductivity and DO are meeting the water quality criteria at majority of locations. pH ranges from 6.7–

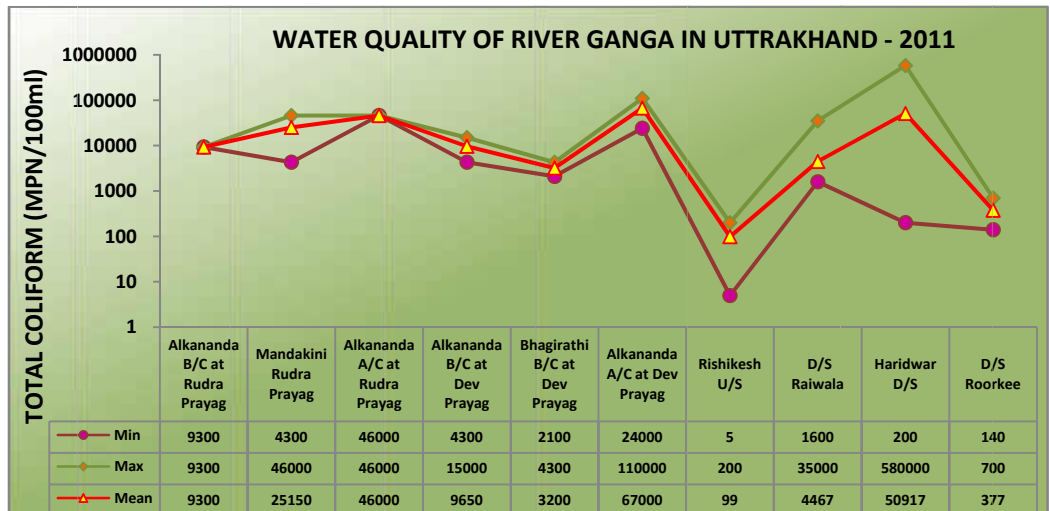
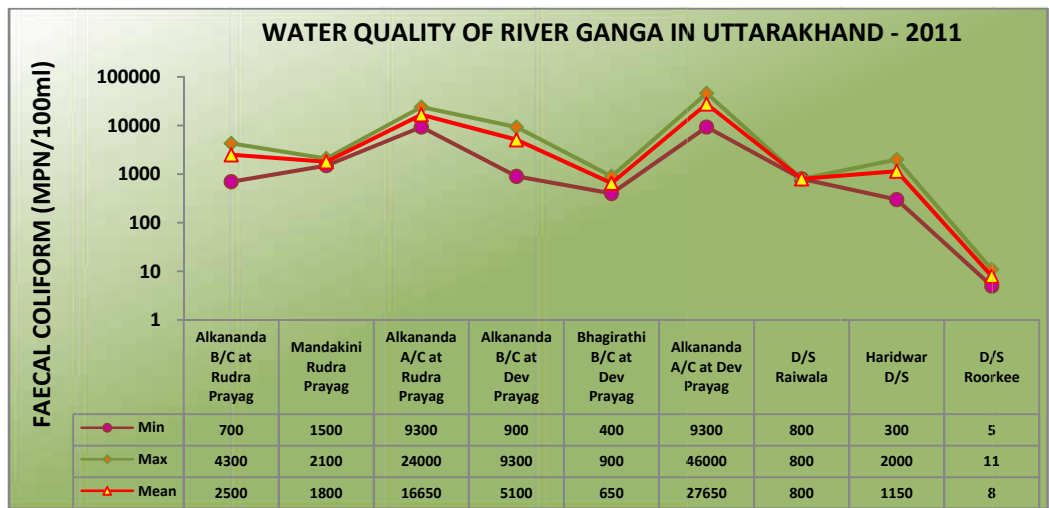
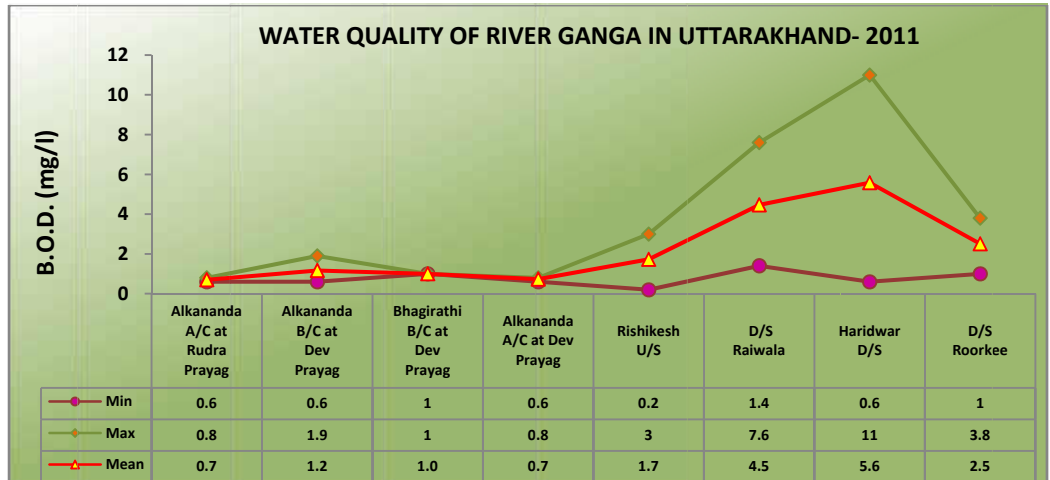
9.1. Dissolved Oxygen ranges from 4 to 14.3 mg/l. Conductivity ranges from 49-10240 μ mhos/cm. High value of conductivity is observed at Diamond Harbour (10240 μ mhos/cm) due to intrusion of sea water in the estuary.

The BOD value ranges from 0.2-11 mg/l. The highest value of 11 mg/l of BOD is observed at Haridwar D/s. The other locations observed with maximum BOD level exceeding the criteria are U/s Vindhyachal; Kanpur U/s (Ranighat); Kanpur D/s (Jajmau Pumping Station); Kannauj U/s (Rajghat); Varanasi U/s (Assighat); Varanasi D/s (Malviya Bridge); Kannauj D/s; Howrah-Shivpur; A/c R. Song Nr Syanarayan Temple D/s Raiwala; Kachhla Ghat; Narora (Bulandsahar); U/s & D/s Anoopshahar; Allahabad (Rasoolabad); Uluberia; Garden Reach; Allahabad D/s (Sangam); Bithoor (Kanpur); Diamond Harbour; Dakshineswar; Kadaghat, Allahabad; D/s Mirzapur; Garhmukteshwar; Trighat (Ghazipur); Dalmau (Rai Bareilly); Kala Kankar (Raebareli); Baharampore; Upper River D/s Roorkee; Nabadip and Serampore.

The count of Faecal Coliform (FC) ranges from 5-11 $\times 10^5$ MPN/100ml whereas Total Coliform (TC) ranges from 5-25 $\times 10^5$ MPN/100ml. The maximum Total Coliform (TC) and Faecal Coliform (FC) level is not meeting the desired water quality criteria at most of the locations. The highest value of Total Coliform and Faecal Coliform is observed at Dakshineswar. The concentration of Nitrate+Nitrite ranges from 0.02 -7.8 mg/l. The water quality of River Ganga with respect to Temperature, pH, Conductivity, DO, BOD, Nitrite+ Nitrate, Total Coliforms (TC) and Faecal Coliform (FC) is given in Annexure-I (Table 5.1). The state-wise water quality status of mainstream of River Ganga with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 5.1 to 5.6.

Figure 5.1: Water Quality of River Ganga in Uttarakhand





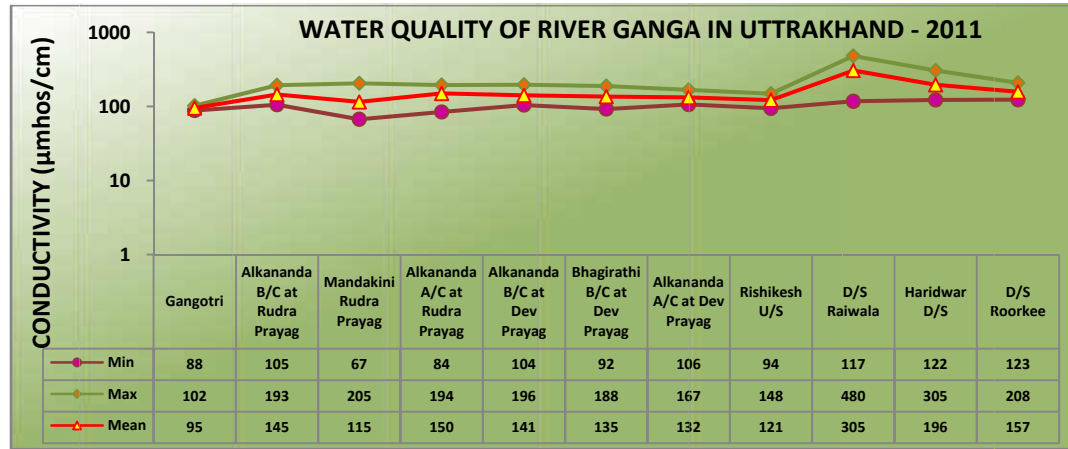
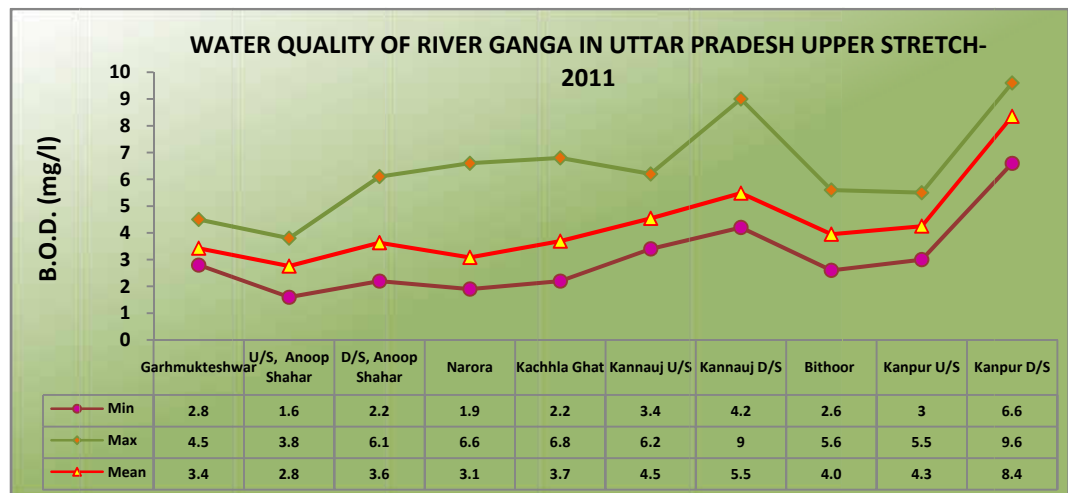
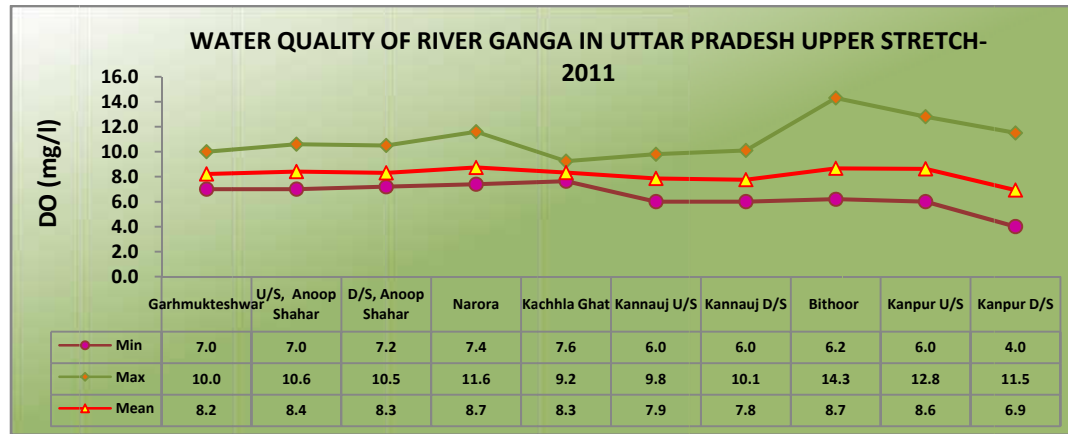


Figure 5.2: Water Quality of River Ganga in Uttar Pradesh (Upper Stretch)



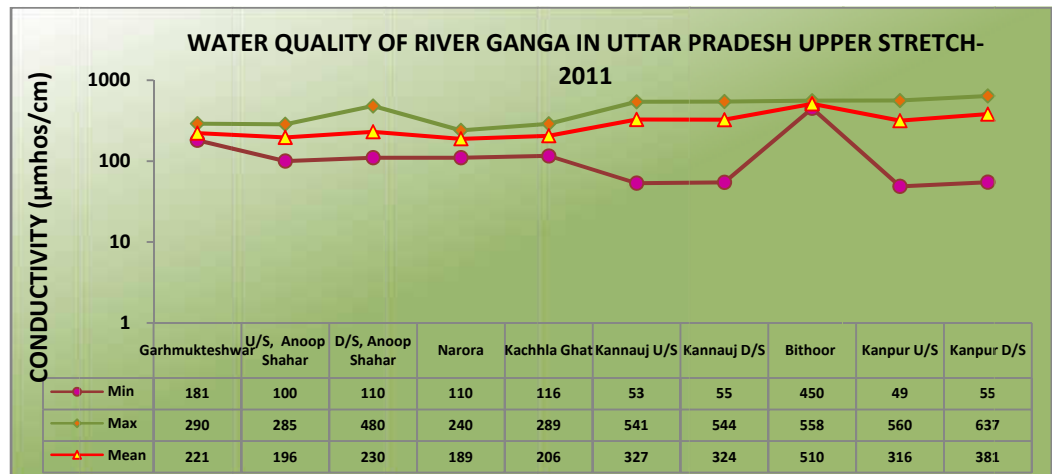
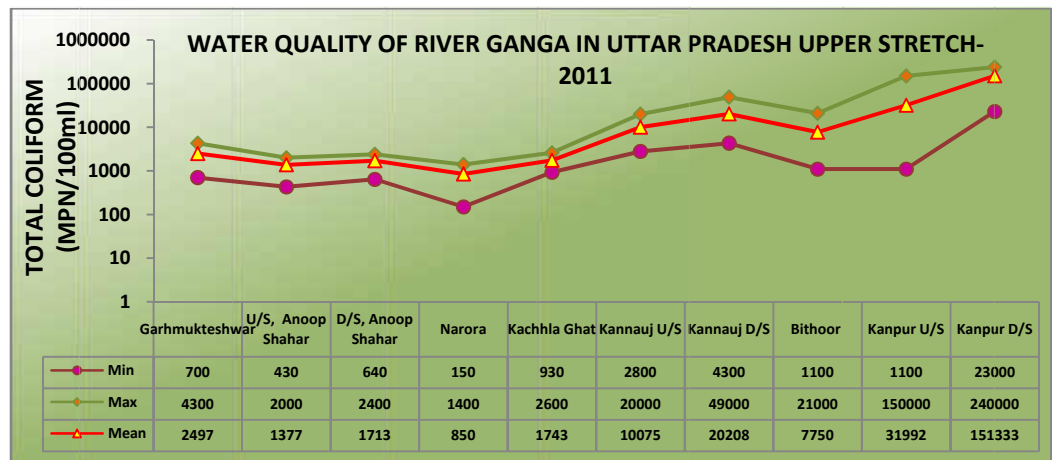
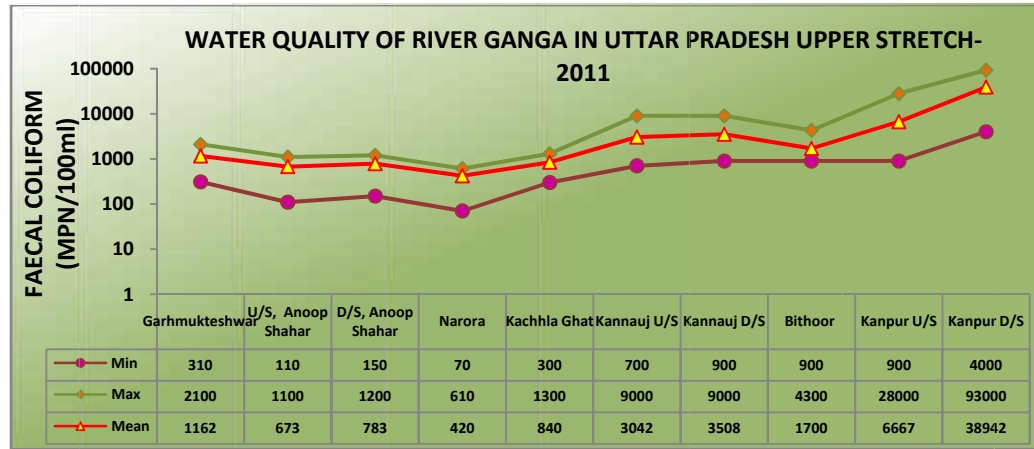
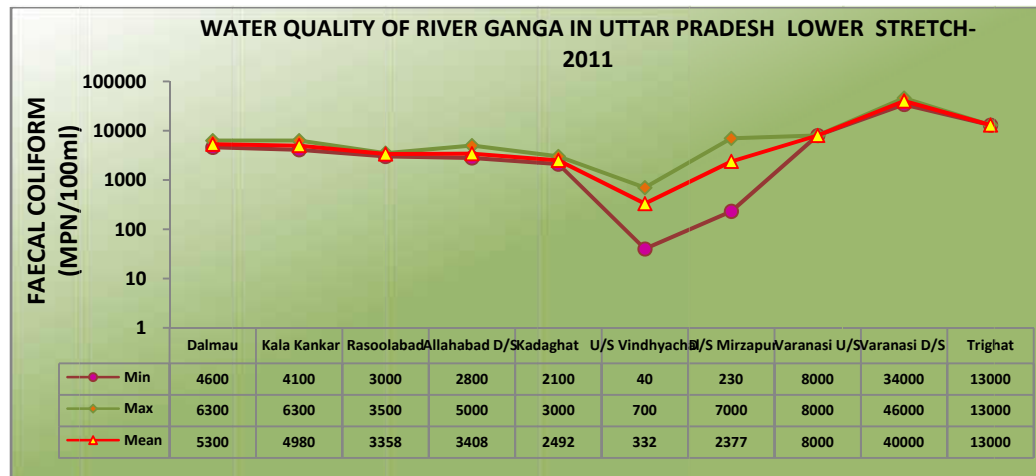
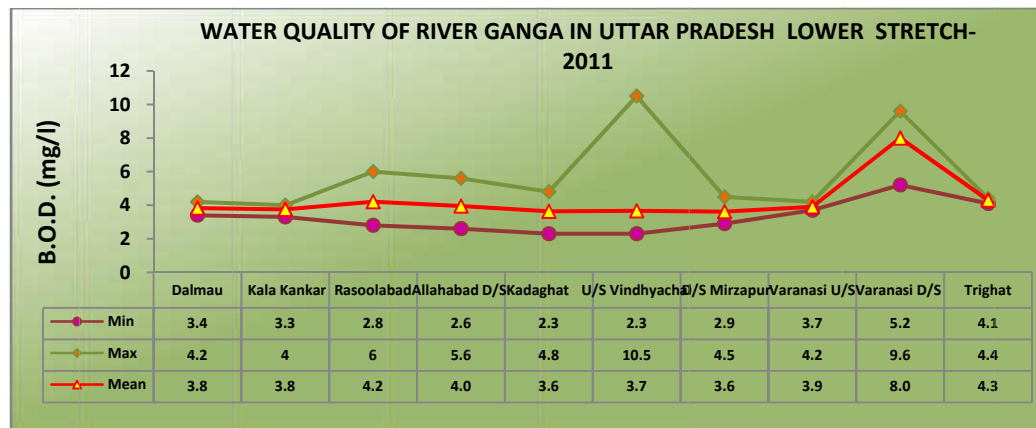
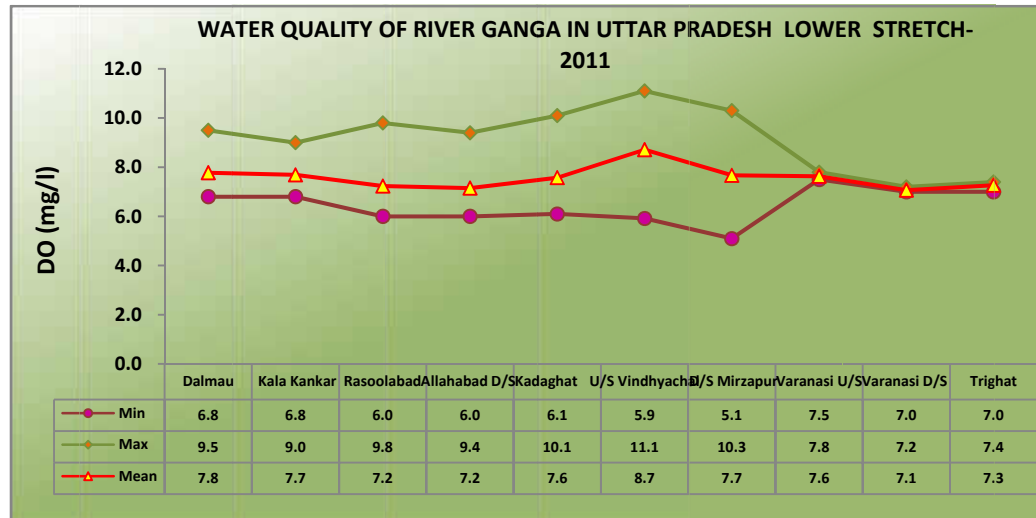


Figure 5.3: Water Quality of River Ganga in Uttar Pradesh (Lower Stretch)



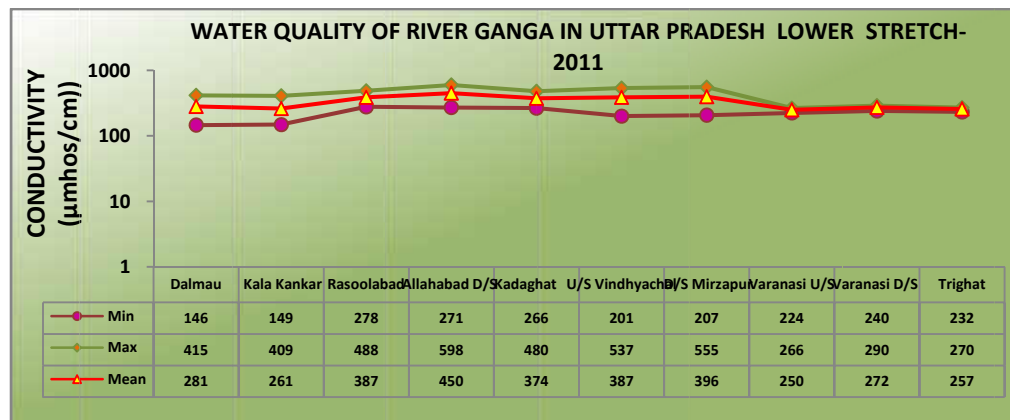
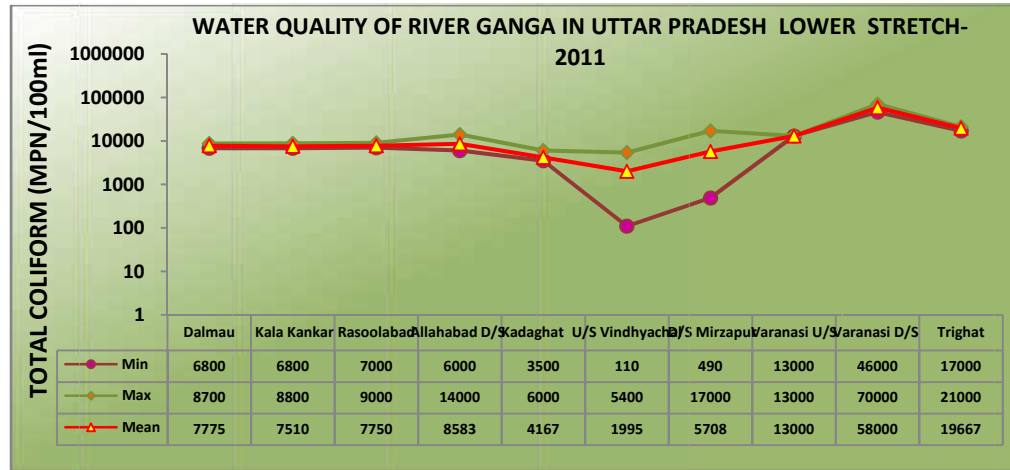
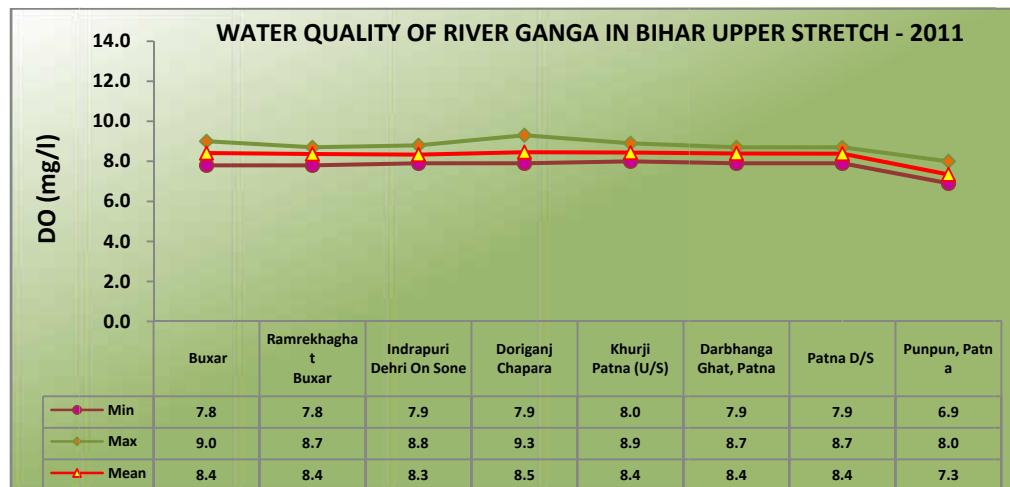
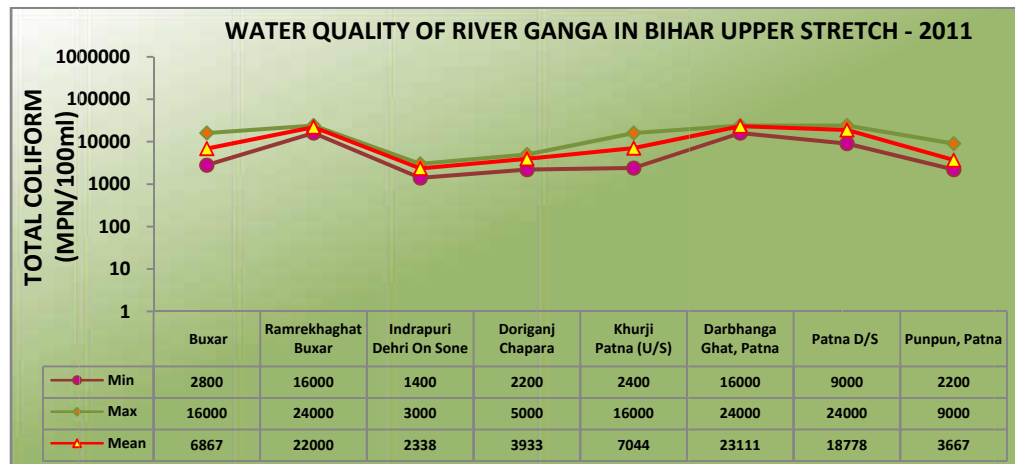
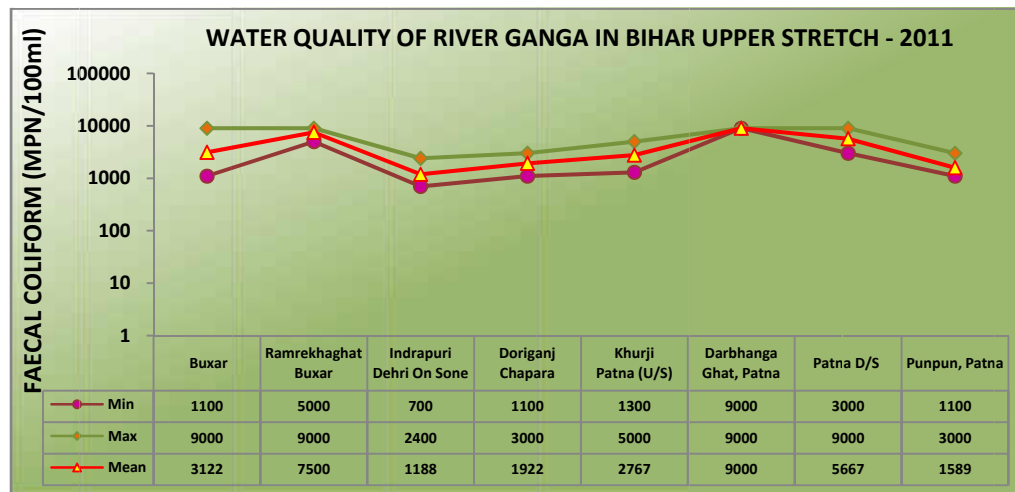
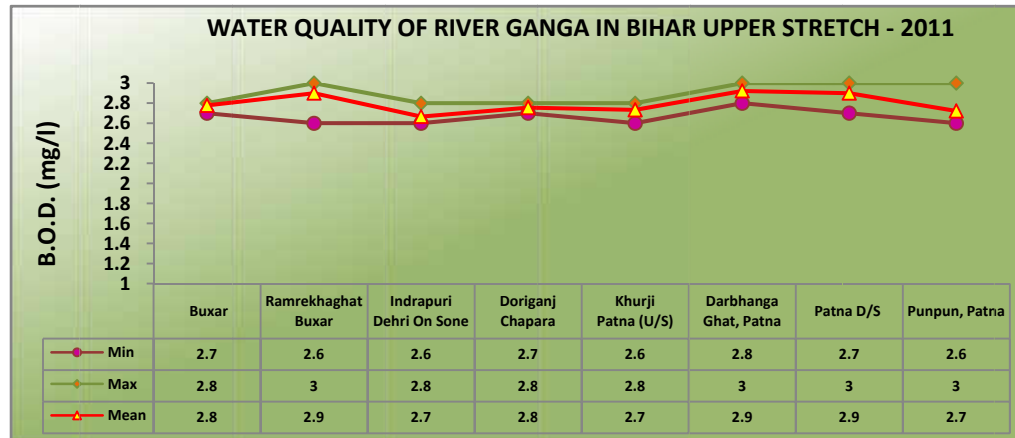


Figure 5.4: Water Quality of River Ganga in Bihar (Upper Stretch)





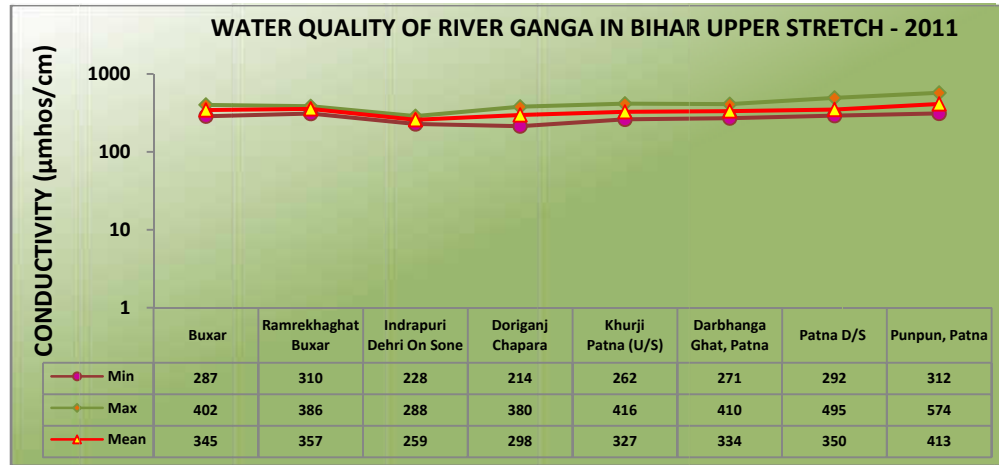
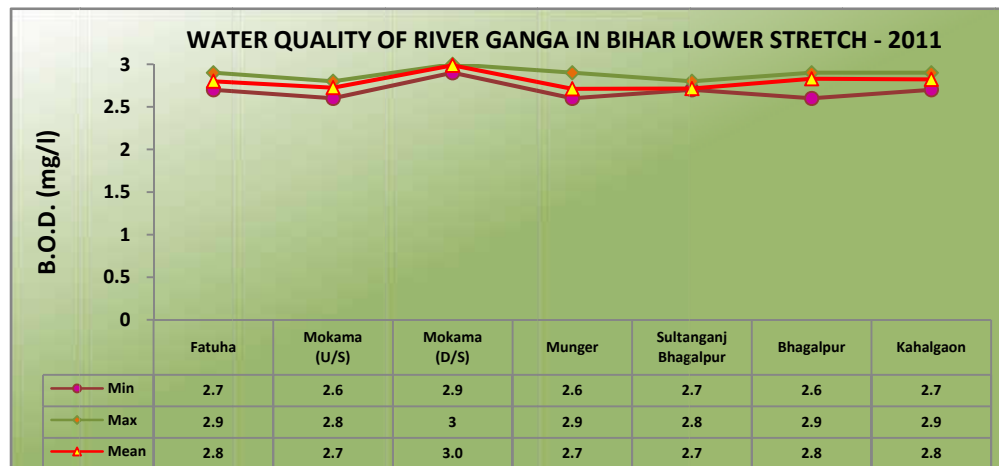
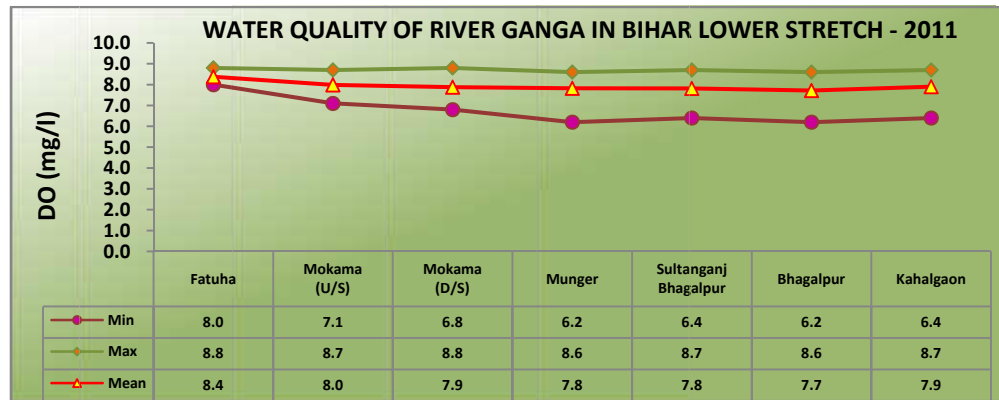


Figure 5.5: Water Quality of River Ganga in Bihar (Lower Stretch)



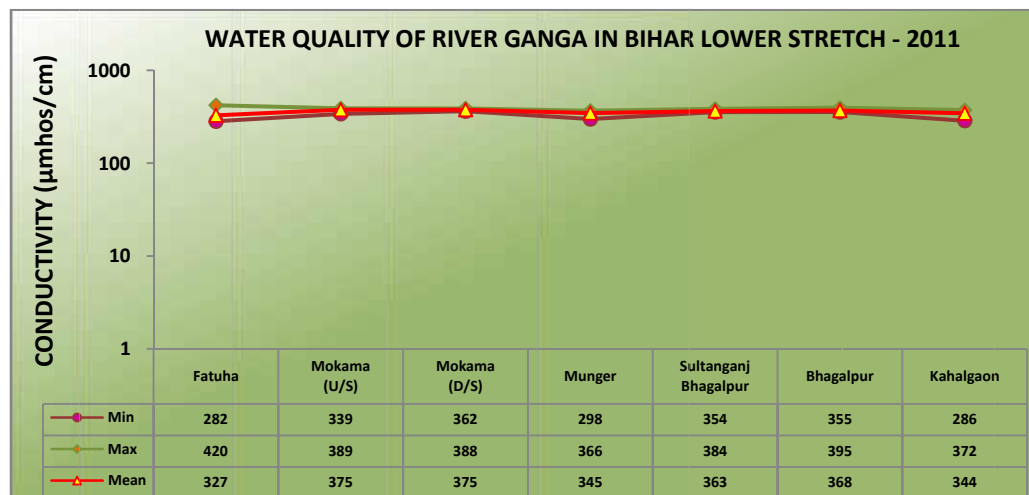
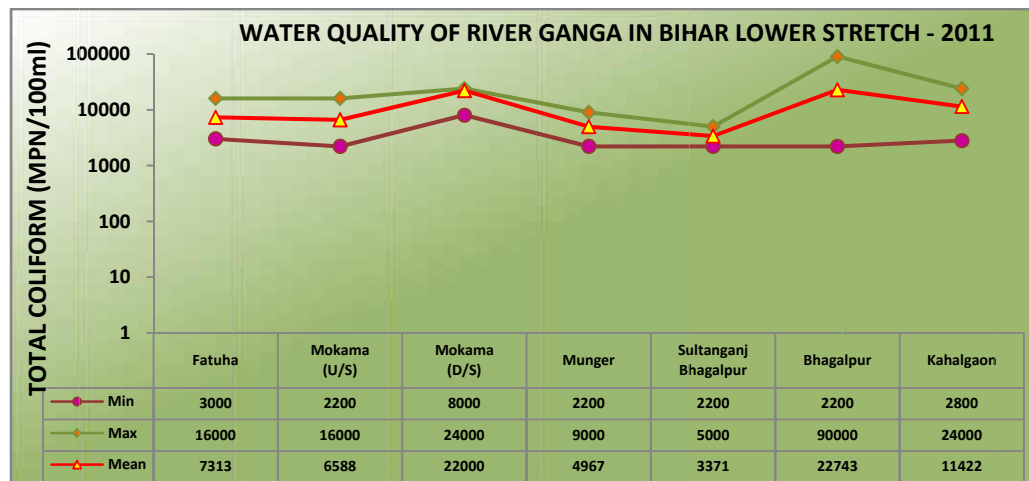
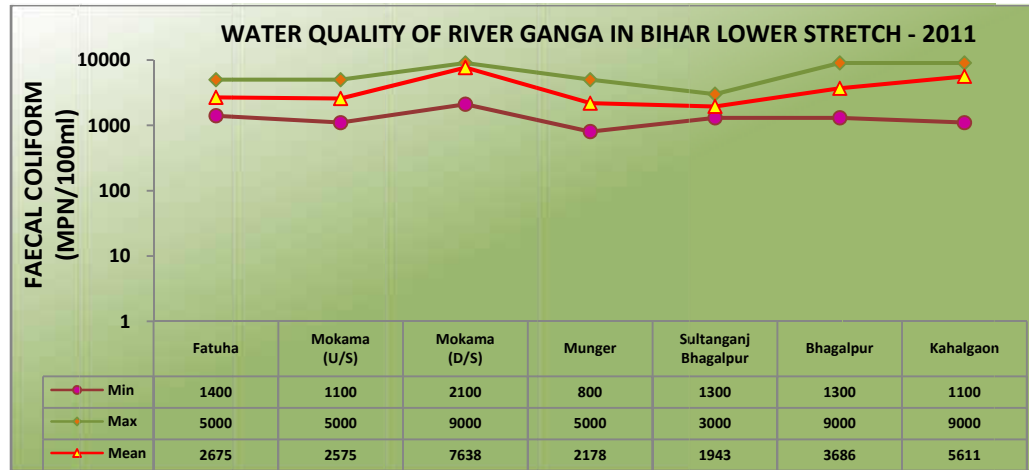
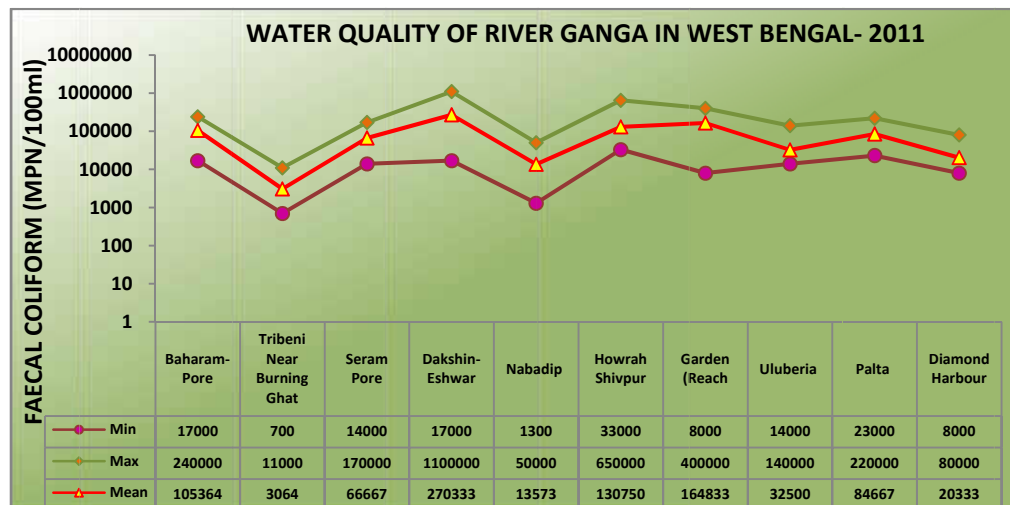
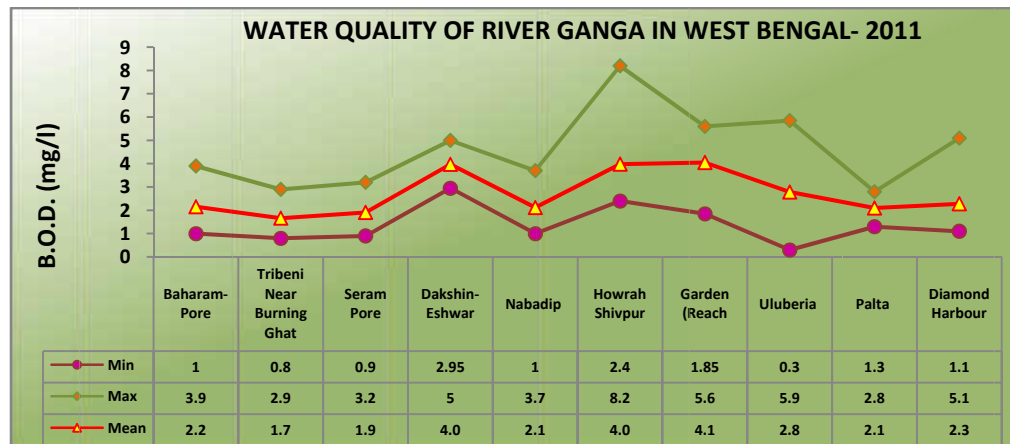
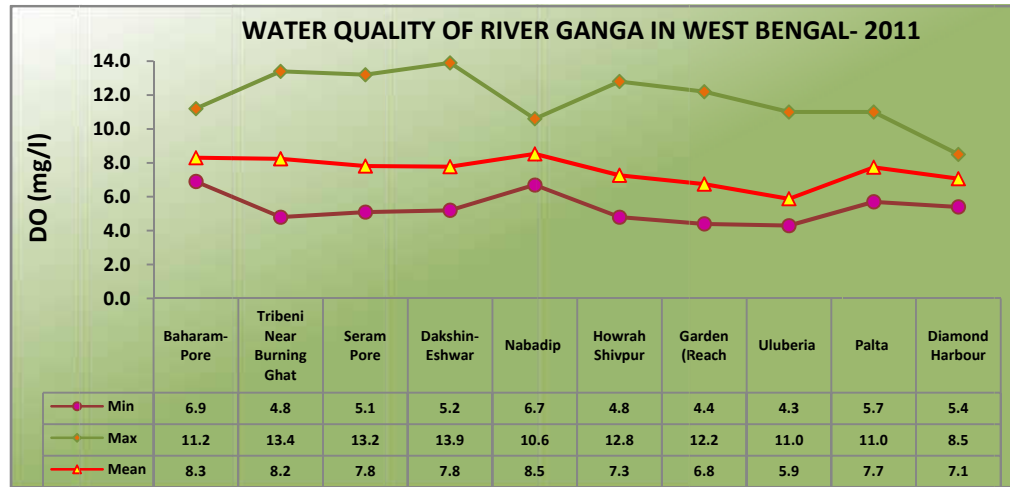
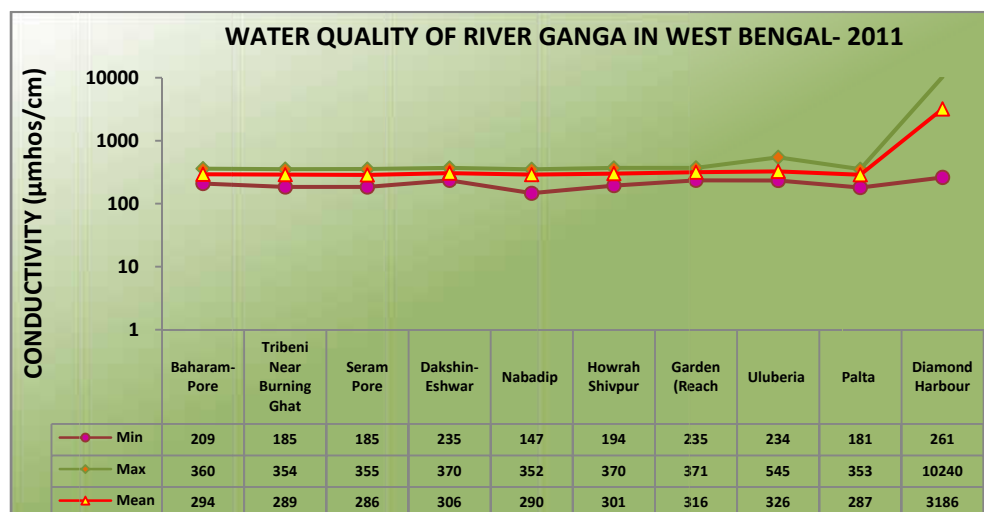
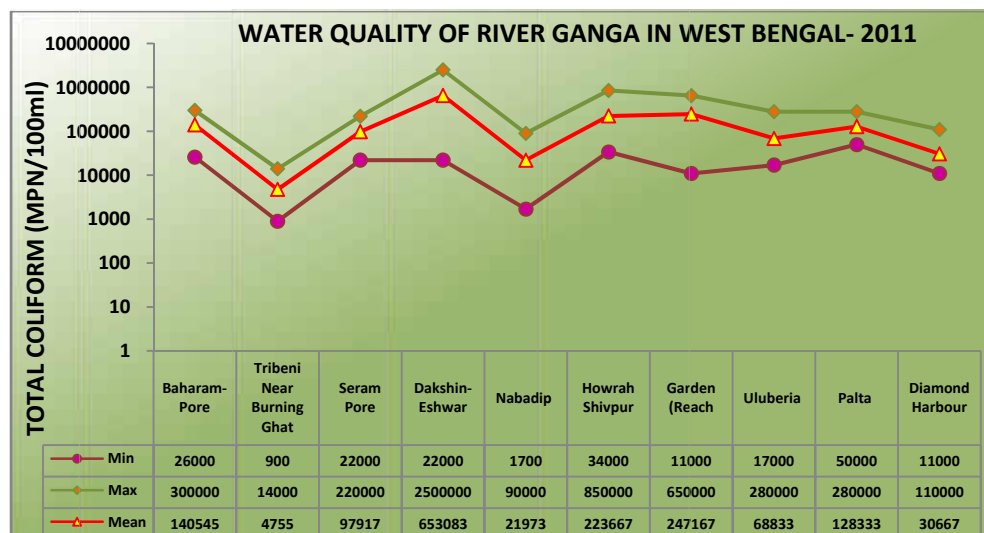


Figure 5.6: Water Quality of River Ganga in West Bengal





5.2.2 Water Quality of River Yamuna

The River Yamuna is a major tributary of River Ganges. In the upper course of 200 km stretch it draws water from several major streams namely Rishi-Ganga, Unta and Hanuman Ganga, Tons, Giri, and Ashan. The combined stream flows through the shivalik range of hills of Uttarakhand, Himachal Pradesh, and Uttar Pradesh and enters into the plains in the Dak Phatthar in Haryana where this river regulated through weir and diverted into canal for power generation. From Tajewala barrage in Yamunanagar district of Haryana, river again diverted into Western Yamuna Canal and Eastern Yamuna Canal for irrigation. River regain its water from ground water accrual and feeding canal through Somnadi (seasonal stream) just U/s of Kalanaur and traverses a route of about 1150 km through three states i.e. Haryana, Delhi and U.P. and finally to its confluence with Ganges at Allahabad. It receives major tributaries like Chambal, Betwa, Sindh and Ken from right bank and Hindon from left bank.

The availability of water in River Yamuna is greatly varied with time and space. Precipitation is confined to only three months in a year and varies greatly. Most of the water flows in the Yamuna (nearly 80%) in monsoon period (July, August and September) only. Whatever water flows in non-monsoon period (October to June) is extensively used for irrigation and drinking leaving very little or no water in the river to flow.

It is observed that about 500 km long stretch of the river is in bad shape, having water quality, most of the time, below desired level for "designated best use". In the dry season four distinct gradients of pollutional load can be discerned in the river stretch between Wazirabad and Etawah. The stretch between Wazirabad and Okhla is the most heavily polluted one, carrying the massive input of wastewater from Delhi. This input has sets off a progressive series of chemical and biological events in the D/s water. This stretch is characterised by high bacterial population, cloudy appearance high BOD and strong disagreeable odour - all indicating general depletion of oxygen. Masses of gaseous sludge rising from the bottom are often noticed floating near the surface of the water. During monsoon due to flood the sludge deposited in this stretch is flushed and stay in suspension causes rise in oxygen uptake in the D/s. This causes heavy fish mortality every year during first flushing after onset of monsoon.

Though there are number of bathing "Ghats along the river in Delhi stretch, the quality of water is far below the bathing standards. Even in this short stretch, remarkable purification takes place due to high temperature and long retention time in this stretch due to the two barrages one at Okhla and another at ITO (nearly 10 km U/s of Okhla Barrage). The ITO Barrage is used divert the Yamuna water for cooling purpose of the two Thermal Power Plants located near ITO. In the stretch between Okhla and Agra the same assimilative capacity can be observed after the sewage input at Okhla, Mathura and Agra. After a few kilometers the repeated additions of sewage are mainly noticeable by a higher state of eutrophication leading to the formation of algal mats in the River. Excessive algal can cause problems associated with the oxygen balance in the water (daytime super saturation and nighttime oxygen depletion). The water quality from DO, BOD, and bacterial point of view is not fit for designated best uses of this stretch. The Agra Water Works is drawing its raw water from this only.

The stretch from Agra to the confluence with the River Chambal at Etawah is characterized by self- purification processes of the Agra effluents. The confluence with relatively clean Chambal River is of great value in diluting the pollution load of River Yamuna before it joins the Ganga at Allahabad.

During the monsoon period due to huge mass of water flows in the river the barrages are opened leading to a more or less continuous system. The high load of untreated biodegradable material (domestic sewage) leads several gradients in saprobic and eutrophic conditions; major part of the Yamuna can hardly fulfill the designated uses.

5.2.2.1 Major Water Quality Segments

The Yamuna is classified into 5 distinct segments due to characteristic Hydrological and Ecological conditions. These segments are:

Himalayan Segment	From origin to Tajewala Barrage (172 kms.)
Upper Segment	Tajewala Barrage to Wazirabad Barrage (224 kms.)
Delhi Segment	Wazirabad Barrage to Okhla Barrage (22 kms.)
Eutrophicated Segment	Okhla Barrage to Chambal Confluence (490 kms.)
Diluted Segment	Chambal Confluence to Ganga Confluence (468 kms.)

5.2.2.2 Critical Segments

The water quality in the Himalayan Segment and the Diluted Segment is comparatively good. However, due to heavy abstraction from and discharge of pollutants into the river system, there are critical segments, which require pollution abatement measures to improve the water quality of the river. These segments with the causes of pollution are:

Wazirabad to Okhla	Domestic and industrial waste water of Delhi.
Okhla to Vrindavan	Domestic wastewater from Delhi and industrial effluent from Saharanpur, Muzaffarnagar, Ghaziabad, Noida, etc.
Vrindavan to Mathura	Domestic wastewater and industrial effluent from dyeing and printing industry of Vrindavan and Mathura
Mathura to Etawah	Domestic wastewater from Agra and Etawah.

5.2.2.3 Water Quality of River Yamuna

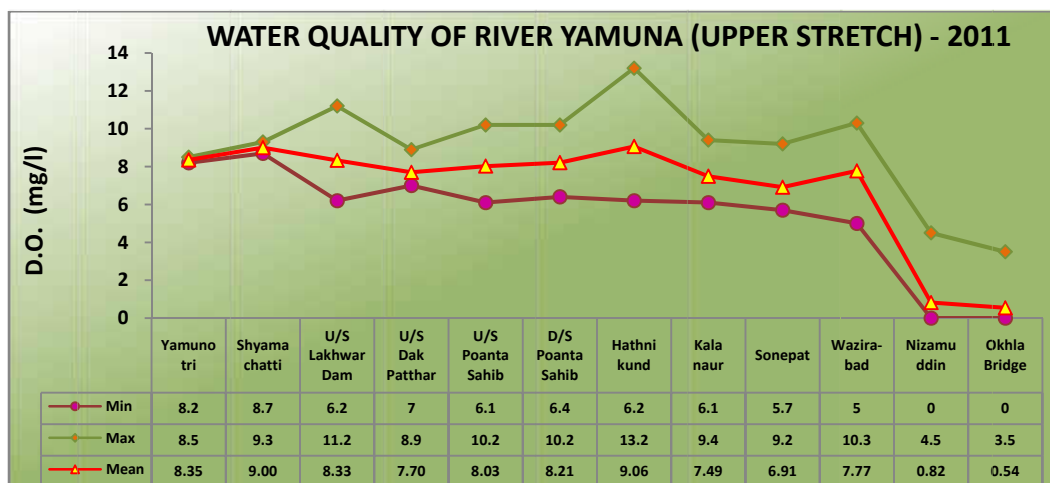
The water quality of River Yamuna with respect to pH ranges from 6.9 to 8.8. The conductivity is complying with desired water quality criteria at all locations and ranges from 19-1905. The DO varies from 0.0 to 17 mg/l. Supersaturation of DO indicates that the river is highly septic or eutrophicated at a number of locations.

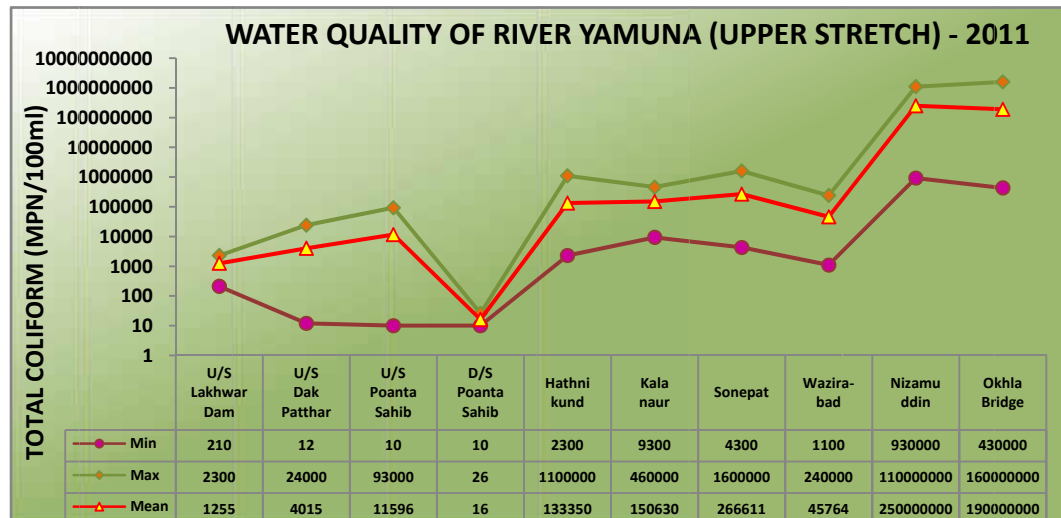
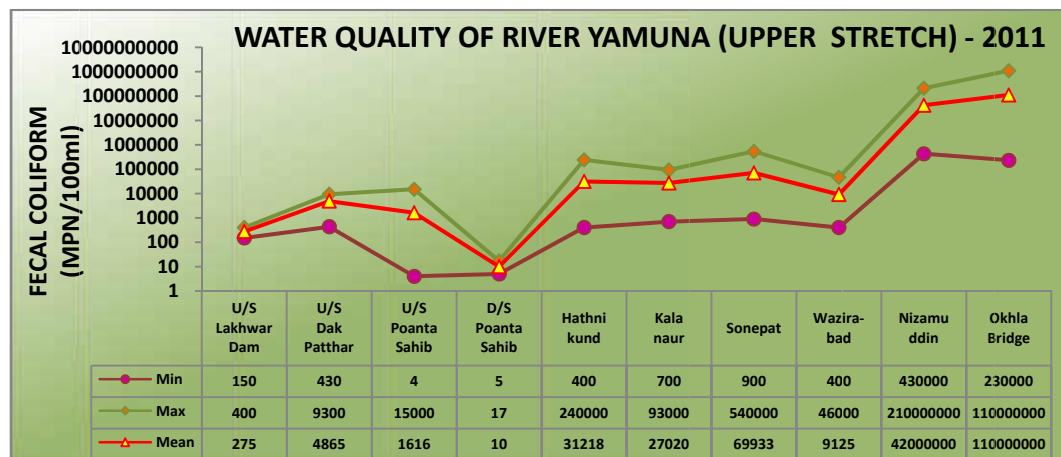
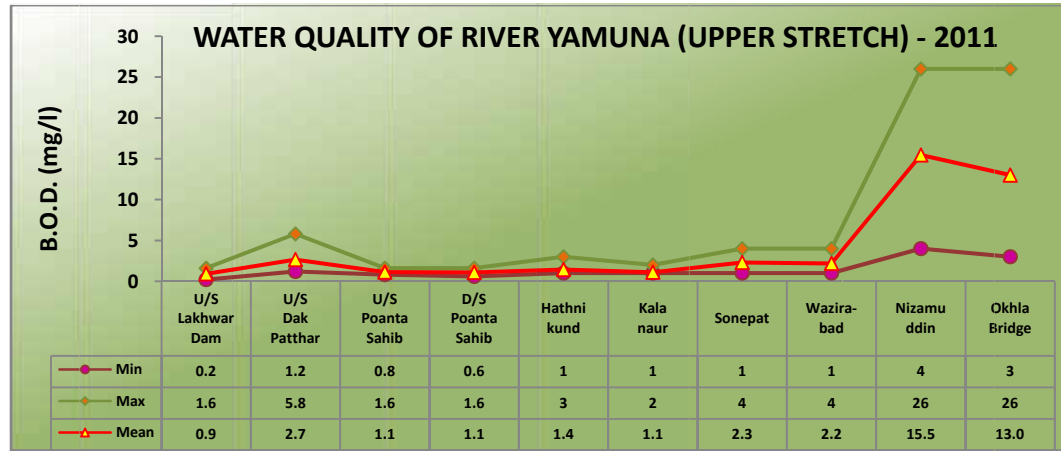
The low value of DO (0.0 mg/l) is observed in the stretch of Nizamuddin to Bateshwar.

The BOD ranges from 0.2-41 mg/l in the entire length of river. The maximum value of 41 mg/l of BOD is observed at Mathura U/s. The other locations observed maximum BOD are at Mazawali (36 mg/l), D/s of agra (29 mg/l), Okhla Bridge (Inlet of Agra Canal) & Nizamuddin (26 mg/l), Mathura D/s (17 mg/l), Vishramghat (Mathura)(15.4 mg/l), Etawah & Bateswar (15 mg/l), Kesighat, Vrindavan (14.4 mg/l), Shahpur (11.8 mg/l), Agra U/s (11 mg/l), Juhika B/c with Chambal (Etawah) (7 mg/l), Allahabad D/s (Balua Ghat) (6.8 mg/l), U/s Dak Patthar (5.8 mg/l), Wazirabad (4 mg/l), Sonapat (4 mg/l) and Allahabad (3.8 mg/l).

Faecal Coliform value ranges from 4-11 x 10⁸ MPN/100ml whereas the Total Coliform value ranges from 10-16 x10⁸ MPN/100ml. The Total and Faecal Coliforms count is considerably high and does not meet the criteria at most of the monitoring locations. The highest value of Faecal Coliform and Total Coliform is observed at Okhla Bridge (Inlet of Agra Canal). The concentration of Nitrate+ Nitrite varies from 0-2.03 mg/l. The water quality of River Yamuna with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is presented in Annexure-I Table 5.2. The water quality status of mainstream of River Yamuna with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 5.5 & 5.6.

Figure 5.5: Water Quality of River Yamuna (Upper Stretch)





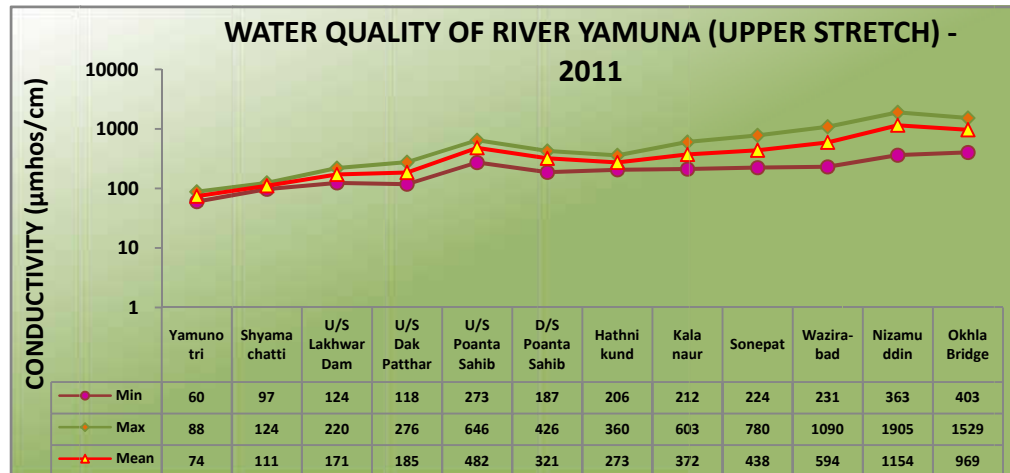
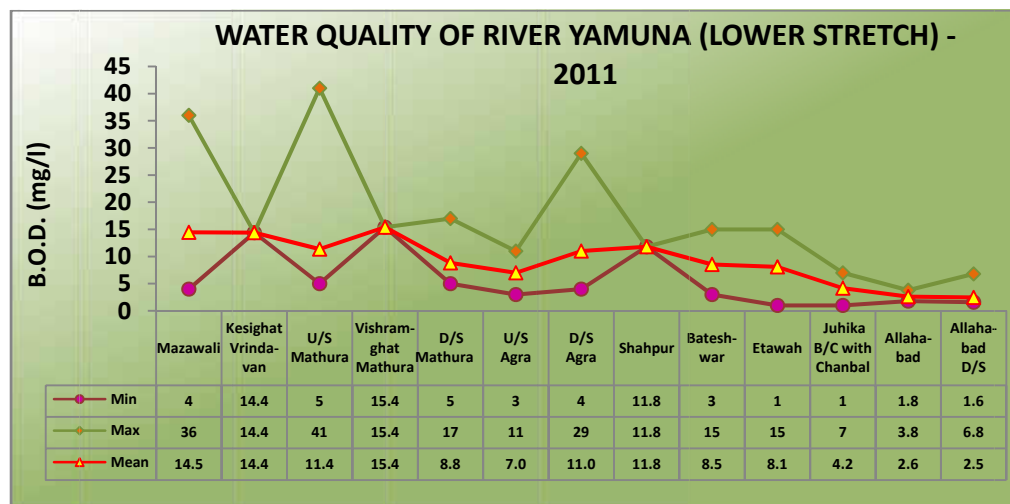
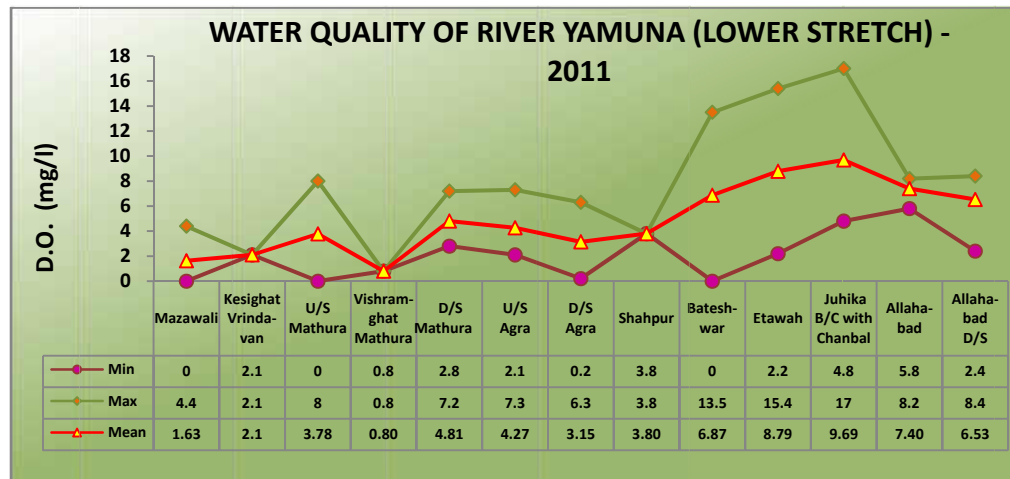
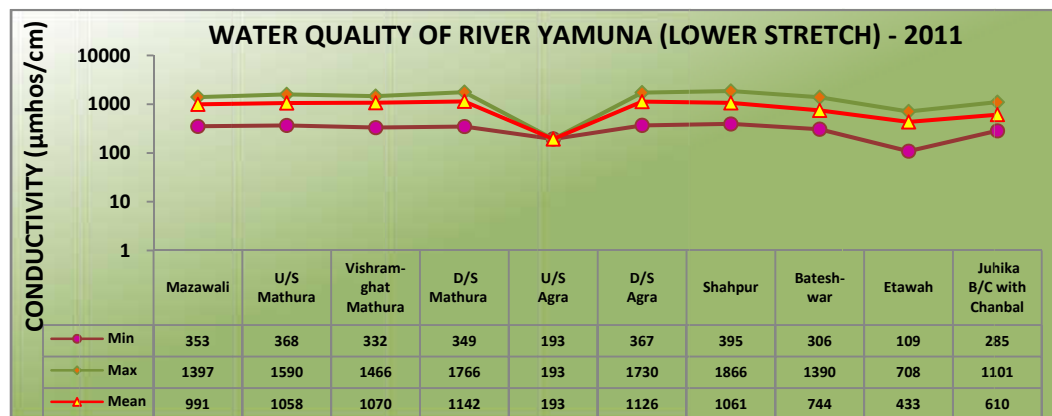
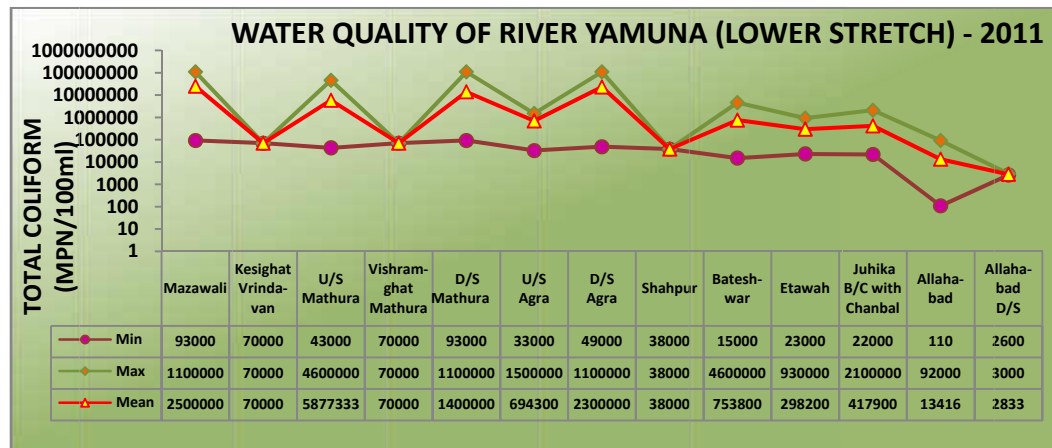
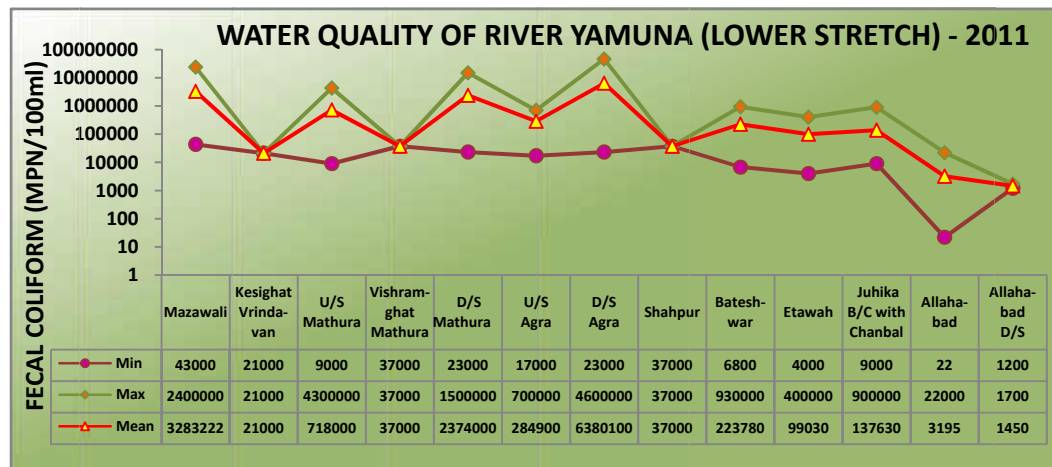


Figure 5.6: Water Quality of River Yamuna (Lower Stretch)





5.2.3 Water Quality of tributary streams - Suswa , Gola, Ramganga, Kalinadi (E), Varuna, Sai, Gomti, Rapti, Saryu, Ghaghara, Rihand, Sone, Gandak, Sikrana, Burhi Gandak, Harbora, Kamla, Manusmar, Koshi, Daha, Dhous, Farmar, Ram Rekha and Sirsa

The water quality of tributary streams Suswa, Gola, Ramganga, Kalinadi (E), Varuna, Sai, Gomti, Rapti, Saryu, Ghaghara, Rihand, Sone, Gandak, Sikrana,

Burhi Gandak, Harbora, Kamla, Manusmar, Koshi, Daha, Dhous, Farmar, Ram Rekha and Sirsa is conforming to water quality criteria with respect to pH and conductivity throughout its length except in River Kalinadi (East) at Kannauj (B/c); River Gandak at Rewaghat (Mujaffarpur); River Manusmar at Riga, (Sitamarhi); River Suswa at Mothrawala; River Daha at Itwa Bridge (Siwan); River Sai at Unnao after Drain Outfall; River Sikrana at Lal Parse, Bittiah where pH is observed higher than the desired criteria.

The DO varies from 0.0 to 11.5 mg/l in mentioned rivers. DO is observed low with respect to desired water quality criteria in river Gomti at Lucknow D/s (2.5 mg/l), Ram Rekha at Harinagar (2 mg/l), Rihand at Renukut D/s (1.5 mg/l), Sushwa at Mothrawala (1.6 mg/l) and Sirsa at Ruxol (0.0 mg/l).

The BOD ranges from 1-161 mg/l in above mentioned tributary streams. The high BOD values were observed in River Varuna B/c with river Ganga at Varanasi (27.6 mg/l) & Rameshwar, Varanasi (4.3 mg/l), River Sushwa at Mothrawala (38 mg/l), River Rapti A/c of R. Honin Nr. Domingarh Rly Bdg Gorakhpur (3.4 mg/l) & Rajghat, Gorakhpur (7.5 mg/l), River Gomti at Lucknow D/s (10.5 mg/l), Sitapur U/s at water intake (10 mg/l), Jaunpur D/s (4.4 mg/l), Varanasi (4.2 mg/l) and Lucknow U/s (9.3 mg/l), River Ramganga at Kannauj (B/c) (12.4 mg/l), River Sirsa at Ruxol & River Ram Rekha at Harinagar (15 mg/l), River Sai at Jalalpur, Jaunpur (4.4 mg/l) & Unnao after Drain Outfall (4 mg/l), River Ghaghara at Barhalganj (3.3 mg/l) and Deoria D/s (3.2 mg/l), River Kalinadi (East) at U/s of Gulaothi Town in Bulandsahar (161 mg/l), Kharkhoda-Parikshit Garh Rd (100 mg/l), Kannauj (Before Conf.) (16 mg/l), River Manusmar at Riga, Sitamarhi (10 mg/l), Harbora River at Narkatiaganj (12 mg/l) and River Rihand at Renukut D/s (7.2 mg/l).

The Faecal Coliform (FC) value ranges from 40 to 46×10^7 MPN/100ml whereas the Total Coliform (TC) value ranges from 160 to 11×10^8 MPN/100ml. The highest count of FC and TC is observed in River Kalinadi (East) at U/s of Gulaothi Town in Bulandsahar, at Kharkhoda-Parikshit Garh Rd, Meerut & at Kannauj (Before Conf.); River Suswa at Mothrawala; River Gomti at Lucknow D/s, at Jaunpur D/s, at Varanasi; River Varuna B/c with River Ganga at Varanasi & at Rameshwar, Varanasi; River Ramganga at Kannauj (Before Conf.); D/s Daha River at Sasamusa; River Ram Rekha at Harinagar; River Sirsa at Ruxol; River Sai at Jalalpur, Jaunpur; River Harbora at Narkatiaganj; River Saryu at Ayodhya at Main Bathing Ghat. The River Koshi at Madhepura is also not complying with the desired water quality with respect to FC. The water quality of the tributary streams Suswa, Gola, Ramganga, Kalinadi (E), Varuna, Sai, Gomti, Rapti, Saryu, Ghaghara, Rihand, Sone, Gandak, Sikrana, Burhi Gandak, Harbora, Kamla, Manusmar, Koshi, Daha, Dhous, Farmar, Ram Rekha and Sirsa is presented in Annexure-I Table 5.3.

5.2.4 Water Quality of tributary streams- Tons, Ashwani, Batta, Giri, Pabbar, Kalinadi (W), Hindon, Tons (MP), Betwa, Kaliasot, Kolar, Chambal,

Parvati, Khan, Kshipra, Kali Sindh, Sindh, Bichia, Sankh, Banas, Chhapi and Ujad

The water quality of Tons, Ashwani, Batta, Giri, Pabbar, Kalinadi (W), Hindon, Tons (MP), Betwa, Kaliasot, Kolar, Chambal, Parvati, Khan, Kshipra, Kali Sindh, Sindh, Bichia, Sankh, Banas, Chhapi and Ujad tributary streams is conforming to water quality criteria with respect to pH and conductivity at all the locations. River Chambal at Nagda D/s is not meeting the desired water quality criteria for conductivity (9880 $\mu\text{mhos/cm}$). pH is observed slightly higher than the desired criteria in river Betwa, Parvati, Govind Sagar, Chhapi, Ashwani, Kali Sindh, Giri, Banas, Kolar, Chambal, Gohad, Kshipra and Sone at their few monitoring locations.

The Dissolved oxygen ranges from Nil to 19.7 mg/l. DO is observed Nil in River Hindon at Ghaziabad D/s. DO is also observed low in River Banas near Newta Dam, Jaipur (0.5 mg/l); Bisulpur Dam, Tonk (3.2 mg/l) & Dhanari Dam near Swaroopganj, Sirohi (3.6 mg/l); Kshipra at Siddhawati (D/s)(1.2 mg/l) & Ramghat at Ujjain (2.3 mg/l); Chambal at Nagda U/s (Water Intake Point) (2.8 mg/l), Nagda D/s (3.1 mg/l), Kota D/s (2 Km. From City)(3.3 mg/l); Rameshwarghat Nr. Sawaimadhopur (3.5 mg/l); Parvati before meeting River Chambal at Khatoli, Kota (3.1 mg/l); Kali Sindh at Anicut of M/S CFCL Gadepan, Kota (3.2 mg/l) & Barod Rd Bdg, Kota (3.8 mg/l) and Ujad U/s Bhim Sagar Dam, Jhalawar(3.7 mg/l).

The BOD ranges from 0.1 to 369 mg/l. The maximum value (369 mg/l) of BOD is observed in River Kalinadi at Mujaffarnagar D/s. Other locations having high BOD are River Betwa at Nayapur D/s Mandideep (104 mg/l), River Hindon at Sardhana Budhana Road, Vill. Baparsi (Meerut) (50 mg/l), D/s of Ghaziabad in Uttar Pradesh (45 mg/l) & A/c with R. Krishna & Kali Near Binauli Town, Meerut (43 mg/l), River Chambal at Nagda D/s (42 mg/l), Nagda U/s (Water Intake Point) (6 mg/l), Kota D/s (2 Km. From City)(4.7 mg/l), Dholpur (4.2 mg/l) & Rameshwarghat Nr. Sawaimadhopur (3.7 mg/l), River Kshipra at Ramghat at Ujjain (28 mg/l), Siddhawati (D/s)(20 mg/l) & Trivenisangam (1 Km. D/s of Sangam)(18 mg/l), River Betwa Before Conf. Yamuna at Hamirpur (18 mg/l), Near Road Bridge, Bhojpur (7.6 mg/l), Near Intake Point, Vidisha (7.5 mg/l), D/s after mixing of River Bais at Vidisha (6.8 mg/l) & Charantirghat, Vidisha(5.4 mg/l), River Banas near Newta Dam, Jaipur (31 mg/l), Dhanari Dam near Swaroopganj, Sirohi (9.2 mg/l) & Bisulpur Dam, Tonk (4.2 mg/l), River Bichia, Bridge Govindgarh Road (8.5 mg/l), River Kaliasot Near Road Bridge, Mandideep (5.4 mg/l), River Parvati A/c of Vindhyaachal Nalla, Pilukhedhi (4.3 mg/l), near Intake Point Pillukhedhi Distt. Rajgarh (3.6 mg/l) & near Village Bataodapar (3.2 mg/l), River Kalinadi at U/s of Muzaffar Nagar (4 mg/l), Gohad Dam (4.1 mg/l), River Ujad U/s Bhim Sagar Dam, Jhalawar (3.9 mg/l) and River Kali Sindh at Anicut of M/S Cfcl Gadepan, Kota (3.2 mg/l).

The Faecal Coliform value ranges from 2 to 11×10^7 MPN/100ml whereas the Total Coliform (TC) value ranges from 2 to 11×10^8 MPN/100ml. The highest value of Faecal Coliform & Total Coliform is observed in River Kalinadi at Mujaffarnagar D/s. The other locations which are not meeting the desired water quality criteria with respect to TC and FC are River Kalinadi at U/s of Muzaffar Nagar; River Betwa at Govind Sagar & B/c Yamuna at Hamirpur; River Chambal at Etawah B/c to Yamuna; River Hindon at D/s of Ghaziabad, Sardhana Budhana Road, Vill. Baparsi (Meerut) and A/c with R. Krishna & Kali near Binauli town, Meerut.

The concentration of Nitrate+Nitrite ranges from 0.0-17.6 mg/l. The maximum value of nitrate is observed in River Betwa at Charantirghat, Vidisha. The water quality of tributaries mentioned above is presented in Annexure-I Table 5.4.

5.2.5 Water Quality of tributary streams- Damodar, Barakar, Konar, Rupnarayan, Dwarakeshwar, Dwarka, Silabati, Jalangi, Churni, Matha Bhanga, Kanshi, Mayurkashi, Mahananda, Vindhyadhari, Bokaro and Jumar

The water quality of the tributary streams Barakar, Konar, Dwarakeshwar, Silabati, Jalangi, Kanshi, Mayurkashi, Mahananda, Bokaro and Jumar are meeting the water quality criteria with respect to pH, DO and conductivity.

Damodar is not meeting pH at Narainpur after Confl. of Nunia Nallah (8.6), D/s of IISCO (8.8), Near Mujher Mana Village A/c of Tamla Nallah (9.3), water intake point Bankura Town on R. Dwarakeshwar (8.8), D/s of Tarapith on River Dwarka, Satighat & U/s of Tarapith on River Dwarka at Sadhak Bamdeb Ghat (8.8) is not meeting at D/s of Krishna Nagar (8.7) and Barakar at Asansol (Water Intake Pt) (8.7). Conductivity is observed high in Damodar at Haldia D/s (17900 $\mu\text{mhos/cm}$); Rupnarayan D/s Kolaghat near Kolaghat Rail Bridge No.3 (2870 $\mu\text{mhos/cm}$) and B/c to River Ganga near Geonkhali (4690 $\mu\text{mhos/cm}$); Vindhyadhari River U/s at Haroa Bridge (13010 $\mu\text{mhos/cm}$) and D/S at Malancha Burning Ghat (29900 $\mu\text{mhos/cm}$). DO is also observed low with respect to desired water quality criteria in river Damodar, Dwarka, Churni, Mathabhanga and Vindhyadhari at their all monitoring locations.

The BOD ranges from 0.2 to 90 mg/l. The highest value of BOD (90 mg/l) is observed in River Matha Bhanga, Gobindapur. River Damodar at most of the monitoring locations and River Mahananda; Dwarakeshwar; Dwarka; Matha Bhanga; Churni; Jalangi; Kanshi; Barakar; Jumar; Rupnarayan at D/s Kolaghat near Kolaghat Rail Bridge No.3; U/s of Vindhyadhari at Haora Bdg & Vindhyadhari D/s at Malancha Burning Ghat are exceeding the maximum level of BOD with respect to desired water quality criteria.

The Faecal Coliform (FC) value ranges from 2 to 5 x10⁶ MPN/100ml, whereas the Total Coliform (TC) value ranges from 4 to x10⁶ MPN/100ml. The highest value of Faecal Coliform and Total Coliform is observed in River Matha Bhanga, Gobindapur. Tributary streams in West Bengal exceeding the maximum level of FC and TC with respect to desired water quality criteria at most of the monitoring locations. The water quality of these tributaries is presented in Annexure-I Table 5.5.

CHAPTER VI

Water Quality of Rivers in Brahmaputra Basin

6.1 Brahmaputra River System

The Brahmaputra basin extends over an area of nearly 5, 80,000 sq km and traverses a distance of about 2900 km through Tibet (China), India and Bangladesh. In India, the basin lies in the states of Arunachal Pradesh, Assam, Nagaland, Meghalaya and West Bengal. The river rises in the Great glacier in the northern-most chain of the Himalayas in the Kailash range at an elevation of about 5,510 m. It enters India across the Sadiya frontiers tract, west of Sadiya town into the Assam valley. Here it is joined by two more tributaries viz. the Dibang or Sikang and the Lohit, from here onwards the river is known as the Brahmaputra. The river then descends down into the Assam valley from east to west for a distance of about 720 km with its channels meandering from side to side and forming several islands, one of these islands, Majuli covers an area of 1,250 sq. Km. during its course the river receives many more tributaries both from the north and the south while some of them are trans-Himalayan rivers with considerable discharges.

The Brahmaputra has the highest discharge of all the rivers, in India, because of heavy annual average rainfall in the catchment area. The river has eight significant tributaries in India, three from the north are the Manas, the Kameng (or the Jia Bharali) and the Subansiri and three from the east are the Dibang or Sikang, the lohit and the Buri Dihing and two from the North West are the Tista and the Jaldhaka.

The basin area of Brahmaputra is covering the States of Arunachal Pradesh, Assam, Nagaland, Meghalaya, Sikkim and West Bengal. The important urban centres in these States are Shillong (Meghalaya), Guwahati, Jorhat, Dilbrugarh, Siliguri, Alipurduar, Dhubri, Nagaon, Tezpur, Tinsukia (Assam), Dimapur (Nagaland), Kohima (Sikkim), Darjeeling, Dabgram Jalpaiguri, Koch-Bihar (West Bengal).

6.1.1 Water Quality Monitoring in Brahmaputra Basin

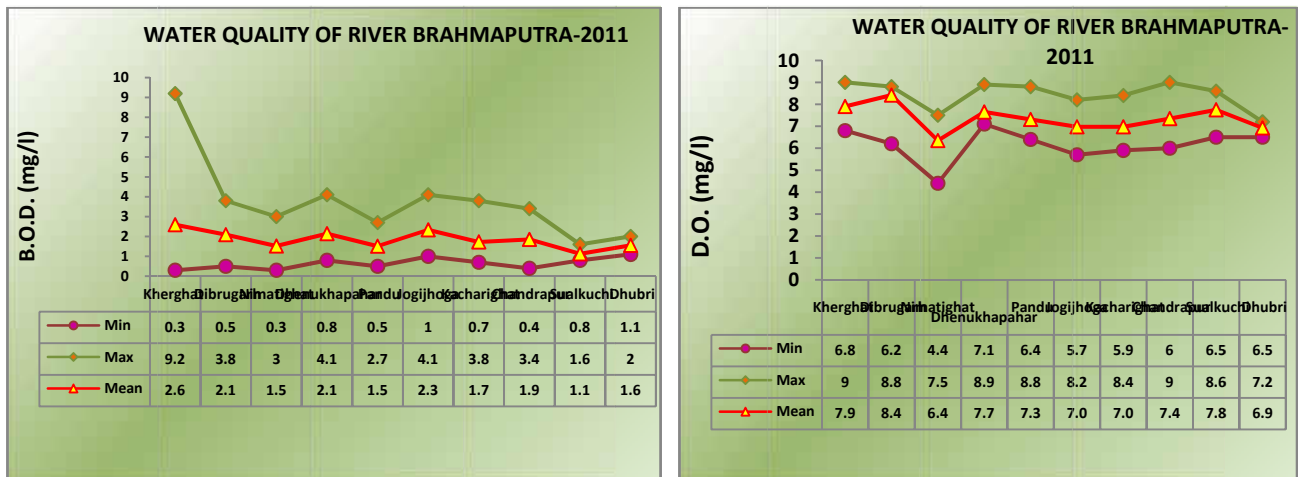
The State Pollution Control Boards of Assam, Nagaland and Sikkim are doing the water quality monitoring of the River Brahmaputra and its several tributaries in the basin. The tributary streams covered under the monitoring programme are Burhidihing, Dhansiri, Disang, Jhanji, Subansiri, Bhogdoi, Bharalu, Borak, Deepar Bill, Digboi, Mora Bharali, Teesta, Dickhu, Maney Khola, Ranichu, Rangit, Jai Bharali, Kathakal, Kharsang, Kolong, Manas, Pagldia, Chathe, Dzu, Kapili, Beki, Kundli, Kushiara, Panchnai, Sankosh, Sonai, Kohara, Ranga, Boginadi, Dikhow, Kaljani, Karola, Dzudza, Dzucha, Dzuna, Sano and Milak. The ranges of water quality observed in the mainstream and tributaries with

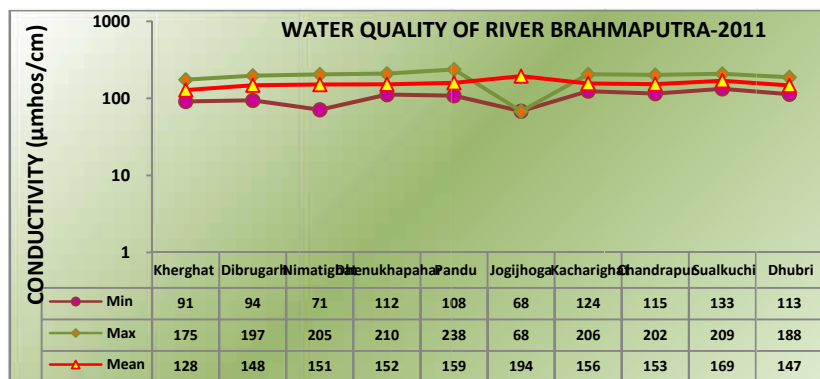
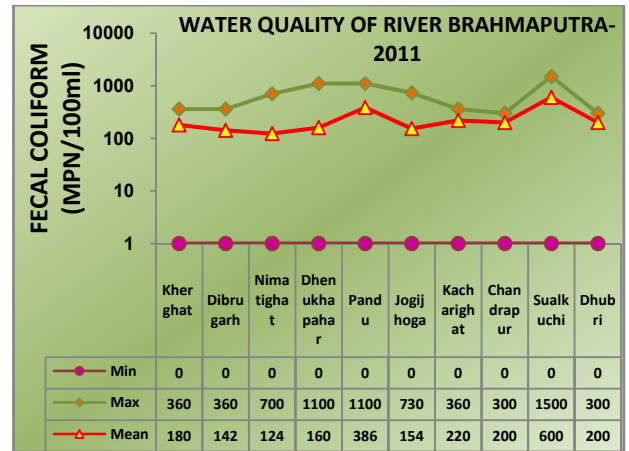
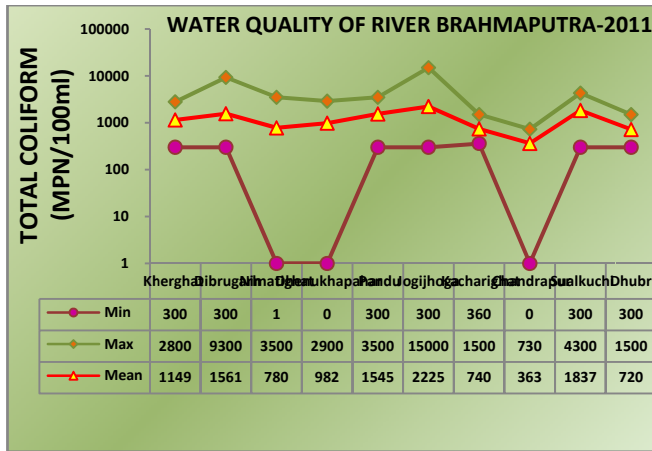
respect to with respect to Temperature, DO, pH, Conductivity, BOD, Nitrate +Nitrite-N, Faecal Coliform (FC) and Total Coliform (TC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

6.1.2. Water Quality of River Brahmaputra

The water quality of River Brahmaputra is conforming to water quality criteria with respect to pH and conductivity. Conductivity is observed in the range of 68 to 238 μ mhos/cm. DO ranges from 4.4 to 9 mg/l .The BOD value ranges from 0.3 to 9.2 mg/l. The highest value of BOD (9.2 mg/l) is observed at Kherghat, Assam. The other locations having high value of BOD are at Jogijhoga, Assam (4.1), Dhenukhapahar (4.1) Dibrugarh, Assam (3.8), Kacharighat, Panbazar, Guwahati (3.8), Chandrapur, Guwahati (3.4) mg/l in Assam. The Faecal Coliform (FC) ranges from 0 to 1500 MPN/100 ml whereas Total Coliform is observed in the range 0 to 15000 MPN/100 ml. The water quality status of River Brahmaputra with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is presented in Annexure I Table 6.1.

Figure 6 .1: Water Quality of River Brahmaputra





6.2.1. Water Quality of tributary stream Dhansiri

The water quality of River Dhansiri is conforming to water quality criteria with respect to pH. BOD is observed in the range of 0.4 to 6.8 mg/l. BOD is not meeting the desired criteria in River Dhansiri at Nuton Basti, (6.8 mg/l) and Town boundary bridge, Diphu Road (5.6 mg/l), Nagaland, and Dhansiri at Nagaland Assam Border, Dimapur (3.6 mg/l). DO ranges from 0.2 to 7.6 mg/l. River Dhansiri is not meeting the criteria limit for DO except Dhansiri at Golaghat (5.8 mg/l), Assam. Total Coliform (TC) and Faecal Coliform count is meeting the criteria limit. The water quality of Dhansiri and its tributary streams is presented in Annexure-I Table 6.2.

6.2.2. Water Quality of tributary streams Subansiri, Kharsang, Burhidihing, Pagldia, Digboi, Jai Bharali, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Deepar Bill & Kathakal

The Water quality of other tributary streams Subansiri, Kharsang, Burhidihing, Pagldia, Digboi, Jai Bharali, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Deepar Bill & Kathakal is meeting the desired criteria for Conductivity, Faecal Coliform, Total coliform and DO whereas low value of DO is observed at River Deepar Bill, Assam (2.3mg/l) and Disang at Gundamghat, Assam (3.5mg/l).

BOD ranges from 0.3 to 50 mg/l/. The highest value of BOD (50 mg/l) is observed in River Bharalu at Guwahati .BOD is not meeting the desired criteria at all the locations except river Subansiri at Gerekamukh, Pagldia river near Nalbari town, dist. Nalbari, Jai Bharali River Near Biswanath Chara II, Sonitpur, Kolong River at Marigaon, Disang at Gundamghat, Assam. The Total Coliform count varies from 0-320000 MPN/100 ml and not meeting the criteria at BhogdoI River at Jorhat, Bharalu River at Guwahati, Deepar Bill, Assam and Kaljani d/s of Alipurdwār, municipality discharge point. The Faecal Coliform count varies from 0 - 260000 MPN/100 ml and not meeting the criteria in river Bhogdoi at Jorhat, Bharalu river at Guwahati, Deepar Bill Assam and Kaljani d/s of Alipurdwār, municipality discharge point. Water Quality of tributary streams Subansiri, Kharsang, Burhidihing, Pagldia, Digboi, Jai Bharali, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Deepar Bill & Kathakal is presented in Annexure-I Table 6.3.

6.2.3. Water Quality of tributary streams Teesta, Dikchu, Maney Khola, Ranichu, Kundli, Dikhow, Kohora, Boginadi, Ranga Nadi, Kapili, Beki, Sankosh, Barak, Sonai, Kushiara, Karola, Kaljani and Panchnai

The Water quality of other tributary streams Teesta, Dikchu, Maney Khola, Ranichu, Kundli, Dikhow, Kohora, Boginadi, Ranga Nadi, Kapili, Beki, Sankosh, Barak, Sonai, Kushiara, Karola, Kaljani and Panchnai is meeting the desired criteria for Conductivity, DO and pH. pH is meeting the desired criteria except few locations in river Teesta, Dikchu, Maney khola and Ranichu. BOD ranges from 0.3 -6.2 mg/l and is not meeting the criteria at all the locations except Kundli River at Kundli/ sapakhowa, Sadia. (1.8) Dikhow River at Dikhow bridge Sivasagar (2.1), Kapili River at Dharmtul Bridge, NH-31, Nagaon (2.0), Sankosh River, Dhubri (1.2), Kushiara River at Karimganj (2.5) mg/l .FC ranges from 0 to 260000 MPN/100ml whereas TC ranges from 0 to 2200000 MPN/100 ml. The higher values of FC & TC is observed at River Teesta at Siliguri and Karola, d/s of Jalpaiguri, near min bhawan .Water Quality of tributary streams Teesta, Dikchu, Maney Khola, Ranichu, Kundli, Dikhow, Kohora, Boginadi, Ranga Nadi, Kapili, Beki, Sankosh, Barak, Sonai, Kushiara, Karola, Kaljani and Panchnai is presented in Annexure-I Table 6.4.

CHAPTER VII

Water Quality of Rivers in Mahi Basin

7.1 Mahi River System

The Mahi basin extends over an area of 34,842 sq. km. The interstate river Mahi is 583 km long, originating in Madhya Pradesh, passing through Rajasthan and Gujarat and draining into the Gulf of Khambhat. The Mahi flows northwards initially entering into Banswara district and then turning southward flowing through Udaipur and Dungarpur districts before entering into Gujarat. In Gujarat, it flows through Panchmahal, Kheda, Vadodara and Bharuch districts before draining into the Gulf. The principal tributaries of the river are the Som from the right and the Anas and the Panam from the left. The important urban centres in the watershed of Mahi are Godhra, Vadodara, Dohad and Dadhoi in Gujarat; Ratlam, Jaora in Madhya Pradesh; and Banswara in Rajasthan.

Vadodara is a metropolitan city as well as a centre for industrial activity. In Vadodara majority of industrial units are pharmaceutical and petrochemicals, besides units of caustic soda; distillery, fertilizer, dyes and pesticides also exist. The wastewater generated by IPCL, GSFC, Gujarat refinery, GIDC, Indian Dye stuff (P) Ltd. are being discharged into the Gulf of Khambhat through the Vadodara effluent channel. Although the large Vadodara industrial complex has extended considerably to the west of the small Dhadhar creek and discharges large quantity of effluent into the tidal segment of the river Mahi, the Dhadhar has its own independent catchment area (outside Mahi Basin) inclusive of its tiny tributary Viswamitri which is extremely polluted by the effluent generated from Vadodara.

7.2 Water Quality Monitoring in Mahi Basin

The State Pollution Control Boards of Gujarat and Rajasthan at 17 locations are doing the water quality monitoring of the River Mahi and several tributaries in the basin. The monitoring locations are on mainstream of River Mahi (11) and tributaries- Anas (1), Panam (1), Jammer (1), Malei (1), Shivna (1) and Chillar (1). The ranges of water quality observed in River Mahi, Panam and Anas with respect to Temperature, DO, pH, Conductivity, BOD, Nitrate +Nitrite-N, Faecal Coliform and Total Coliform are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

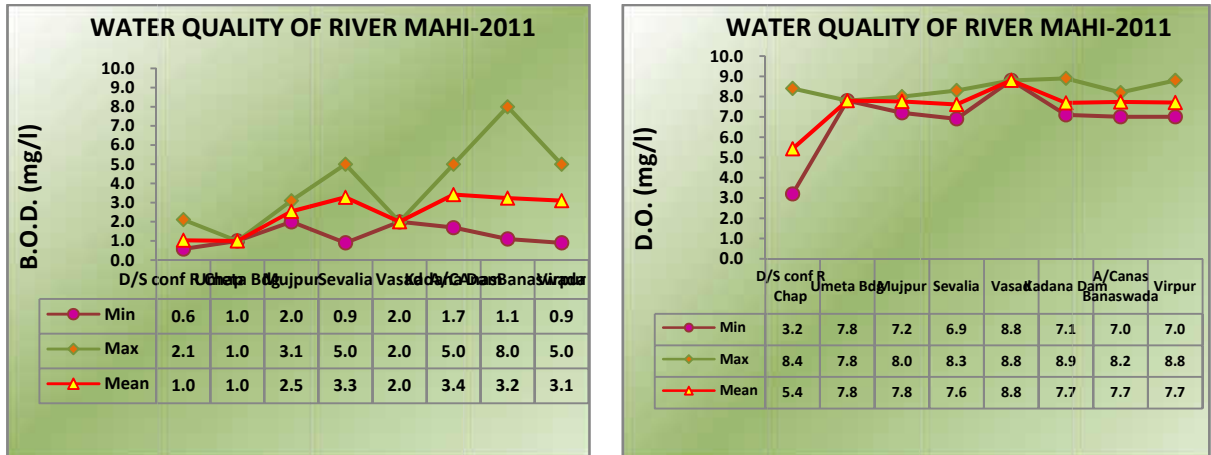
7.2.1 Water quality of River Mahi and its tributary streams Shivna, Jammer, Malei, Chillar, Anas and Panam

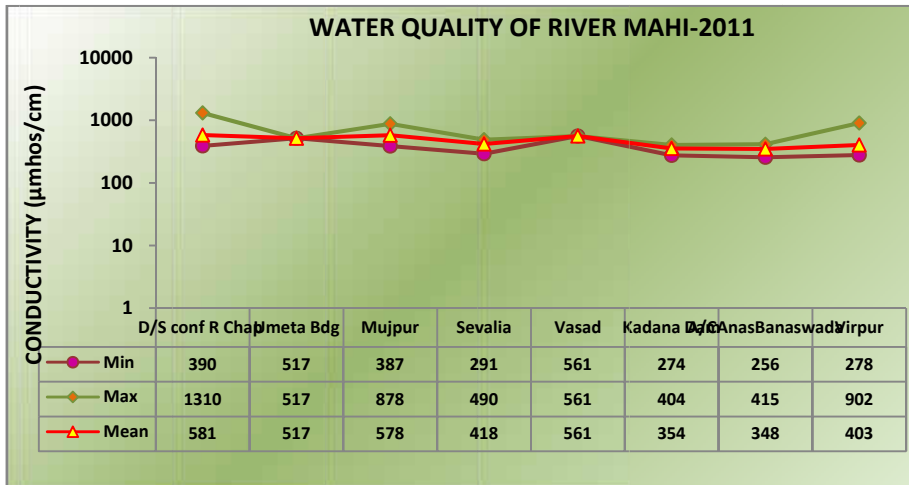
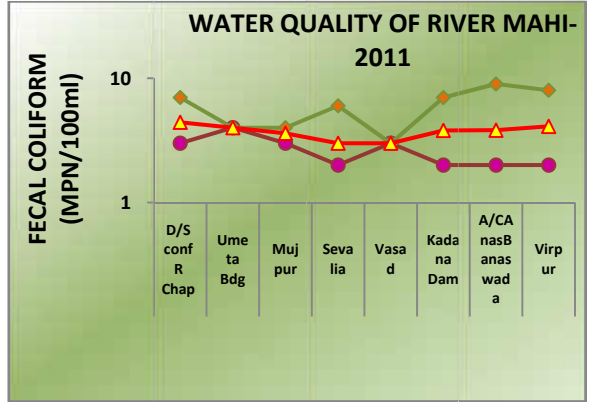
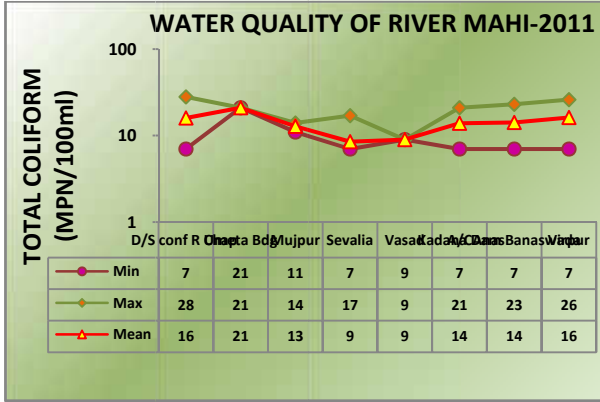
The water quality of River Mahi is meeting the desired criteria with respect to Total Coliform and Faecal Coliform. pH is observed in the range of 7.1-9.1 and is

not meeting the criteria at D/S Conf with R. Chap (Under Sagwara-Sarhi Rd. Bdg.) (9.1) in Rajasthan; at Mahi A/c Anas at Pardi (Banawada) & Sevalia (8.7), at Virpur & Near Rajasthan Border at Kadana Dam (8.6) in Gujarat. The Conductivity lies in the range of 256 -1310 μ mhos/cm. The DO lies in the range of 3.2-8.9 mg/l and is not meeting the criteria at D/s conf with R. Chap (3.2 mg/l) in Rajasthan. The BOD is observed in the range of 0.6 -8 mg/l and is not meeting the criteria at A/c Anas at Pardi (Banawada) (8 mg/l), at Virpur, Sevalia & Mahi near rajasthan border at Kadana Dam (5 mg/l) in Gujarat. The Faecal Coliform ranges from 2-9 MPN/100ml and the Total Coliform is in the range of 7-28 MPN/100ml and is meeting the desired crietria.

The water quality of tributary streams River Shivna at Ramghat, Mandasaur (4 mg/l) in Madhya Pradesh and River Anas at Dahod, (Kushalgarh), Dist. Panchmahal & River Panam at Lunawada (5 mg/l) in Gujarat is not complying with the criteria in the respect of BOD. The DO is not meeting the criteria in River Panam at Lunawada (3 mg/l) in Gujarat. pH is not meeting with the criteria in River Shivna at Ramghat, Mandasaur (8.6) in Madhya Pradesh and River Anas at Dahod, (Kushalgarh), Dist. Panchmahal & River Panam at Lunawada (8.6) in Gujarat. The water quality data of River Mahi and its tributaries Shivna, Jammer, Malei, Chillar, Anas and Panam with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is presented in Annexure-I Table 7.1. The water quality status of River Mahi with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in Figure 7.1.

Figure 7.1: Water Quality of River Mahi





CHAPTER VIII

Water Quality of Rivers in Sabarmati Basin

8.1 Sabarmati River System

The Sabarmati basin extends over an area of 21,674 sq km. Located in Western India, the basin covers areas in the States of Rajasthan and Gujarat. It rises in the Aravalli hills. The total length of the river from the head to its outfall into the sea is 371 km. The principal tributaries of the river are the Sei, the Wankal, the Harnay, the Hathmati, and the Vatrak and the Meshwa. The river Sabarmati and its tributaries are all rain-fed. The rainfall being fairly low in the basin, its water wealth potential is one of the two lowest in India. The lower part of the basin has become a haven for industries and GIDC has encouraged a new gene of small and medium industries many of them being engineering and chemical units generating significant water pollution. The textile industry continues to dominate the industrial scene in Ahmedabad. In the recent times about 100 km long 30 km wide Gandhinagar-Vadodara belt is a prosperous and fast developing urban industrial area.

The river is one of the most polluted rivers in the country although it is the lifeline of the State of Gujarat. Intensive agricultural practices coupled with intensive withdrawal of water for cropping had left the river absolutely dry after it entered the Ahmedabad city limits. The river is in a very serious state and deserves urgent attention. Large number of industrial units is located in Ahmedabad. Besides this there are thousands of small scale industries (SSI) units engaged in diversified products mostly concentrated in various industrial states like Naroda, Odhar, Vatva, Pilas and Chandola etc. All these industries are discharging their waste waters D/s (D/s) of Sabarmati Ashram whereas thermal power plant is discharging U/s (U/s) of Sabarmati Ashram.

The river Sabarmati U/s of Ahmedabad city to Sabarmati Ashram and from Sabarmati Ashram to Vautha have been identified as polluted stretches. The immense urban and industrial growth combined with growing demand of irrigation water has taken their toll as observed by the deteriorating water quality recorded particularly from Ahmedabad city to Vautha. The total length of the stretch from Ahmedabad city to Vautha is of 52 km and in the polluted river stretch; the main contributing outfalls are the Maninagar (mixed effluent) and river Khari (industrial).

The basin area of Sabarmati is covering the States of Rajasthan, Madhya Pradesh and Gujarat. The important urban centres in Gujarat are Gandhi Nagar, Junagadh, Ahmadabad, Surendranagar, Gandhidham, Anand, Dholka, Himatnagar, Kalol, Unjha, Viramgam and Visnagar.

8.2 Water Quality Monitoring in Sabarmati Basin

The water quality monitoring of the River Sabarmati and its tributaries are being done in the basin by the State Pollution Control Boards of Gujarat. The monitoring locations are on mainstream of River Sabarmati and tributaries- Meshwa, Shedi and Khari. The ranges of water quality observed in Sabarmati Basin with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

8.2.1 Water Quality of River Sabarmati

The water quality meets the desired water quality criteria with respect to DO, pH, Conductivity, Fecal coliform and Total coliform at all locations. The BOD is not meeting the criteria at Mahudi Jain Temple, 150 Km. from Origin (4 mg/l) in Gujarat. The water quality of River Sabarmati with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 8.1.

CHAPTER IX

Water Quality of Rivers in Narmada Basin

9.1 Narmada River System

The Narmada basin extends over an area of 98,796 sq km. Lying in the northern extremity of the Deccan plateau, the basin covers large areas in the Madhya Pradesh and Gujarat and a comparatively smaller area in Maharashtra. The Narmada Basin is bounded on the north by the Vindhya, on the east by the Maikala range, on the south by the Satpura and on the west by the Arabian Sea.

Narmada is the largest west-flowing river of the Indian peninsula. Narmada rises from Amarkantak, in the Shahdol district of Madhya Pradesh. The total length of the river from the head to its outfall into the Gulf of Khambhat is 1,312 km. Although entirely rain fed, the Narmada has a fairly heavy discharge because of moderately heavy annual average rainfall in the basin, particularly in the upper catchment area.

Urbanisation unlike in other basins has been going on in a slow pace in this basin mainly due to the river passing through hilly terrain that has made it inaccessible in most places. The major urbanisation centres are Jabalpur, Dewas and Khandwa besides Bharuch in Gujarat State.

The industrial development in the Narmada basin is lower as compared to other river basins. The industrialized districts of the Narmada basin are Dhar, Jabalpur and Bharuch consisting of clusters of pharmaceuticals, pesticides, dyes & distilleries, leather & fertilizer units whereas in Jabalpur, Khandwa and Hoshangabad the main industrial activity are the paper mills. In most of the other districts the industries are almost non-existent.

The basin area of Narmada is covering the States of Madhya Pradesh, Gujarat and Maharashtra. The important urban centres in these States are Bharuch and Ankleshwar in Gujarat; Murwara (Katni), Jabalpur, Khandwa, Betul, Hoshangabad, Itarsi and Khargone in Madhya Pradesh.

9.2 Water Quality Monitoring in Narmada Basin

The State Pollution Control Boards of Madhya Pradesh and Gujarat are doing the water quality monitoring of the River Narmada at 26 locations and its tributary streams Chota Tawa, Gour, Katni and Kunda at one location each. The ranges of water quality observed in River Narmada and tributary streams Chota Tawa, Gour, Katni and Kunda with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are

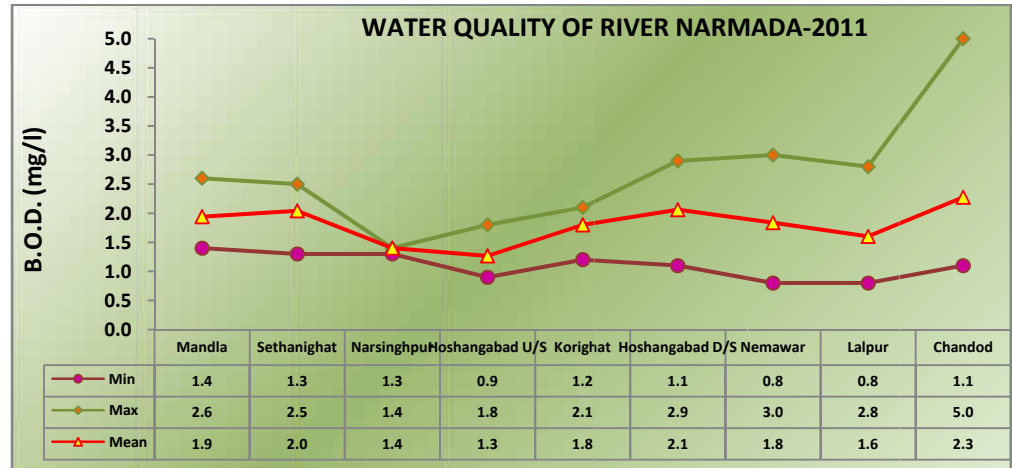
presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

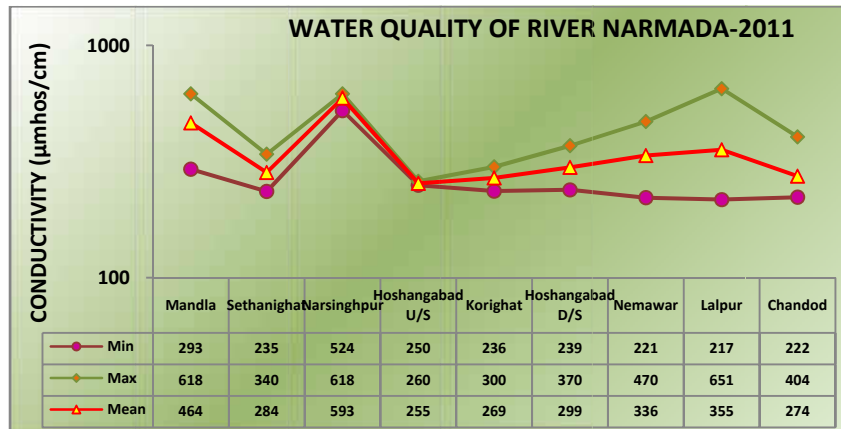
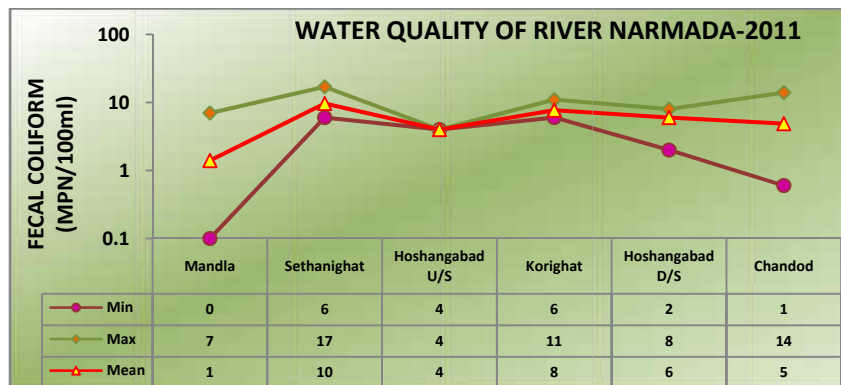
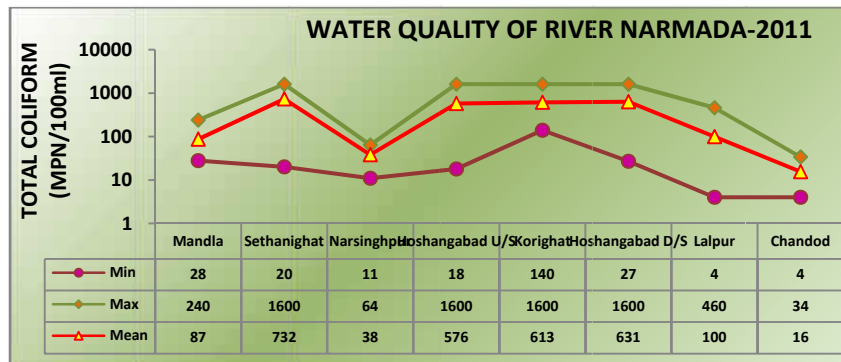
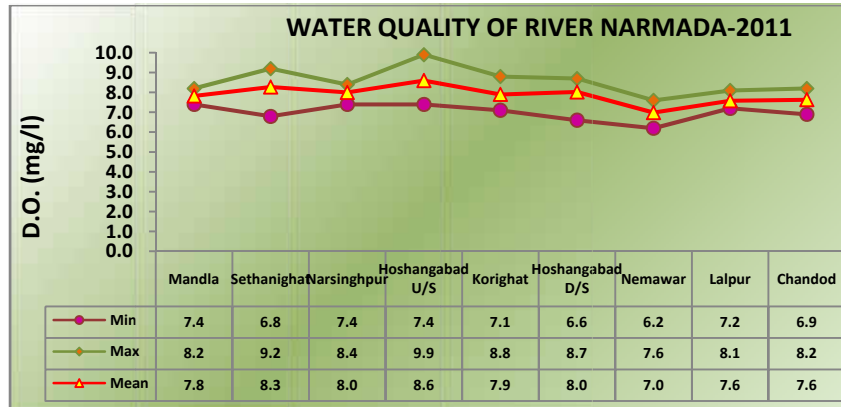
9.2.1 Water Quality of River Narmada and its tributary streams Gour & Katni

The water quality of mainstream of Narmada with respect to pH ranges from 7.1- 8.6 and is not meeting the criteria at Hoshangabad D/s (8.6) in Madhya Pradesh. The conductivity ranges from 217-651 μ mhos/cm. The DO varies from 6.2- 9.9 mg/l. The BOD ranges from 0.8- 5.0 mg/l and is not meeting the criteria at Chandod (5.0) in Gujarat. The Total Coliform count in the river ranges from 4-1600 MPN/100ml whereas the Faecal Coliform count varies from 0-17 MPN/100ml and is meeting the desired criteria. The water quality of River Narmada is broadly meeting the criteria for beneficial uses.

The Water Quality of the tributary streams Gour and Katni are meeting the desired criteria in all respects except high value of BOD (3.8 mg/l) and low value of DO (3.8 mg/l) in River Gour Bhoga Door at Jabalpur in Madhya Pradesh. The water quality observation indicates that all the parameters are by and large meeting the water quality criteria at all locations. The ranges of water quality observed in River Narmada and its tributary streams Gour and Katni with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 9.1. The water quality status of River Narmada with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in figure 9.1.

Figure 9.1: Water Quality of River Narmada





CHAPTER X

Water Quality of Rivers in Tapi Basin

10.1 Tapi River System

The Tapi basin extends over an area of 65,145 sq km. Situated in the Deccan plateau, the basin covers large areas in the States of Madhya Pradesh, Maharashtra and Gujarat. The Tapi basin is bounded on the north by the Satpura range, on the east by the Mahadeo hills, on the south by the Ajanta range and Satmala hills and on the west by the Arabian Sea. The total length of the river from the head to its outfall into the sea is 724 km of which 228 km is in Madhya Pradesh. 228 km in Maharashtra, 214 km in Gujarat and the remaining 54 km from the common boundary between Madhya Pradesh and Maharashtra.

The Tapi receives several tributaries on both its banks. The Bhokar, the Suki, the Mor, the Harki, the Guli, the Aner, the Arunavati, the Gomai, the Gomati and the Valer join it from the right and the Puma, the Bhogvati, the Vaghur, the Girna, the Bori, the Panjhra, the Amarvati, the Shiva, the Rengavati and the Nesu join from the left. The river basin is moderately rain fed and flows through intensively farmed black cotton-soil area.

The urban population has been observed to be higher in the tail reaches of the river compared to the Upper reaches of the basin, although the proportion of the geographical areas covered to these two reaches are in reverse order. The most populous town in Tapi basin is Surat followed by Amravati and Dhule in Maharashtra.

Major part of the upper Tapi basin is predominantly agricultural but in the lower basin area industrialisation has fairly developed in M.P. the industries are centred only in one district-East Nimar (Khandwa) while in Maharashtra Jalgaon is the most industrialised area. Distillery units contribute the largest share in Maharashtra where as textile occupies the predominant activity in Gujarat followed by food & beverages and chemical industries.

The Tapi receives several tributaries on both its banks. The Bhokar, the Suki, the Mor, the Harki, the Guli, the Aner, the Arunavati, the Gomai, the Gomati and the Valer join it from the right and the Puma, the Bhogvati, the Vaghur, the Girna, the Bori, the Panjhra, the Amarvati, the Shiva, the Rengavati and the Nesu join from the left. The river basin is moderately rain fed and flows through intensively farmed black cotton-soil area.

The basin area of Tapi is covering the States of Madhya Pradesh, Gujarat and Maharashtra. The important urban centres in these States are Burhanpur and Sarni

in Madhya Pradesh; Akola, Malegaon, Bhusawal, Jalgon, Amaravati, Dhule, Achalpur Akot Khamgaon Malkapur in Maharashtra; and Surat in Gujarat.

10.2 Water Quality Monitoring in Tapi Basin

The water quality monitoring of the River Tapi and tributary streams Girna, Kim, Rangavali, Denwa, Purna, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur is being done in the basin by the State Pollution Control Boards of Gujarat, Madhya Pradesh and Maharashtra. The ranges of water quality observed in River Tapi and its tributary streams Girna, Kim, Rangavali, Denwa, Purna, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

10.2.1 Water Quality of River Tapi and its tributary streams Girna, Kim, Rangavali, Denwa, Purna, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur

The water quality of River Tapi with respect to pH ranges from 7.0-8.7. The conductivity varies from 172-41836 μ mhos/cm. The DO ranges from 3.2-7.6 mg/l. The lowest value of DO is observed at ONGC Bridge, Surat (3.2 mg/l) in Gujarat and Bhusawal U/s (3.9 mg/l) in Maharashtra. The BOD varies from 1.2-10 mg/l and the values higher than the desired criteria are observed at Ajnand Village (8 mg/l), Bhusawal U/s (9 mg/l) and Uphad village (10 mg/l) in Maharashtra; at ONGC Bridge (9 mg/l) in Gujarat. The Total Coliform count in the river ranges from 22-24000 MPN/100ml and is exceeding the criteria at Near Bardoli (Kapp Bridge), Bardoli (24000 MPN/100ml), ONGC Bridge, Surat (15000 MPN/100ml) and Ukai Sherula Bridge (10000 MPN/100ml) in Gujarat whereas the Faecal Coliform count varies from 9 -9000 MPN/100ml and is not confirming with the criteria at ONGC Bridge, Surat (9000 MPN/100ml), Ukai Sherula Bridge (7500 MPN/100ml) and Near Bardoli (Kapp Bridge), Bardoli (4300 MPN/100ml) in Gujarat.

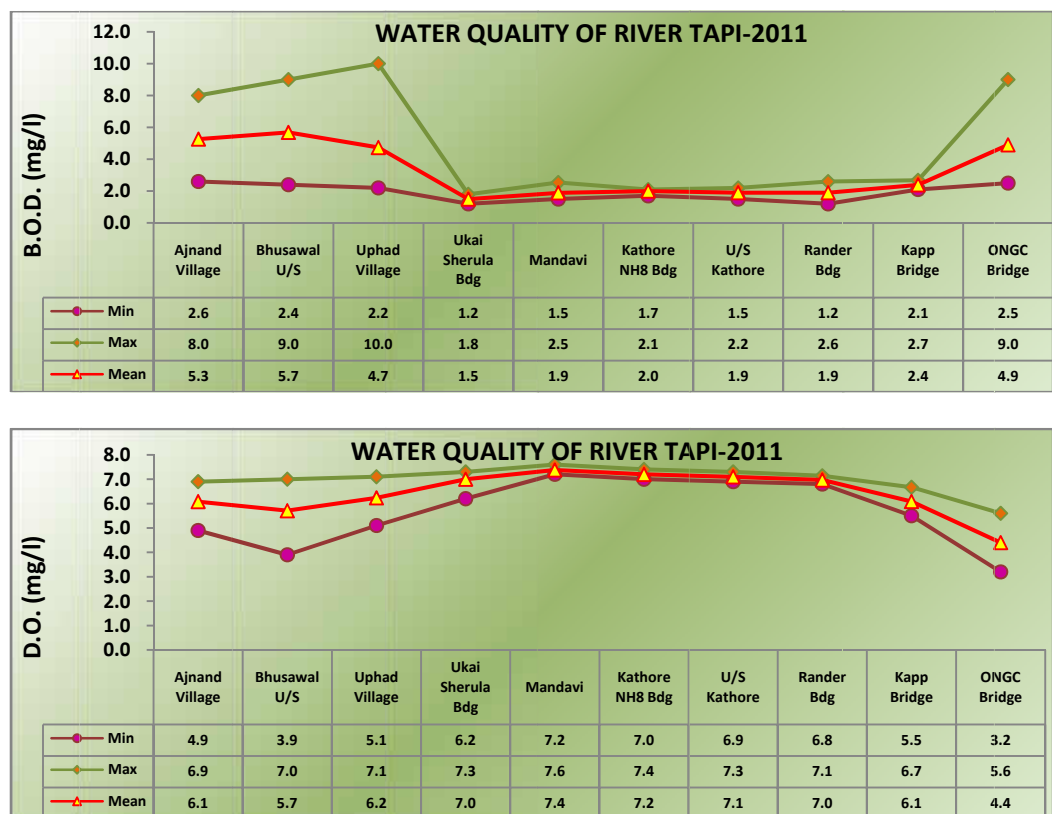
The water quality of tributary stream Girna is meeting the desired criteria with respect to Conductivity, DO, Fecal coliform and Total Coliform. pH ranges from 7.2 - 8.8 and is not meeting the criteria at Jalgaon (8.8). The BOD is observed in the range of 2.2-10 mg/l which indicates that the river is moderately polluted at Malegaon, Manmad (7 mg/l) and Jalgaon (10 mg/l) with respect to BOD. The tributary stream Kim is moderately polluted as indicators of organic and bacterial pollution as BOD, Total coliform and Faecal coliform does not meet the desired criteria.

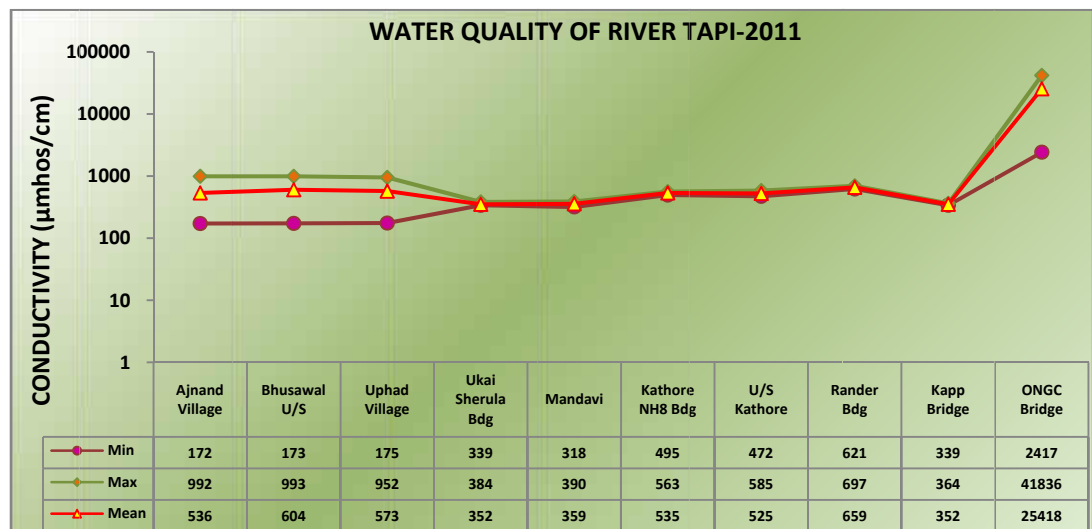
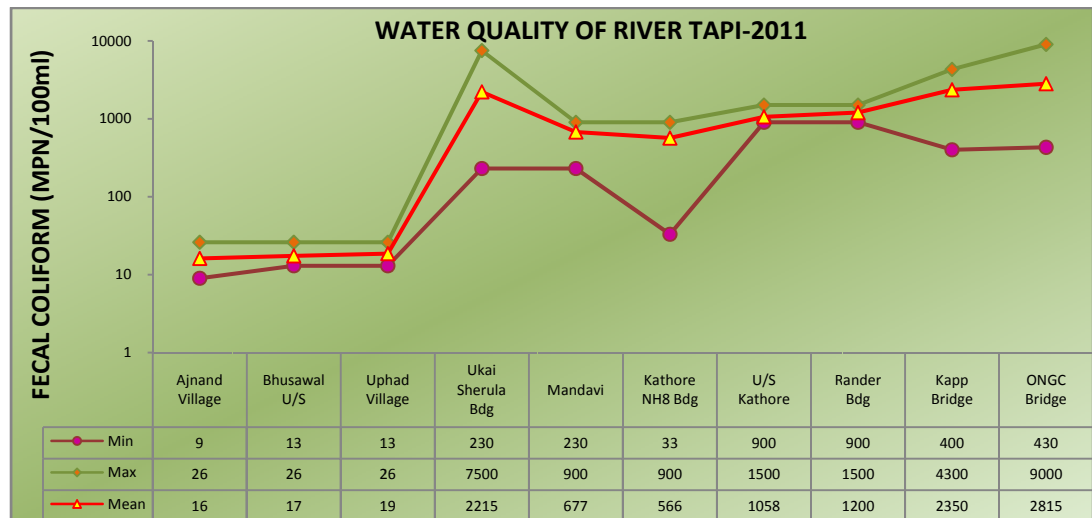
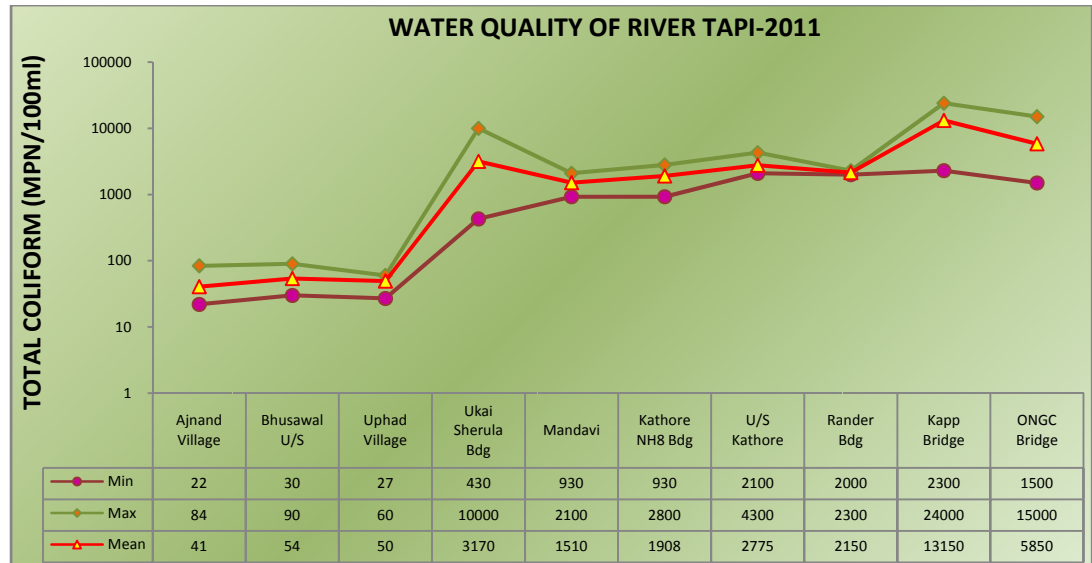
The tributary streams Denwa and Purna are meeting the desired water quality criteria in all respects except BOD which is exceeding and observed 3.6 mg/l and 12 mg/l respectively and low value of DO (2.7 mg/l) is observed in River Purna.

The water quality of other tributaries viz. Rangavali, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur with respect to DO is observed in the range of 1.8-7.4 mg/l, pH ranges from 7.1- 8.9, Conductivity is observed in the range of 163- 1880 μ mhos/cm, BOD ranges from 2-46 mg/l, Fecal coliform ranges from 9-300 MPN/100ml whereas Total coliform is observed in the range of 22- 1600 MPN/100ml.

The ranges of water quality observed in River Tapi and its tributary streams Girna, Kim, Rangavali, Denwa, Purna, Amravati, Bori, Burai, Gomai, Hiwara, Mor, Morna, Panzara, Pedhi, Titur and Waghur with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 10.1. The water quality status of River Tapi with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in figure 10.1.

Figure 10.1: Water Quality of River Tapi





CHAPTER XI

Water Quality of Rivers in Mahanadi Basin

11.1 Mahanadi River System

The Mahanadi basin extends over an area of 141 thousands sq km. lying in the north east of the Deccan plateau, the basin covers large areas in the States of Chattisgarh and Orissa, and only small areas in Bihar and Maharashtra. The upper basin is a saucer-shaped depression known as the Chhatisgarh. The Mahanadi rises in a pool, 6 km from Pharsiya village near Nagri town in Raipur district of Chattisgarh, and falls into the Bay of Bengal, near False point about 16 km below the confluence of the Chitarala and the Mahanadi. The total length of the river from the head to its outfall into the sea is 851 km of which 357 km are in Chattisgarh and the balance of 494 km are in Orissa. The Seonath, the Jonk, the Hasdeo, the Mand, the Ib, the Ong and the Tel are the principal tributaries of the Mahanadi river.

The water quality study reveals that the water of Mahanadi is comparatively less polluted compared to the other similar rivers in the country. However, certain stretches like the D/s portion of river Ib at Brajrajnagar, D/s of Sambalpur and Cuttack have comparatively higher degree of pollution. The pollution of Ib river is easily attributable to the discharges from a large paper industry situated in Brajrajnagar. In the majority of the other locations the BOD and the total coliform are the two parameters that are mainly responsible for lowering the water quality. While at places like Tikarapara this could be due to run-off from the areas adjoining the riverbanks that are generally used by the village people for defecation. At the urban centres, the high BOD and coliform levels are obviously due to the discharges into the river from domestic sources either directly or indirectly. None of the towns small or large, on the banks of Mahanadi have any regular sewerage system or sewage treatment plants and the domestic wastes find their way mostly through small nullah or storm water drains which join the D/s of the Ib river at Brajrajnagar causing serious depletion of oxygen level along the whole stretch which cause serious threat to the aquatic lives.

Korba has been identified as a critically polluted area in this river basin. The industrial as well as domestic wastewaters are being discharged into the River Hasdeo directly as well as through river Ahiran and Dengur Nala. The major source of pollution in the river is due to Thermal Power Plants, Bharat Aluminium Company, Captive power plant of BALCO, IBP (explosive unit) and coal mining operations. The action plan formulated suggests that the capacity of ash ponds of thermal ponds of BALCO have to be augmented.

The river has often been referred to as the 'Sorrow of Orissa'. The inhabited inner basin Chattisgarh plain suffered frequent droughts whereas the fertile deltaic area has been wrecked by repeated floods.

The basin area of the Mahanadi has a large number of industrial complexes in the Orissa portion of the basin the major industries are paper, textiles and thermal power plants at Choudwar, fertiliser and breweries at Paradeep, Sugar industries of Nayagarh, Badamba, Cement industry at Bargarh, paper industry of Brajrajnagar, coal mining areas of Rampur and Ib valley, and an aluminium smelter at Hirakud.

Most of these industries are located on the banks of the river Mahanadi or its tributaries and distributaries, which are used to carry the industrial effluents and wastewater from these industries. From the point of view of significant environmental impacts, the important medium scale industries are the chemical, textile, paper, cement, and leather tanning which consume large quantities of water.

Iron and steel industry at Bhilai, cement industries at Durg and Raipur, textile industry of Rajnandagaon, aluminium and thermal power plants at Korba are the major polluting industries in the State of M.P that falls in the river basin. All these major units are located on the riverbanks of Seonath, Kharoon and Hasdeo. The medium scale industries include chemical and distilleries of Durg, cement industries of Raipur, Iron and steel of Urla, paper industries of Bilaspur and many other agro based industries.

All the industries are discharging their wastewater either directly or indirectly to river Mahanadi as well as its tributaries. The vast mineral and human resources of the basin besides power generation infrastructure has resulted in a growth of a large variety of industries. The industries using the river bodies as the ultimate sink need to establish effluent treatment plants so that the designated best use of the river is sustained.

The basin area of Mahanadi is covering the States of Chhattisgarh, Madhya Pradesh, Orissa and Jharkhand. The important urban centres in these States are Rajnandgaon, Korba, Bilaspur, Durg, Raipur, Dhamtari, Raigarh, Rajharajharandalli in Madhya Pradesh & Chhattisgarh. And Cuttack, Puri, Sambalpur, Jatani, Balangir, Bargarh, Bhawanipatna, Brajarajnagar and Jharsuguda in Orissa.

11.2 Water Quality Monitoring in Mahanadi Basin

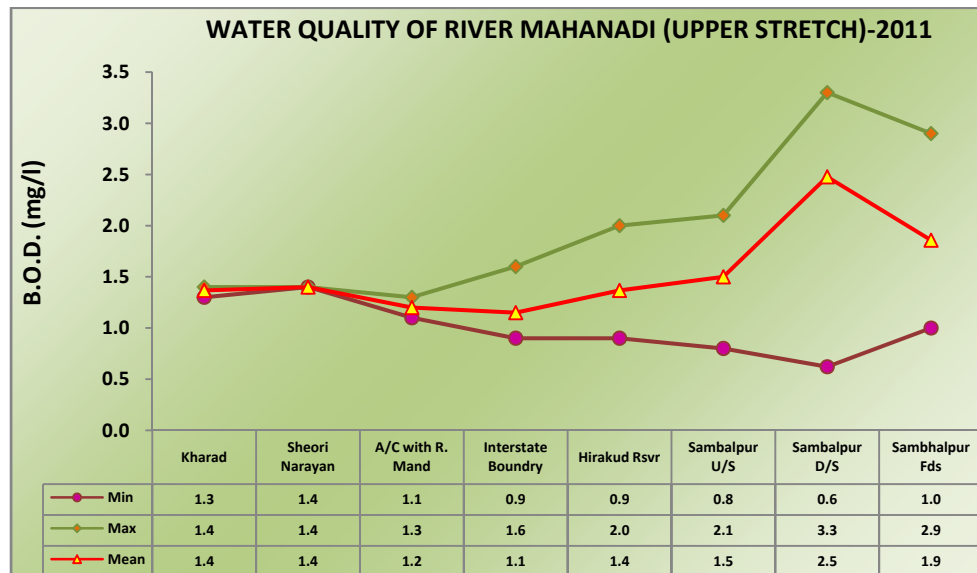
The State Pollution Control Boards of Chhattisgarh and Orissa at 48 locations are doing the water quality monitoring of the River Mahanadi and its several tributaries in the basin. The ranges of water quality observed in River Mahanadi and its tributary streams viz. Seonath, Kharoon, Hasdeo, Kelo, Ib, Kuakhai, Daya, Kathajodi, Sankha, Tel and Birupa with respect to Temperature, pH, DO,

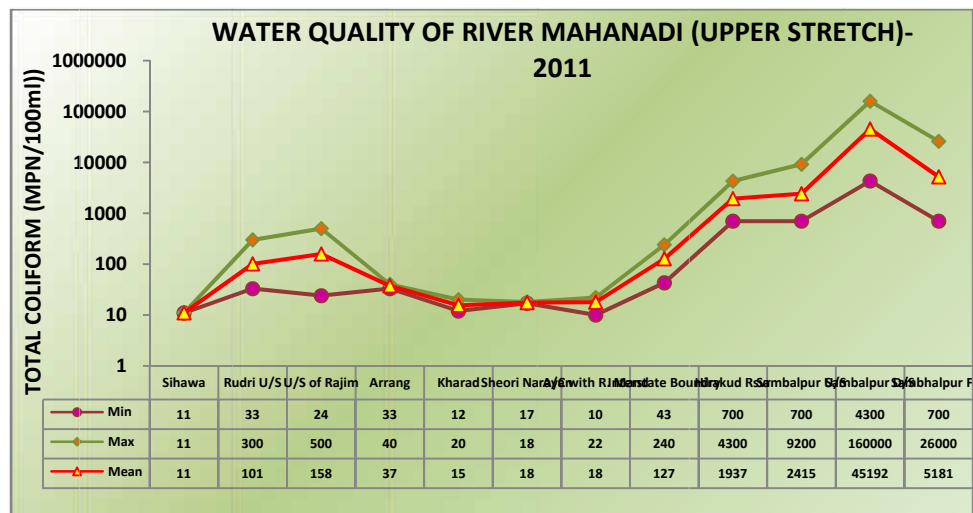
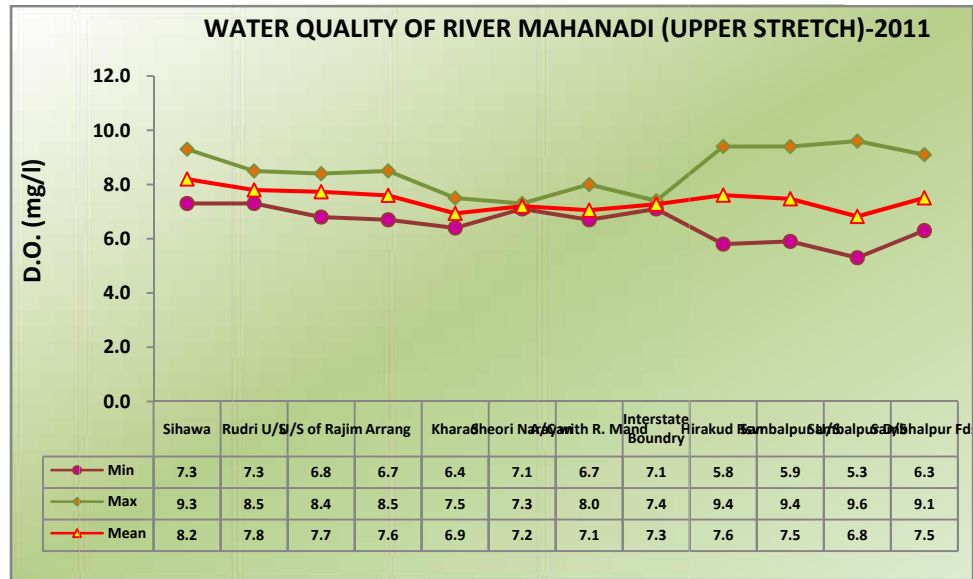
Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

11.2.1 Water Quality of River Mahanadi

The water quality of mainstream of Mahanadi with respect to pH is observed in the range of 7.1–8.5. The value of conductivity ranges from 90 $\mu\text{mhos/cm}$ to 13190 $\mu\text{mhos/cm}$. The DO value varies from 4.9 -10.5 mg/l. The BOD ranges from 0.6 -3.6 mg/l and the higher values are observed at Cuttack D/s (3.6 mg/l), Sambalpur D/s (3.3 mg/l) and Cuttack FD/s (3.3 mg/l) in Orissa. The Faecal Coliform count is observed in the range of 78-160000 MPN/100 ml. The higher value of Faecal Coliform count is observed at Cuttack D/s (160000 MPN/100 ml), Sambalpur D/s (92000 MPN/100 ml), Paradeep D/s & Sambhalpur FD/s at Huma (13000 MPN/100 ml), Cuttack FD/s (Serua) at Sankhatrasa (7900 MPN/100 ml), Sambalpur U/s (5400 MPN/100 ml), Tikarpada (4300 MPN/100 ml), Paradeep U/s (Before Industrial activity at Paradeep) (3100 MPN/100 MI) and A/c R.Tel (Sonapur D/s) (2800 MPN/100 ml). The Total Coliform count is observed in the range of 10- 160000 MPN/100 ml. The higher value of Total Coliform count is observed at Cuttack D/s & Sambalpur D/s (160000 MPN/100 ml), Paradeep D/s (54000 MPN/100 ml), Sambhalpur FD/s at Huma (26000 MPN/100 ml), Cuttack FD/s (Serua) at Sankhatrasa (13000 MPN/100 ml), Sambalpur U/s & A/c R.Tel (Sonapur D/s) (9200 MPN/100 ml), Tikarpada (8400 MPN/100 ml) and Paradeep U/s (Before Industrial activity at Paradeep) (7000 Mpn/100 ml). The water quality status observed in River Mahanadi with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 11.1. The water quality status of River Mahanadi with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in figure 11.1 & 11.2.

Figure 11.1: Water Quality of River Mahanadi (Upper Stretch)





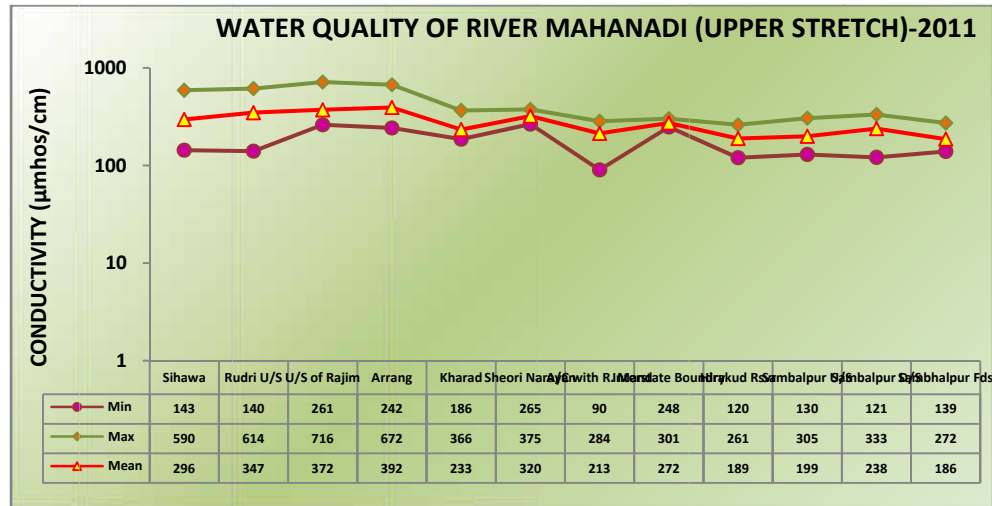
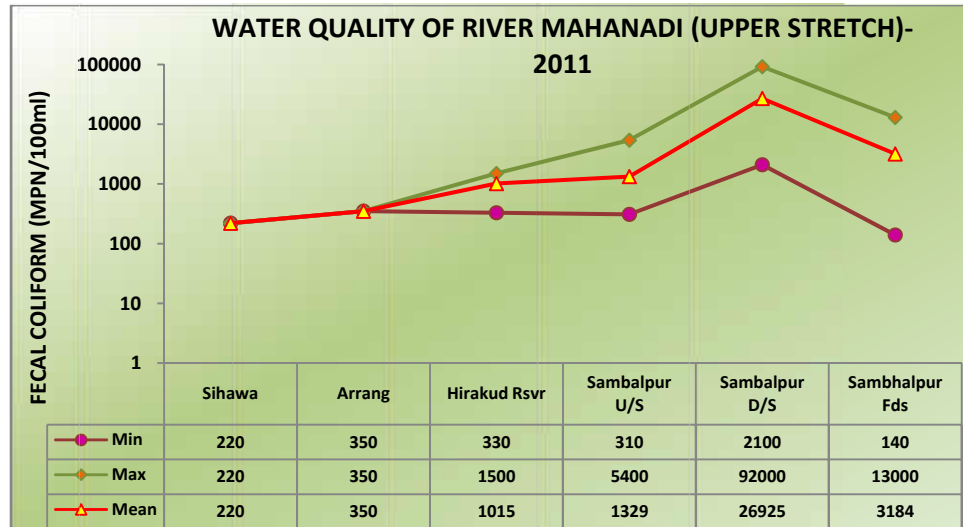
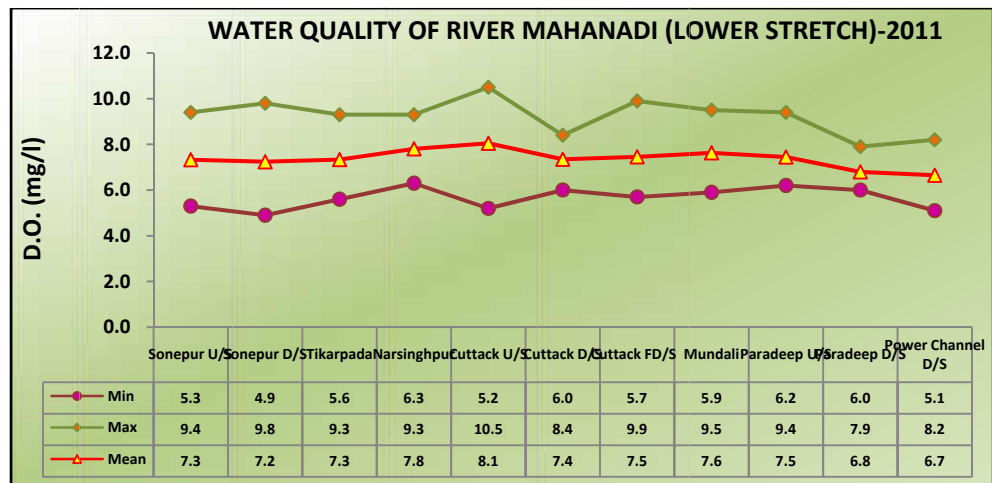
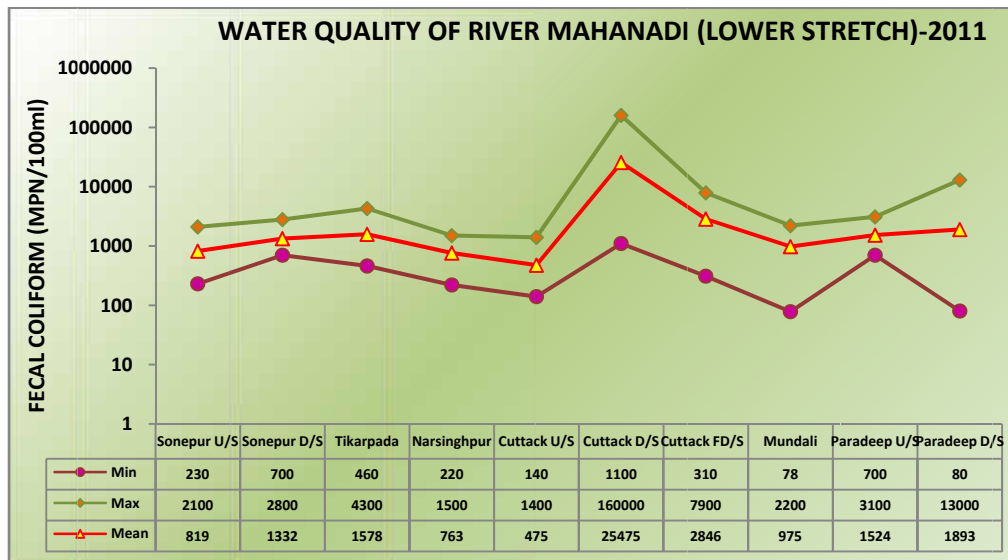
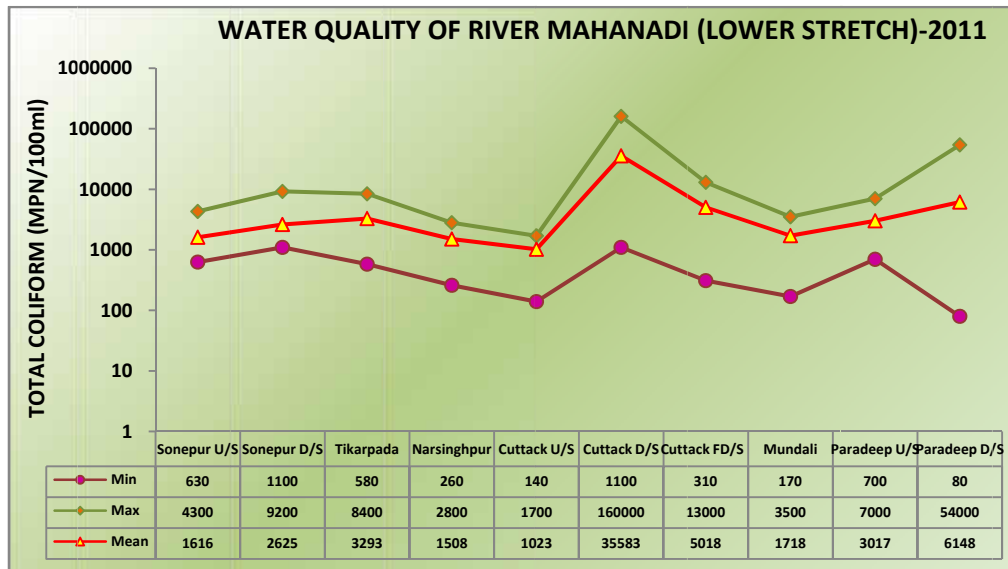
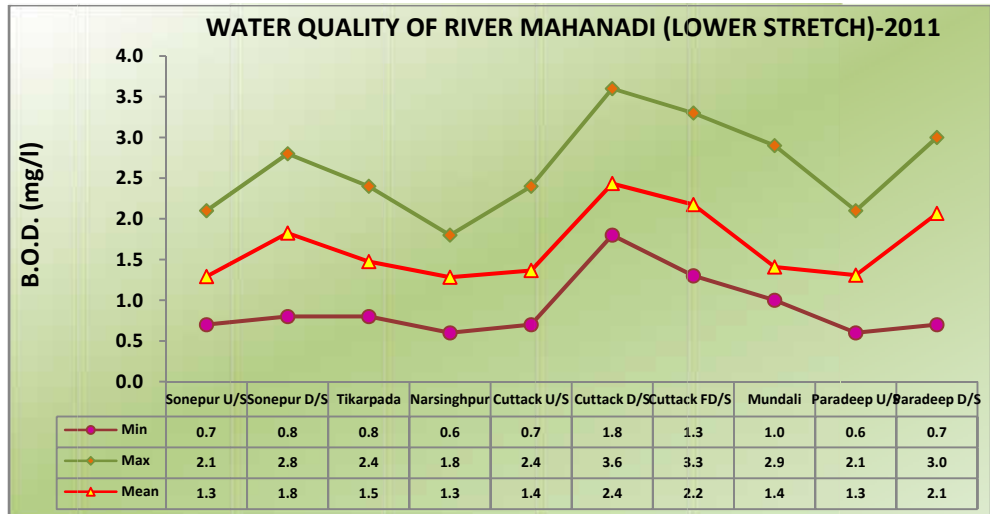
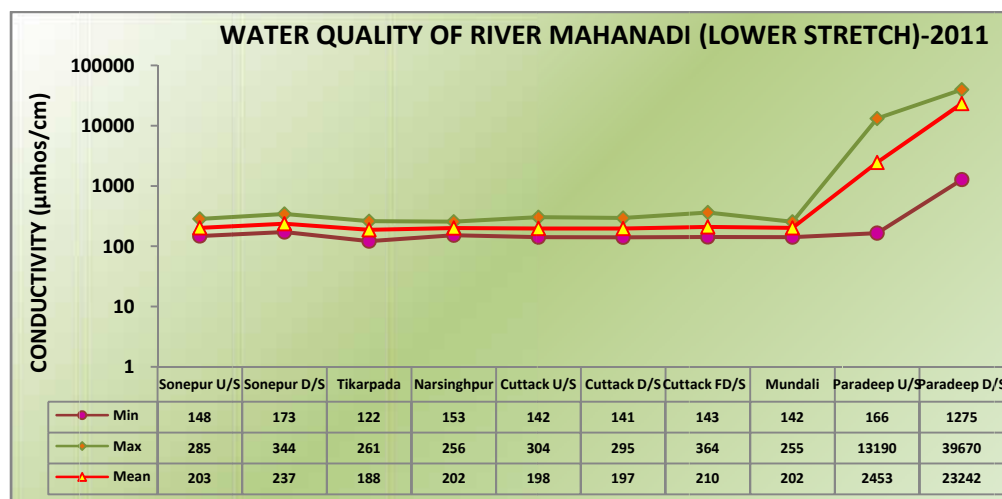


Figure 11.2: Water Quality of River Mahanadi (Lower Stretch)







11.2.2 Water Quality of tributary streams Seonath, Kharoon, Hasdeo, Kelo, Ib, Kuakhai, Daya, Kathajodi, Sankha, Tel and Birupa

The Water Quality of tributary stream Seonath with respect to DO varies from 7.2 -8.1 mg/l and Conductivity ranges from 228-674 $\mu\text{mhos/cm}$. The Total Coliform count is observed in the range of 11-2400 MPN/100ml. The BOD is observed in the range of 1.1-2.1 mg/l. In River Kharoon, a tributary of Seonath DO varies from 7.1 -8.7 mg/l and Conductivity ranges from 196-632 $\mu\text{mhos/cm}$. BOD is observed in the range of 1.4-2.2 mg/l and Total Coliform count ranges from 27-2400 MPN/100 ml.

The tributary stream Hasdeo and Ib are meeting the the desired water quality criteria in respect of all parameters except Total coliform count which is exceeding in River Ib at Brajrajnagar (Intake) D/s & Sundargarh (17000 MPN/100 ml) and Jharsuguda (Intake) (6300 MPN/100 ml) in Orissa.

The seven tributaries of Mahanadi i.e Kuakhai, Kathajodi, Birupa, Daya, Sankha, Tel and Kelo are meeting the water quality criteria with respect to pH, conductivity and Dissolved Oxygen (DO). The BOD is observed in the range of 0.7-6.5 mg/l and is observed higher than the desired criteria in River Kathajodi at Cuttak D/s (3.9 mg/l), River Kuakhai at Bhubaneswar D/s (6.5 mg/l) and River Daya at Bhubaneswar FD/s-2 Km A/c Gangua Nallah (4.8 mg/l) in Orissa. The Total Coliform and Faecal Coliform are varying from 28-160000 MPN/100ml and 70- 160000 MPN/100ml respectively in these tributaries. The higher value of Total Coliform and Faecal Coliform is observed in River Kathajodi at Cuttak D/s (160000 & 160000 MPN/100ml), River Kuakhai at Bhubaneswar D/s (92000 & 54000 MPN/100ml) & Bhubaneswar U/s (17000 & 11000 MPN/100ml), River Sankha U/s (D/s Mandira Dam) (54000 & 24000 MPN/100ml), River Daya at Bhubaneswar FD/s (2 Km A/c Gangua Nallah With River Daya) (54000 & 35000 MPN/100ml) and River Birupa at Choudwar (17000 & 13000 MPN/100ml) respectively in Orissa. The water quality status observed in tributary streams Seonath, Kharoon, Hasdeo, Kelo, Ib, Kuakhai, Daya, Kathajodi, Sankha, Tel and

Birupa with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 11.2.

CHAPTER XII

Water Quality of Rivers in Brahmani & Baitarni Basin

12.1 Brahmani and Baitarni River System

The Brahmani-Baitarani basin extends over an area of 51,822 sq km. Lying in the northeast of the Deccan Plateau, the basin covers large areas in the States of Orissa and Jharkhand and a small area in Chattisgarh. The Chhotanagpur Plateau on the west and south bound the basin on the north by the ridge separating it from the Mahanadi basin, and on the east by the Bay of Bengal. The Brahmani sub-basin covers an area of 39,033 sq km while the Baitarani sub-basin covers an area of 12,789 sq km. The Brahmani known as the South Koel, in the upper reaches, rises near Nagri village in the Ranchi district of Jharkhand State. The total length of the river from the head to its outfall into the Bay of Bengal is 799 km of which 258 km is in Jharkhand and 541 km is in Orissa. The Baitarni river rises in the hill ranges of Keonjhar district of Orissa at an elevation of about 900 meters and has a length of about 355 km. Both the rivers outfall in the Bay of Bengal, forming a common delta. The important tributaries of Brahmani are, the Karo, the Sankh and the Tirka and those of Baitarni are the Salandi and the Matai.

The industrial complex of Angul Talcher has been identified as a critically polluted area in the Brahmani basin. The wastewaters generated from the industries Viz, NALCO, TTPS etc. and mining operations are primarily responsible for deterioration of water quality of Nandira River which is a tributary stream of Brahmani river. Detailed survey of this stretch has been carried out and the action plans have been formulated to improve the water quality of this stretch. The basin area of Brahmani and Baitarni is covering the States of Jharkhand, and Orissa. The important urban centres in these States are Rourkela in Orissa; and Gumia in Jharkhand.

12.2 Water Quality Monitoring in Brahmani and Baitarni Basin

The water quality monitoring of the River Brahmani and Baitarni & its tributaries is being done by the State Pollution Control Boards of Jharkhand and Orissa at 31 locations. There are sixteen (16) monitoring locations on the main stream of River Brahmani, five on Baitarni, one each on tributaries Karo, Kusei & Sankh, two on Kharasrota and five on Koel. The ranges of water quality observed in River Brahmani and its tributaries with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

12.3 Water Quality of River Brahmani and tributary streams Koel, Kharasrota, Aul, Sankh and Karo

The water quality of mainstream Brahmani is meeting the desired criteria with respect to pH, DO and conductivity. pH is observed in the range of 6.7–8.5. The value of conductivity ranges from 93 $\mu\text{mhos/cm}$ to 458 $\mu\text{mhos/cm}$. The DO value varies from 5.0 -9.9 mg/l. The BOD varies from 0.6 to 6.6 mg/l and higher values of BOD are observed at Panposh D/s (6.6 mg/l), Rourkela D/s (5.3 mg/l) and Rourkela FD/s at Biritola (3.6 mg/l) in Orissa. The Faecal Coliform (FC) count ranges from 170-35000 MPN/100ml whereas the Total Coliform (TC) count ranges from 330-92000 MPN/100ml. The higher values of TC & FC is observed at D/s Panposh (35000 MPN/100ml & 54000 MPN/100ml), Rourkela D/s (35000 MPN/100ml & 92000 MPN/100ml), Dhenkanal D/s (35000 MPN/100ml & 54000 MPN/100ml), Pattamundai (35000 MPN/100ml & 92000 MPN/100ml), Kamalanga (28000 MPN/100ml & 43000 MPN/100ml), Talcher FD/s (14000 MPN/100ml & 21000 MPN/100ml), Rourkela FD/S at Biritola (13000 MPN/100ml & 22000 MPN/100ml), Bhuban (13000 MPN/100ml & 24000 MPN/100ml), Dharmashala (11000 MPN/100ml & 17000 MPN/100ml), Kabatabandha (Before Impact of Indl. Activity in Kalinganagar Area) (8400 MPN/100ml & 15000 MPN/100ml), U/s Panposh (7900 MPN/100ml & 13000 MPN/100ml) and Bonaigarh (3100 MPN/100ml & 5800 MPN/100ml) in Orissa.

The water quality of tributary streams Koel, Kharasrota, Aul, Sankh and Karo is meeting the desired criteria in respect of DO, pH and Conductivity. BOD is observed in the range of 0.3- 6.8 mg/l and is observed higher than the criteria in River Koel at Basia Dam U/s (6.8 mg/l), River Sankh at Bolba and River Karo at Lohojimi U/s (6.0 mg/l) in Jharkhand. Faecal coliform (FC) and Total Coliform (TC) count is exceeding the desired water quality criteria in River Kharasrota at Aul & Khanditara (D/s of Industrial Activities st Kalinga Nagar) (24000 & 35000 MPN/100ml and 9400 & 14000 MPN/100ml respectively) and River Koel U/s - A/c River Karo (17000 & 35000 MPN/100ml) in Orissa. The water quality of mainstream of River Brahmani & its tributary streams with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 12.1. The water quality status of River Brahmani with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in figure 12.1 & 12.2.

Figure 12.1: Water Quality of River Brahmani (Upper Stretch)

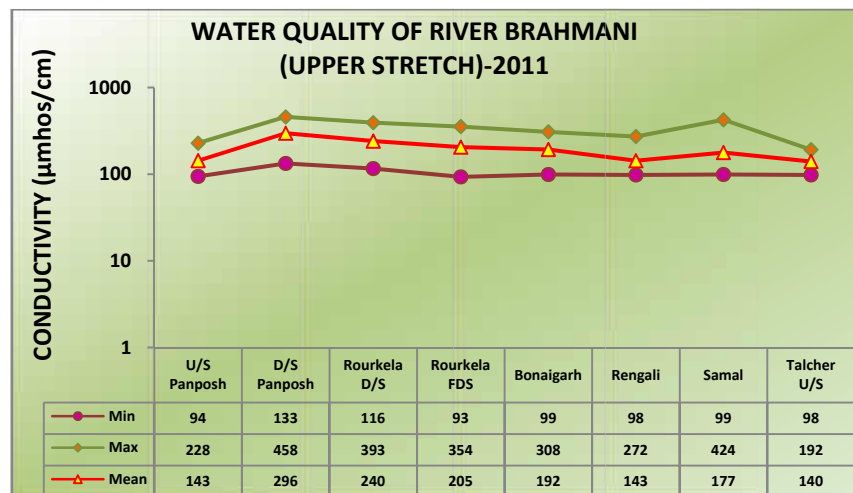
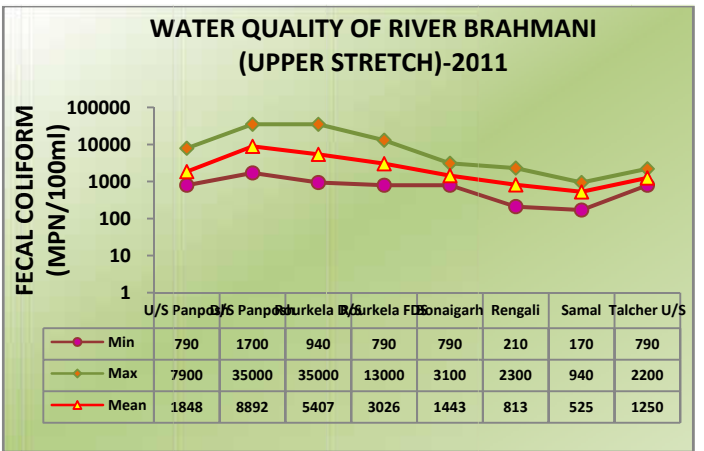
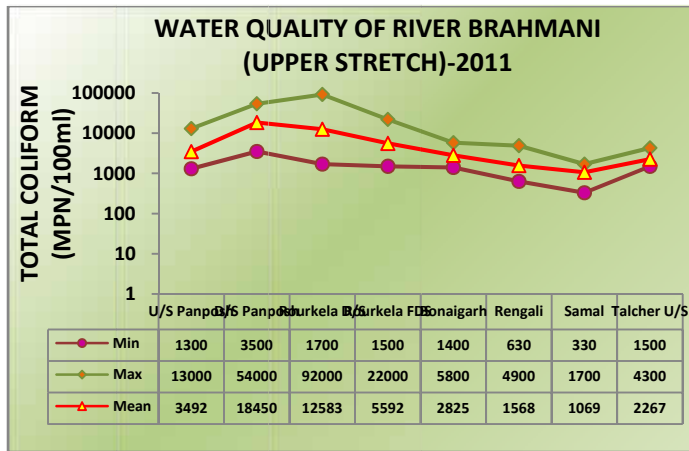
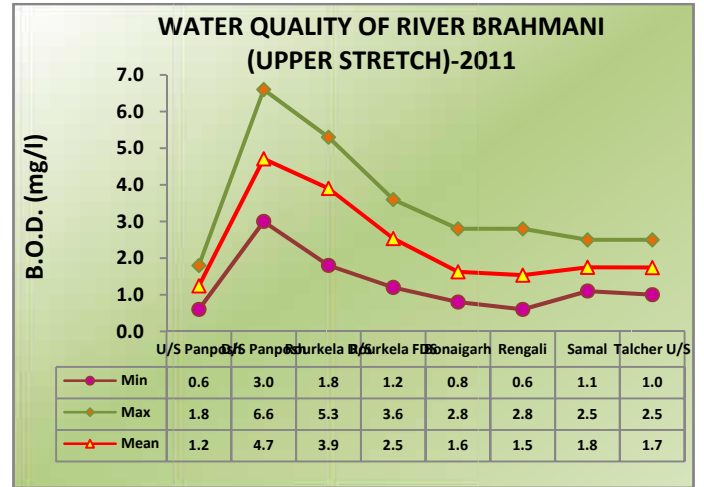
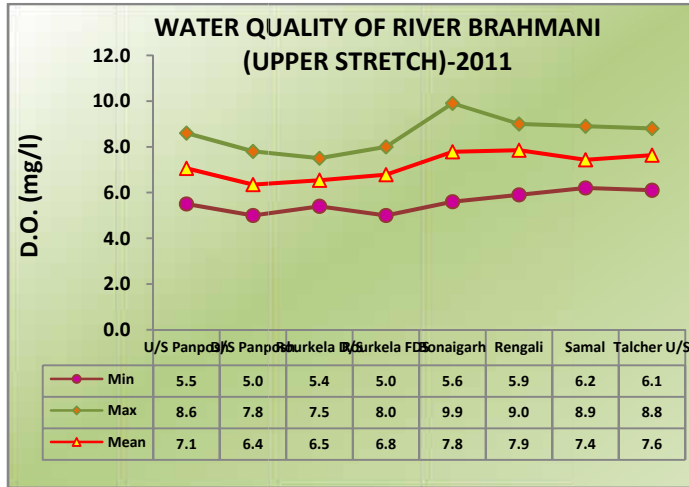
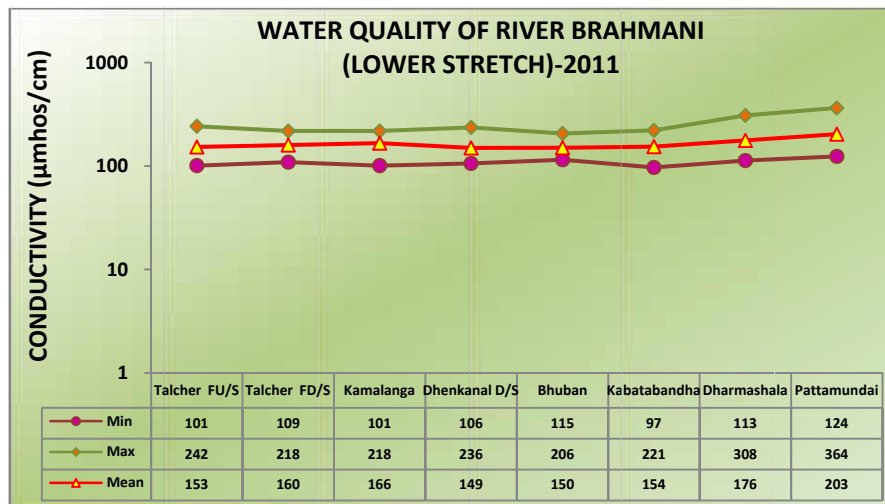
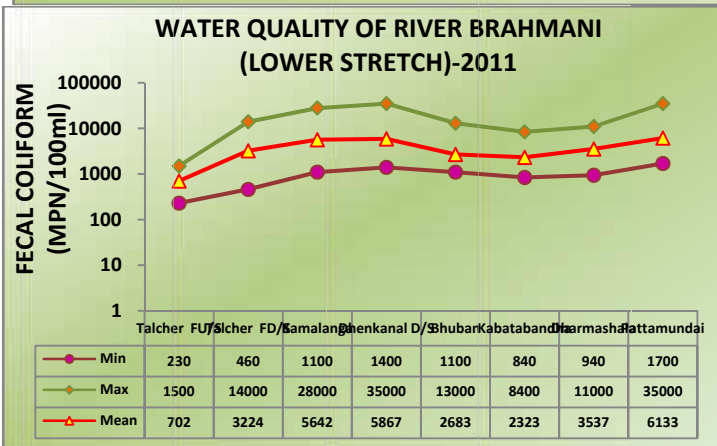
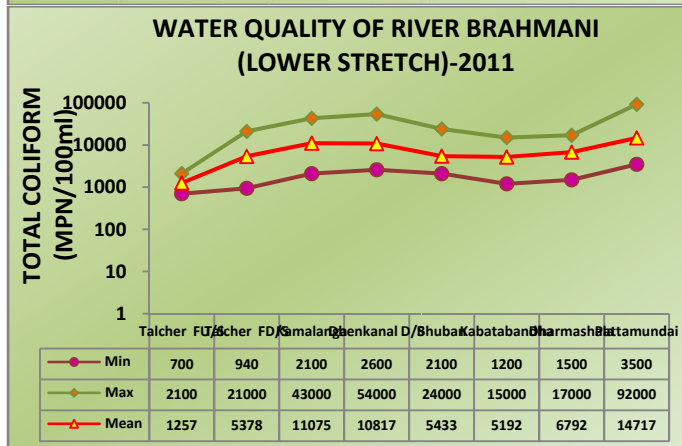
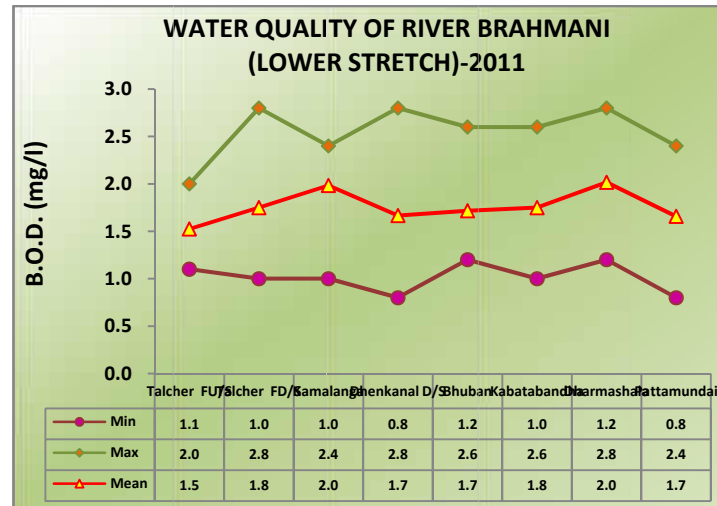
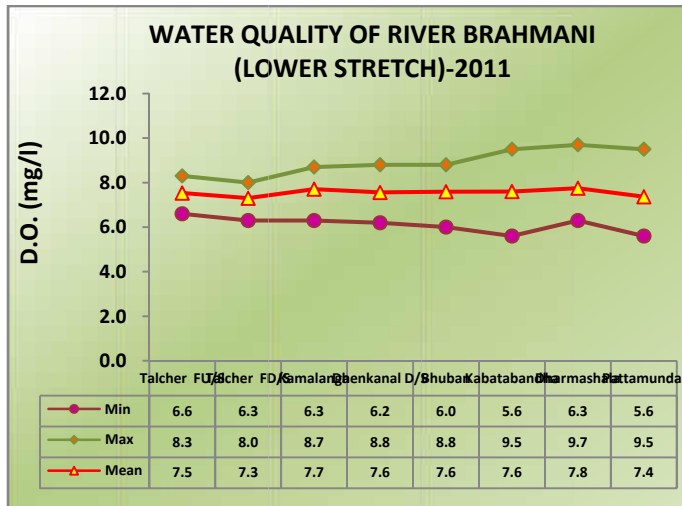


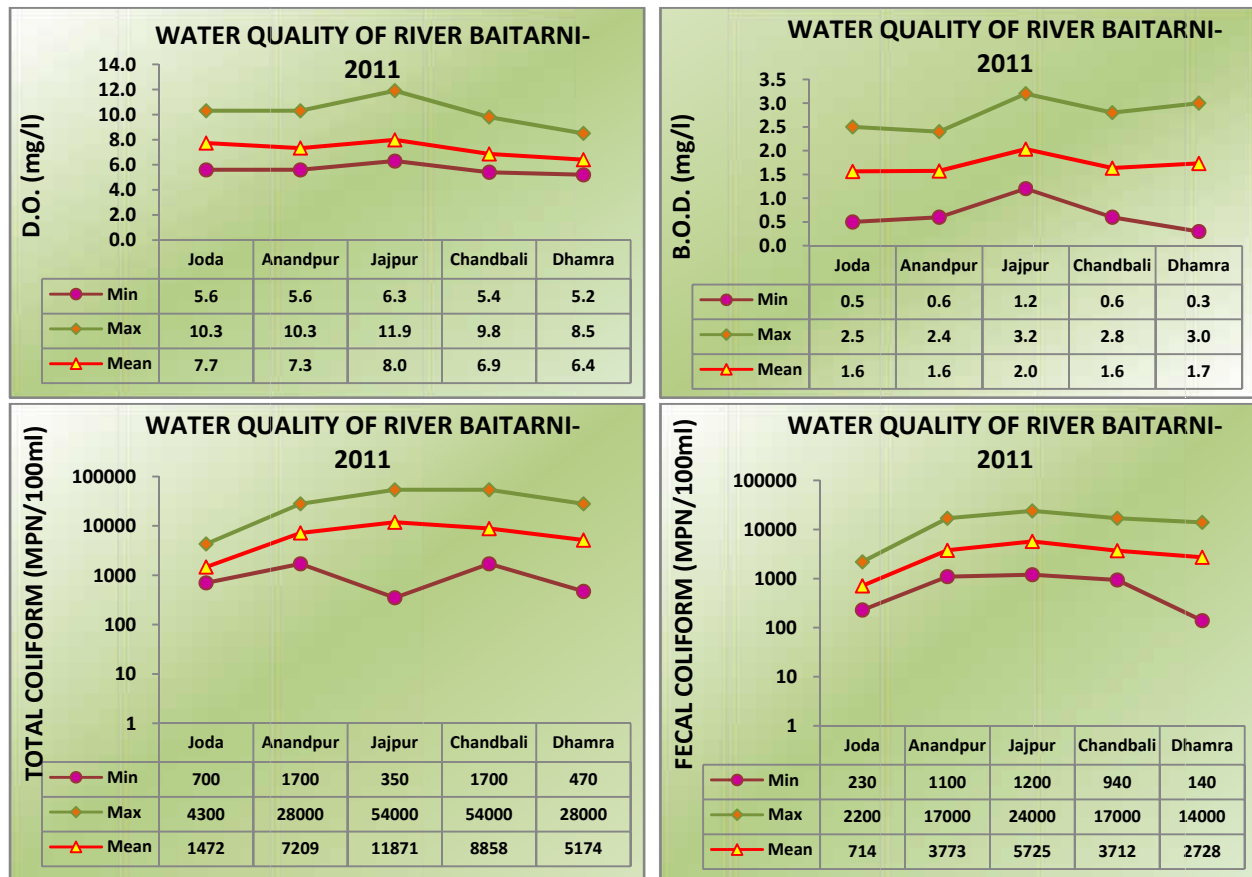
Figure 12.2: Water Quality of River Brahmani (Lower Stretch)

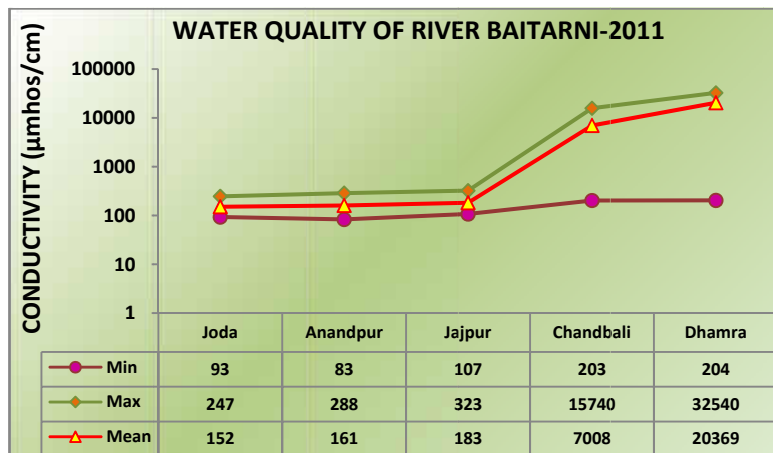


12.4 Water Quality of River Baitarni

The water quality of mainstream of Baitarni is observed at 5 locations and tributary stream kusei at one location. The water quality of River Baitarni is meeting the water quality criteria with respect to pH and DO. BOD varies from 0.3- 3.2 mg/l and the high value of BOD is observed at Jajpur (3.2 mg/l) in Orissa. Conductivity is observed in the range of 83- 32540 μ mhos/cm. The higher values of conductivity are observed at Dhamra (32540 μ mhos/cm) and Chandbali (15740 μ mhos/cm) due to estuarine region of the river. The Faecal Coliform (FC) count ranges from 140 to 24000 MPN/100ml whereas the Total Coliform (TC) count ranges from 350 to 54000 MPN/100ml. The higher value of TC & FC is observed at Chandbali (54000 & 17000 MPN/100ml), Jajpur (54000 & 24000 MPN/100ml), Anandpur (28000 & 14000 MPN/100ml) and Dhamra (28000 & 17000 MPN/100ml). The water quality of River Baitarni and its tributary stream Kusei with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 12.2. The water quality status of River Baitarni with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in figure 12.3.

Figure 12.3: Water Quality of River Baitarni





CHAPTER XIII

Water Quality of Rivers in Subarnarekha Basin

13.1 Subarnarekha River System

The Subarnarekha rises near Nagri village in the Ranchi district. Of its total length 269 km are in Jharkhand and 64 km in West Bengal and 62 in Orissa. The river drains a total area of 19,296 sq km. The Subarnarekha is the smallest of the basins and is falling short only marginally to be called a 'major basin'. It has virtually no significant tributary; the tiny Kharkai has gained a name only because of its support to the Jamshedpur steel city. The river Subarnarekha passes through an important industrial belt of Jharkhand.

The river is basically a rainfed peninsular river with the wet months being June to September. The river in its upper and middle reaches remains more or less as a stagnant pool, often highly charged with pollutants, particularly during dry periods. The largest concentration of population is located in the Singbhum and Ranchi districts of Jharkhand. The river and its tributaries are the main sources of urban water supply with the ground water resources still under utilized. Nearly 60 percent of the water supplies eventually find their way to surface water systems. Some of the important towns are also significant industrial centres. None of the towns except partly for Jamshedpur and Tatanagar railway colony have wastewater treatment facility worth mentioning.

The Subarnarekha being a mineral rich area, it is natural that mining activity would always be an important element in the pollution control programme. The possibility of contamination of surface and ground water derived from the ore dumps and radioactive waste materials in the uranium mines at Jaduguda is very great.

The basin area of Subarnarekha is covering the States of Jharkhand and Orissa. The important urban centres in these states are Jamshedpur, Chaibasa and Ranchi in Jharkhand; and Bhadrak in Orissa.

13.2 Water Quality Monitoring in Subarnarekha Basin

The water quality monitoring of the River Subarnarekha and its tributary is being done in the basin by the State Pollution Control Boards of Jharkhand, Orissa and West Bengal at 12 locations. The ranges of water quality observed in River Subarnarekha with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as

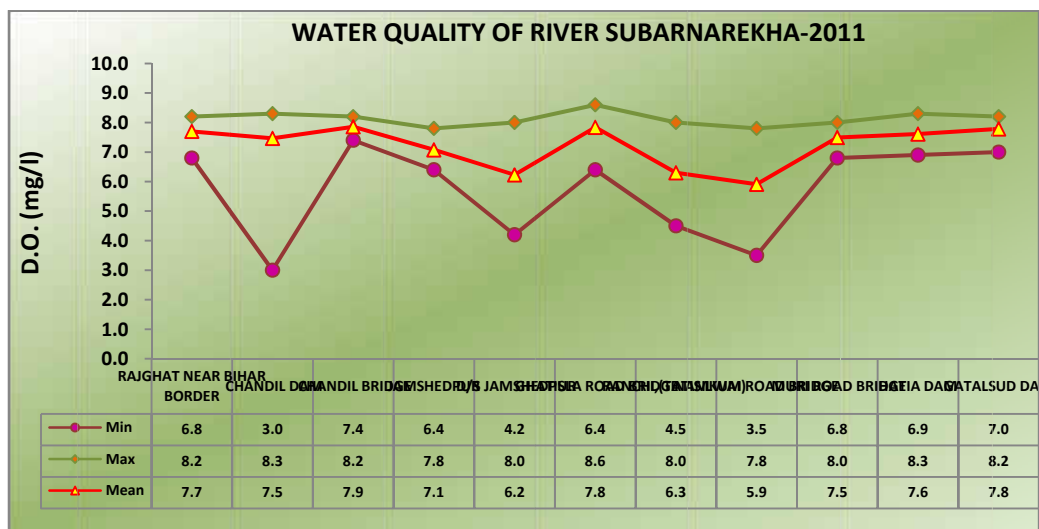
minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

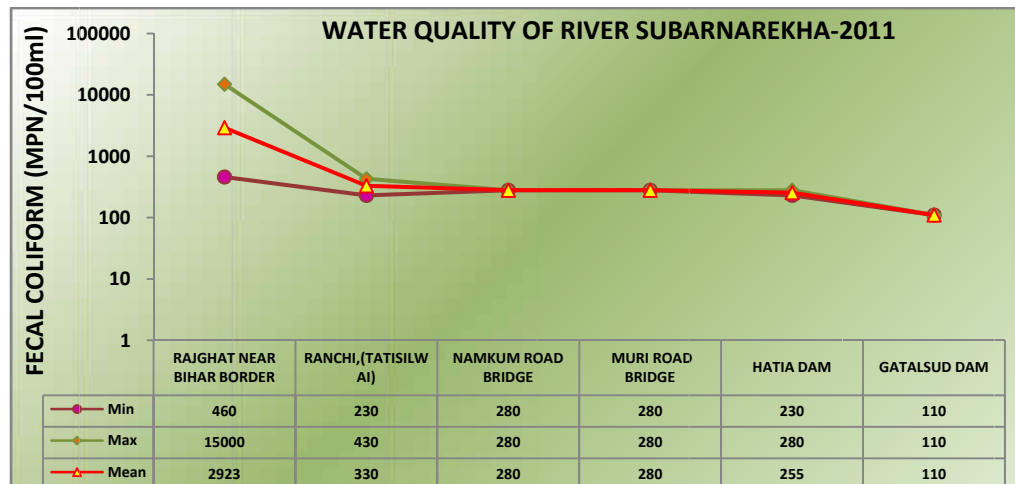
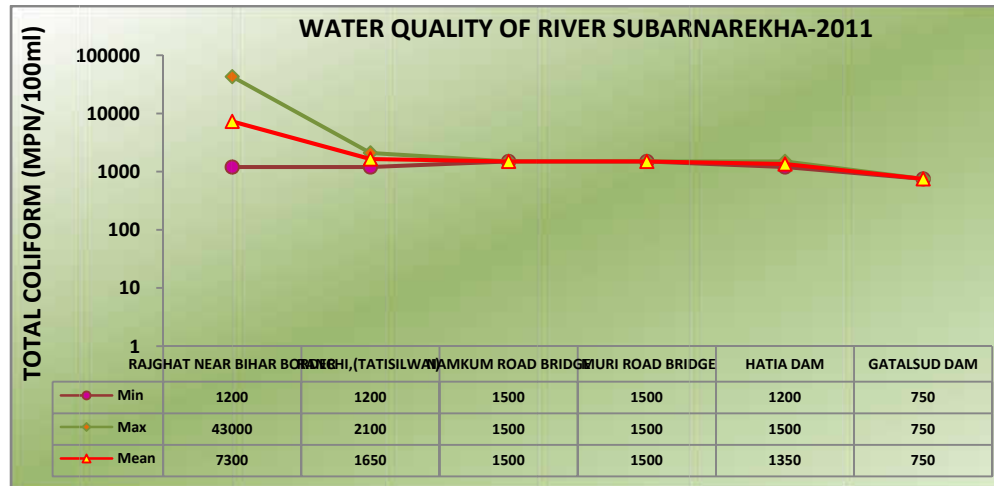
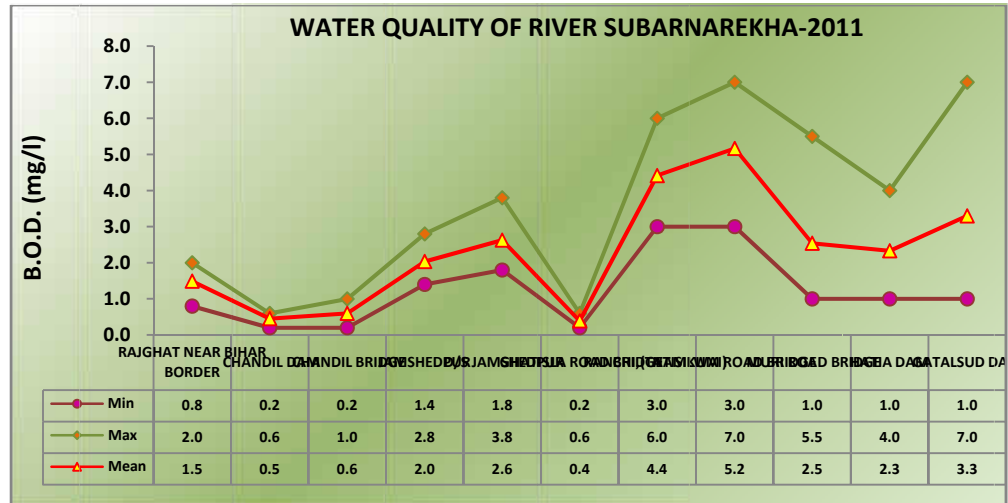
13.3 Water Quality Status of River Subarnarekha

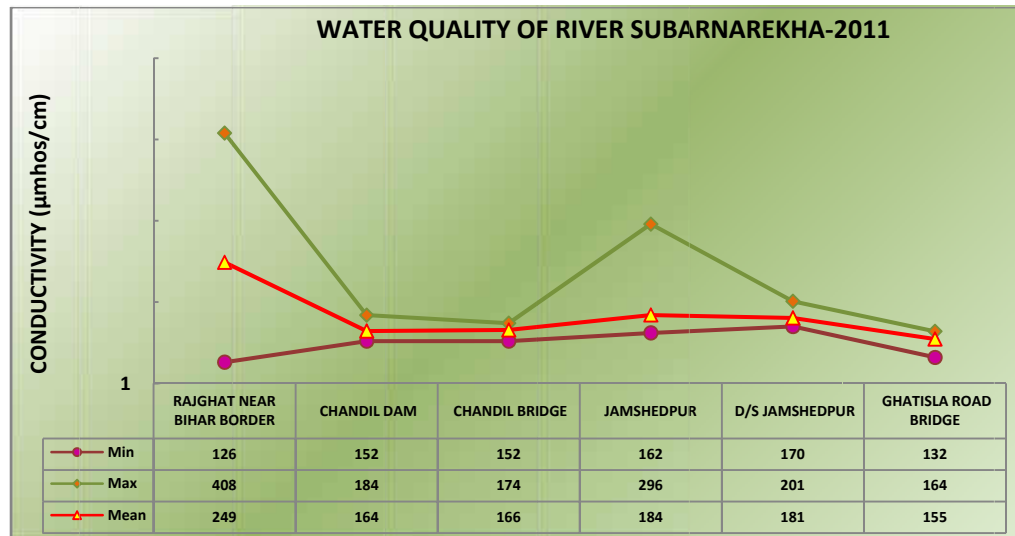
The water quality of Subarnarekha with respect to pH and Conductivity is meeting the desired water quality criteria at all the locations. DO is observed in the range of 3.0 - 8.6 mg/l and the low value of DO is observed at Chandil Dam (3.0 mg/l) and Namkum Road Bridge (3.5 mg/l) in Jharkhand. BOD is observed in the range of 0.2-7.0 mg/l. The higher value of BOD is observed at Gatsud Dam & Namkum Road Bridge (7.0 mg/l), Ranchi, (Tatisilwai) 6.0 mg/l, Muri Road Bridge (5.5 mg/l), Hatia Dam (4.0 mg/l), D/S Jamshedpur, (Tata Nagar) (3.8 mg/l) in Jharkhand. The Fecal coliform and Total coliform count is meeting the desired criteria at all the locations except Rajghat near Bihar Border (15000 & 43000 MPN/100ml respectively) in Orissa.

The water quality of the River Subarnarekha with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) is given in Annexure-I Table 13.1. The water quality status of River Subarnarekha with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in figure 13.1.

Figure 13.1: Water Quality of River Subarnarekha







CHAPTER XIV

Water Quality of Rivers in Godavari Basin

14.1 Godavari River System

The Godavari basin extends over an area of 3, 12,812 sq km which is nearly 10 percent of the total geographical area of the country. The basin lies in the Deccan plateau, and covers large areas in the States of Andhra Pradesh, Madhya Pradesh, Chhattisgarh and Maharashtra, in addition to smaller areas in Karnataka and Orissa.

The Satmala Hills, the Ajanta Range and the Mahadeo Hills, on the south and east by the Eastern Ghats and on the west by the Western Ghats, bound the Godavari basin on the north. The Godavari is the largest river of the Peninsular India, inspite of its massive catchment area; the discharge is not very impressive because of moderate annual average rainfall in the basin. Its four important tributaries are the Manjira, the Pranhita, the Indravati and the Sabari. The wastewater generation from domestic (both rural and urban) and the industrial sector are the main sources of pollution in the river basin. Amongst the five states Orissa State is least industrialized followed by Chhattisgarh and Karnataka, with Maharashtra having the high urban industrial pockets. Most of the industrial activities are centred mainly at Aurangabad & Nasik in Maharashtra, East & West Godavari District in Andhra Pradesh. Sugar and distillery units are large in number in Maharashtra followed by pharmaceuticals, leather, pulp and paper and pesticide units. In Andhra Pradesh sugar and distillery units are large in number followed by Pulp & Paper and fertilizer industries. The above-mentioned industries are massive water consuming by nature and the deterioration in water quality in the river cannot be ruled out particularly from Nashik to Nanded in Maharashtra and at Baster in Chhattisgarh and Burgampahad in Andhra Pradesh.

The important urban centers in this basin are Nagpur, Ambejogai, Ballarpur, Bhandara, Buldhana, Chalisgaon, Hinganghat, Hingoli, Manmad Nandurbar Osmandabad Parli Pusad Shrirampur Udgir Latur Kamptee Ahmadnagar Parbhani Aurangabad Wardha Bid Nashik Chandrapur Jalna Nanded Yavatmal, Amalner and Gondiya in Maharashtra; Jagdalpur in Chhattisgarh, Chiklikalan Parasia, Chindwara Seoni Balaghat in Madhya Pradesh, Rajahmundry Nizamabad Ramagundam Eluru Warangal Khammam Kothagudem Karimnagar Bhimavaram Kakinada Adilabad, Bellampalle Bodhan Jagtial Kagaznagar Mancherial Mandamarri Narsapur Nirmal Palacole Palwancha Sangareddy Siddipet Siricilla Tadepalligudem and Tanuku in Andhra Pradesh; Bidar in Karnataka and Jeypur in Orissa.

14.2 Water Quality Monitoring in Godavari Basin

The water quality monitoring of the River Godavari are being done in the basin by the State Pollution Control Boards of Maharashtra, Andhra Pradesh, Madhya Pradesh and Orissa. The monitoring locations are on main stream of Godavari (35) and on tributaries are Manjara (Manjira), Maner, Nira, Wainganga, Wardha, Kolar, Kanhan, Purna, Indravati, Sankhani, Nakkavagu, Vamsadhara, Darna, Bindusar, Penganga, Vena, Kinnarsani and Sabari. The ranges of water quality observed in Godavari basin with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate, Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

14.2.1 Water Quality of River Godavari

The water quality of River Godavari indicates that the DO value ranges from 1.2-12.2 mg/l. The minimum value of DO (1.8 mg/l) is observed at Kapila- Godavari Sangam in Maharashtra. Other locations having low DO are Tapovan (1.8 mg/l), Nasik D/s (1.9 mg/l), Jalna Intake Water Pump House, Shahabad (2.3 mg/l), Saikheda (2.7 mg/l), U/s of Aurangabad Reservoir (3.4 mg/l) and Hanuman Ghat, Nashik City (3.8 mg/l) in Maharashtra. The BOD values ranges from Nil-37 mg/l and the higher values are observed at Kapila- Godavari Confluence Point at Tapovan (37.0 mg/l), Nasik D/s & Tapovan (28.0 mg/l), Jalna Intake Water Pump House at Shahabad (18.7 mg/l), Panchavati at Ramkund (16.0 mg/l), Someshwar Temple (14.5 mg/l), Hanuman Ghat at Nashik (13.5 mg/l), Saikheda (12.5 mg/l), Jayakwadi Dam at Aurnagabad & D/s of Paithan at Pathegaon Bridge (12.0 mg/l), Dhalegaon (10.0 mg/l), U/s of Gangapur Dam at Nasik (9.0 mg/l), U/s of Paithan at Jayakwadi (8.0 mg/l), Latur Water Intake Near Pump House at Dhamegaon & Nanded (7.4 mg/l), U/s of Aurangabad Reservoir at Kaigaon Tokka (7.2 mg/l), Raheer (7.0 mg/l) and Nandur- Madmeshwar Dam (6.0 mg/l) in Maharashtra and Godavarikhani at Karimnagar (7.8 mg/l), D/s of Ramanugundam (7.7 mg/l), Ramagundam D/s Near FCI Intake Well at Karimnagar (6.4 mg/l), Basara at Adilabad (4.0 mg/l), Mancherial & Mancherial B/c of Rallavagu (3.6 mg/l) and Kamalpur D/s at Warangal & Ramagundam U/s at Karimnagar (3.5 mg/l) in Andhra Pradesh. The Faecal Coliform ranges from 1-500 MPN/100ml whereas the Total Coliform ranges from 7-2400 MPN/100 ml.

The River Godavari at most of locations in Maharashtra and Bhadrachalam U/s, near Rly Bdg B/c of Rallavagu at Mancherial, Rajahmundry D/s, Godavarikhani, Ramagundam U/s & D/s and Burgampahad in A.P. is exceeding desired water quality criteria. The sources of pollution is from domestic and industrial wastewater generated from the large cities in Maharashtra and Mancherial, Ramagundam, Rajahmundry, Godavarikhani, Burgampahad and Bhadrachalam cities in Andhra Pradesh. Depletion of dissolved oxygen has been reported due to addition of sewage into the river besides bacteriological pollution. To maintain the desired water quality uses of the River Godavari in these stretches, the

municipalities need to treat their wastewater and the industries to install effluent treatment plants (ETP) before discharging into the rivers for sustaining the desired level of water quality. Water quality of River Godavari is presented in Annexure-I Table 14.1. The water quality status of River Godavari with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is presented in Figure 14.1 to 14.4.

Figure 14.1: Water Quality of River Godavari in Maharashtra (Upper Stretch)

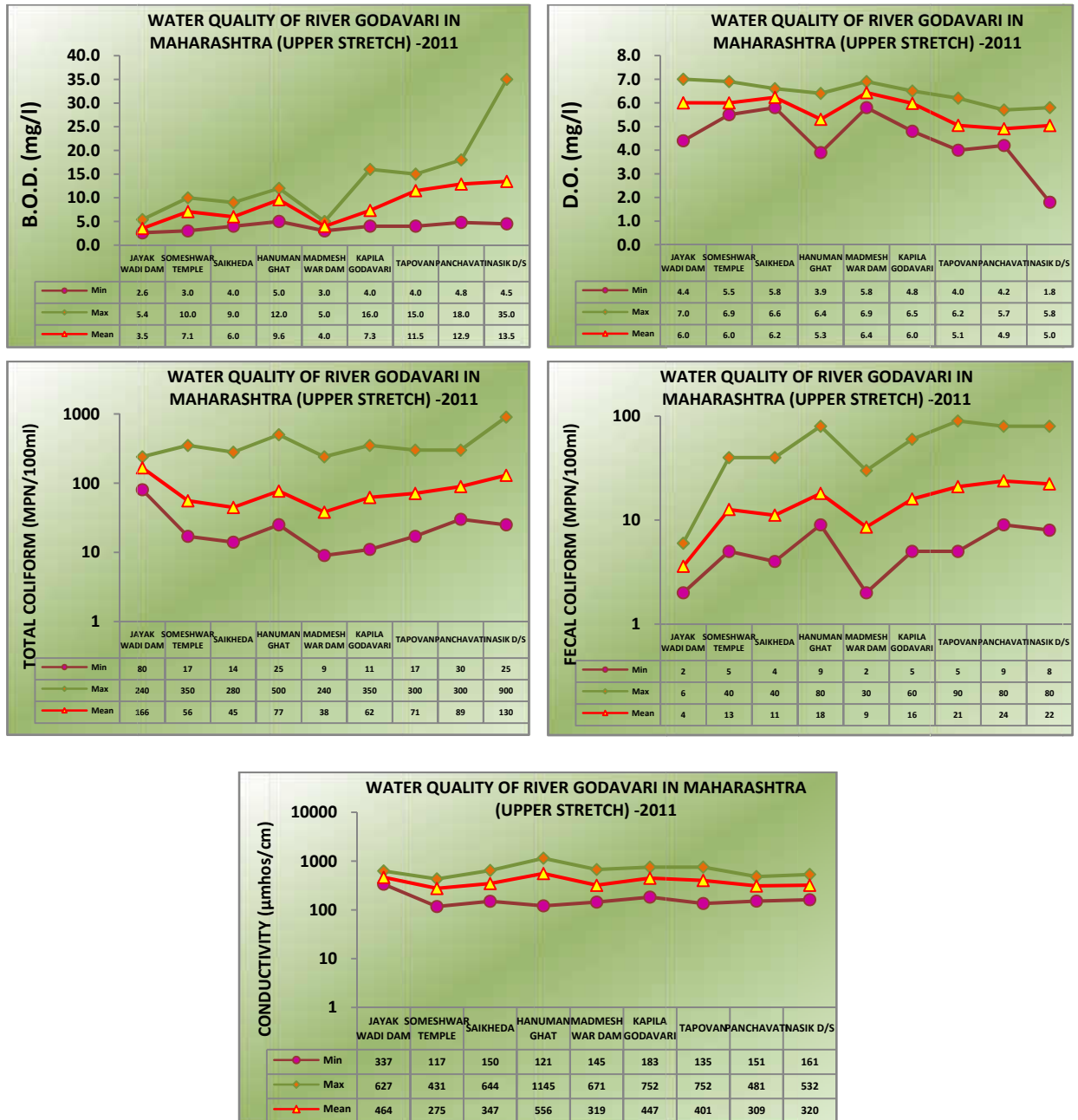


Figure 14.2: Water Quality of River Godavari in Maharashtra (Lower Stretch)

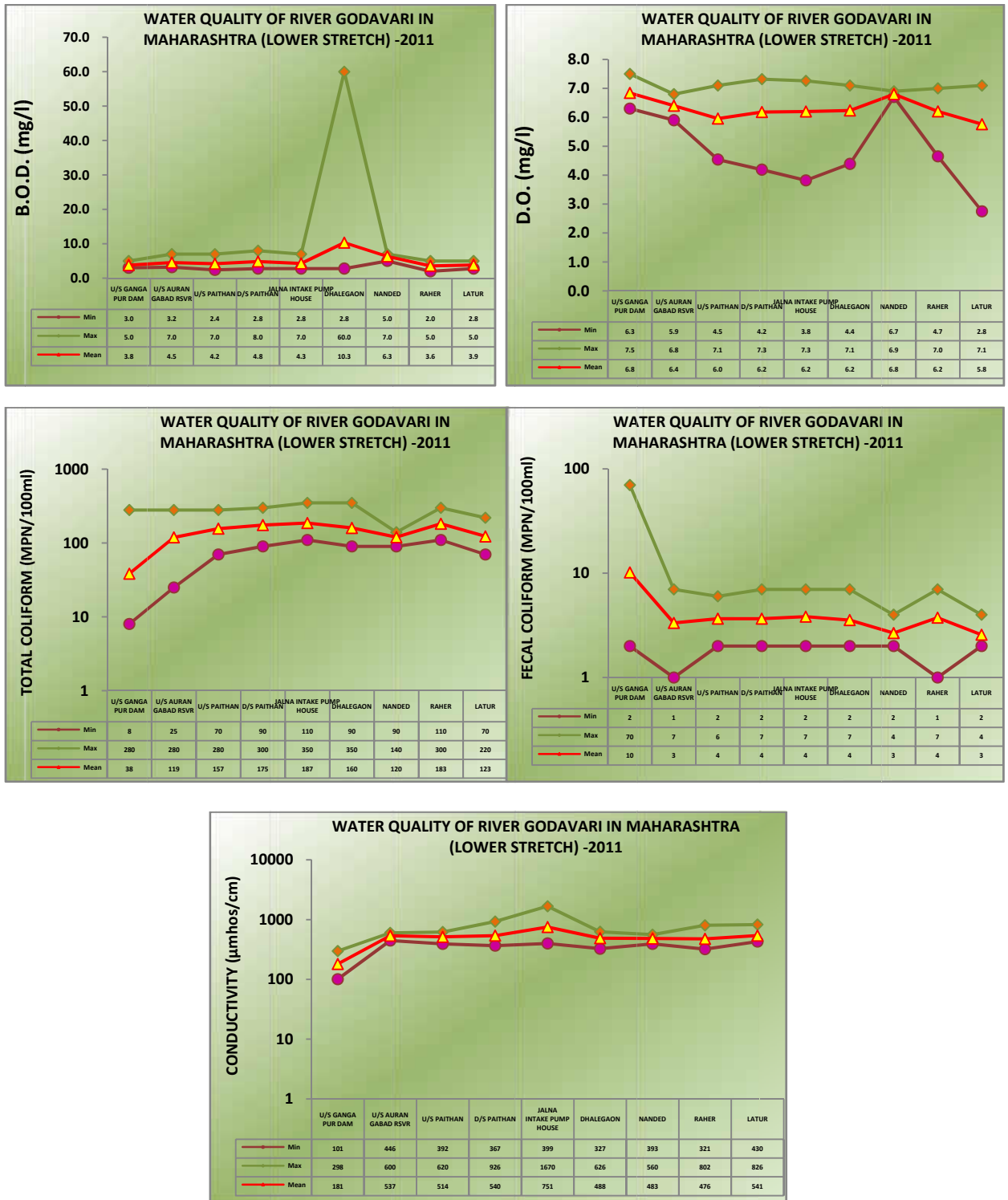


Figure 14.3: Water Quality of River Godavari in Andhra Pradesh (Upper Stretch)

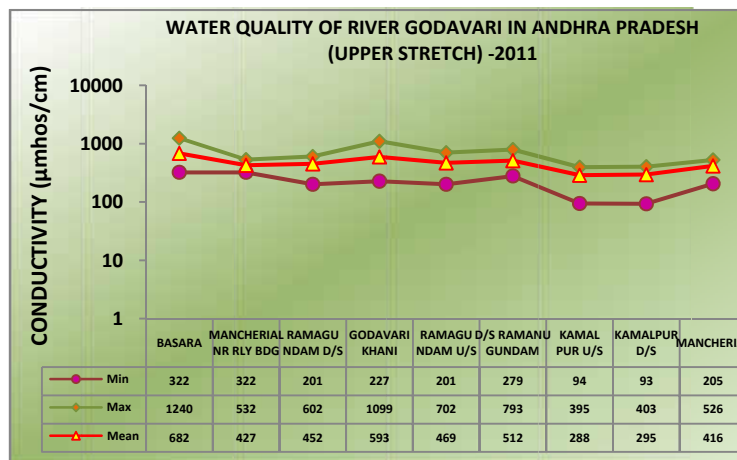
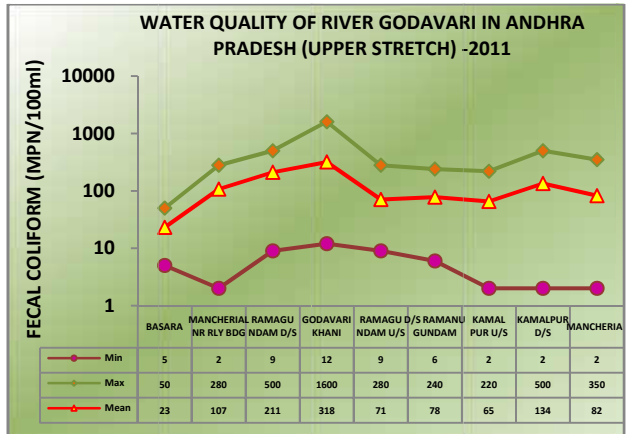
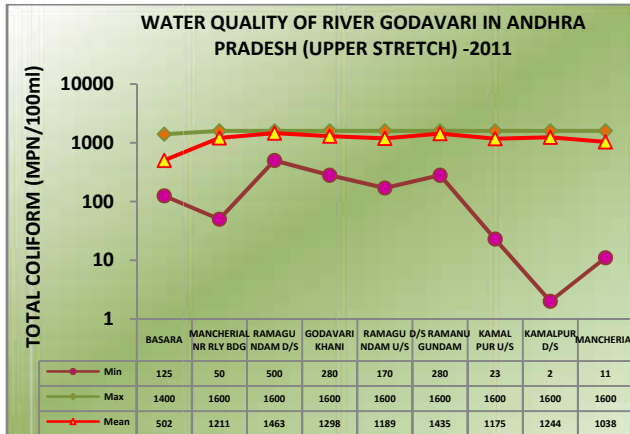
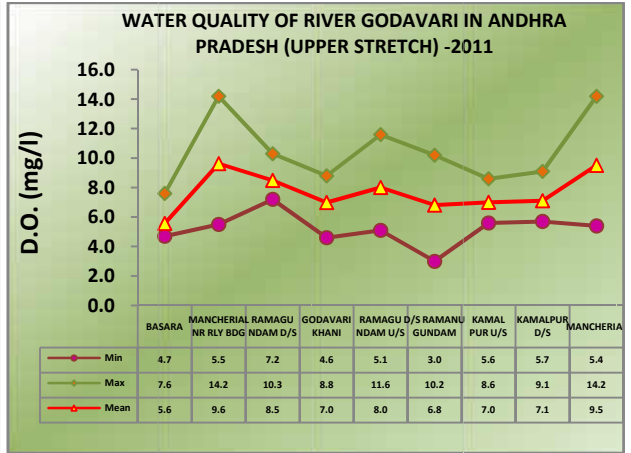
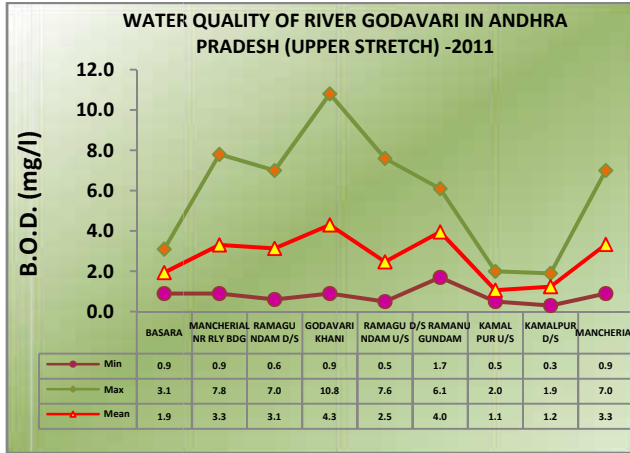
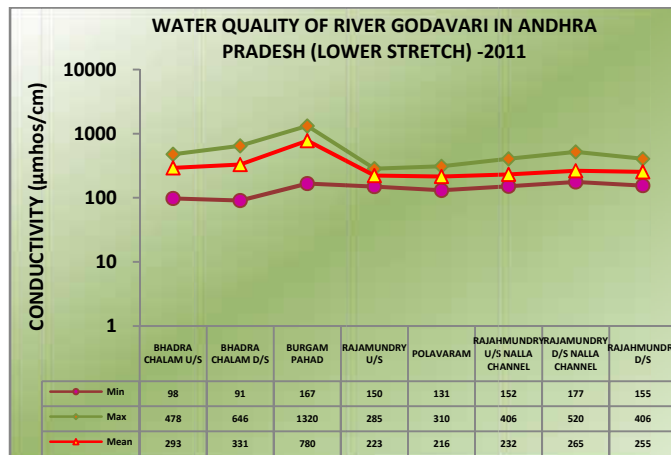
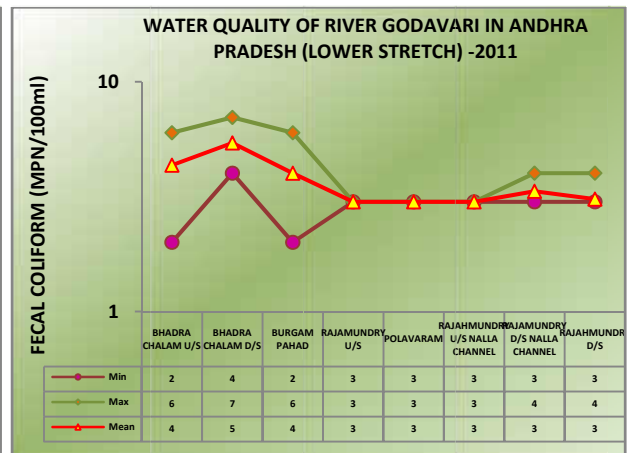
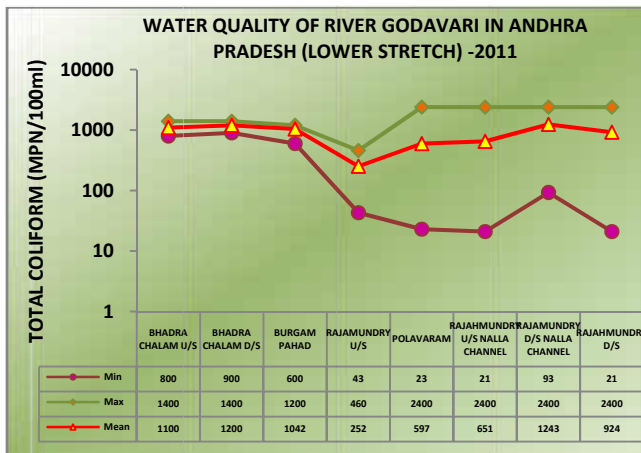
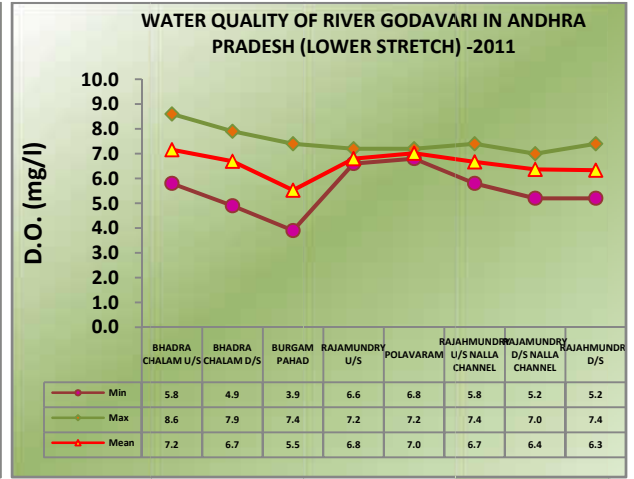
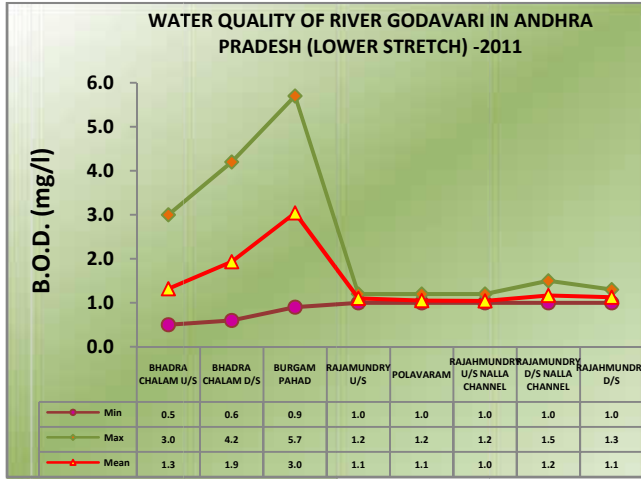


Figure 14.4: Water Quality of River Godavari in Andhra Pradesh (Lower Stretch)



14.2.2 Water Quality of tributary streams Indravati, Shankini, Manjeera, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna, Nira, Kinnersani, Sabari, Bindusara, Darna, Penganga and Wena

The Water Quality of tributary streams Indravati, Shankini, Manjeera, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna, Nira, Kinnersani, Sabari, Bindusara, Darna, Penganga and Wena indicates that BOD and DO are exceeding the criteria limit at certain locations whereas other parameters like pH, Conductivity and Faecal Coliform are meeting the desired water quality criteria. The DO ranges from 2.1-14.2 mg/l and the lower values of DO are found in River Maner at Warangal U/s (2.1 mg/l) in Andhra Pradesh and River Manjeera at D/s of Latur (2.7 mg/l); River Darna at Sansari –Nashik (3.0 mg/l); River Kanhan D/s of Nagpur & River Penganga at Mehkar- Buldana Road Bridge (3.1 mg/l); River Wena at D/s of Mohata Mills (3.2 mg/l); River Wardha at U/s of Erai River (3.6 mg/l), D/s of Erai River (3.7 mg/l) & D/s of ACC Ghuggus (3.8 mg/l) and River Purna at Dhupeshwar & River Wainganga at D/s of Ellora Paper Mills (3.9 mg/l) in Maharashtra.

BOD ranges from 0.4-110 mg/l. The higher values of BOD are observed in River Wardha at D/s of Erai River (110.0 mg/l), U/s of Erai River (13.3 mg/l), Confluence Point Of Penganga & Wardha (12.0 mg/l), D/s of ACC Ghuggus (8.6 mg/l), Rajura Bridge (8.4 mg/l) & U/s of ACC Ghuggus (7.2 mg/l); River Penganga near Water Supply Scheme of Umardhed MC Belkhed (15.0 mg/l), Mehkar- Buldana Road Bridge (11.0 mg/l) & D/s of Isapur Dam (9.4 mg/l); River Purna at Dhupeshwar (14.0 mg/l) & near Achalpur-Amravati Road Bridge (7.7 mg/l); River Darna at Sansari (12.0 mg/l), MES Site Pumping Station at Bhagur (10.0 mg/l), Chehedi Pumping Station (7.0 mg/l), Aswali (Darna Dam) at Igatpuri & Bhagur Pumping Station near Pandhurli Bridge (6.0 mg/l); River Wainganga at D/s of Gaurav Paper Mills (12.0 mg/l), D/s Of Ellora Paper Mill (11.0 mg/l), A/c with Kanhan (8.7 mg/l), U/s of Gaurav Paper Mills (8.6 mg/l), Ashti (7.2 mg/l) & U/s of Ellora Paper Mill (6.8 mg/l); River Wena at D/s of Mohata Mills (12.0 mg/l) & U/s of Mohata Mills (6.9 mg/l); River Kanhan D/s of Nagpur (11.0 mg/l), D/s of M/s Vidharbha Paper Mill (9.4 mg/l) & U/s of M/s Vidharbha Paper Mill (8.0 mg/l); River Nira at Pulgaon Cotton Mill (8.6 mg/l); River Kolar B/c to Kanhan at Kamptee (8.0 mg/l); River Manjeera at D/s Of Latur (7.6 mg/l) and River Bindusara at Beed (7.4 mg/l) in Maharashtra; River Maner at Warangal U/s (9.5 mg/l) & Somnapalli (4.0 mg/l) and River Manjeera at Gowdicharla A/c With Nakkavagu (5.6 mg/l), Near Ganapathi Sugars (4.8 mg/l), Raipallu (4.0 mg/l) & Gowdicharla B/c With Nakkavagu (3.2 mg/l) in Andhra Pradesh and River Manjeera at D/s in Intake Point to Bidar City (3.5 mg/l) in Karnataka.

The Total Coliform ranges from 4-3200 MPN/100ml whereas the Faecal Coliform is observed in the range of Nil-1600 MPN/100ml. The water quality status of tributary streams Indravati, Shankini, Manjeera, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna, Nira, Kinnersani, Sabari, Bindusara, Darna, Penganga and Wena is given in Annexure-I Table 14.2.

CHAPTER XV

Water Quality of Rivers in Krishna Basin

15.1 Krishna River System

The Krishna basin extends over an area of 2, 58,948 sq km which is nearly 8% of the total geographical area of the country. Lying in the Deccan plateau, it covers large areas in the States of Maharashtra, Karnataka and Andhra Pradesh. All the major tributaries draining the base of the triangle fall into the river in the upper two-thirds of its length. The Krishna rises in the Western Ghats at an altitude of 1,337 meter just north of Mahabaleshwar, about 64 km from the Arabian Sea and flows from west to east through the States of Maharashtra, Karnataka and Andhra Pradesh to join the Bay of Bengal. The total length of the river from the source to its outfall into the sea is about 1,400 km. Together with its tributaries, the river drains about 708 km of the Western Ghats which is its chief source of supply. The Krishna is the third longest river within India, yet it has a rather poor water wealth because of fairly low rainfall in the basin. The river has two large tributaries - the Bhima and the Tungabhadra and four smaller tributaries - the Ghataprabha, the Malprabha the Musi and the Muneru. The river basin survey report communicates that the most populous cities in the basin are Hyderabad Agglomeration in A.P. Pune agglomeration in Maharashtra and Bhadravati complex in Karnataka. Bhadravati in Karnataka and Patancheru- Bolaram in Andhra Pradesh are the critically polluted areas identified in the basin area of Krishna. For Bhadravati the major source of water pollution is the wastewater generated from industries besides the untreated sewage of the town, which is being discharged into Bhadra. It is suggested that sewage treatment plant may be provided for the sewage of the town and ETPs of the existing industries need modifications to comply with prescribed standards for restoration of water quality of the Bhadra River. In the Patancheru - Bolaram area in Andhra Pradesh the effluent generated by industries is the main sources of water pollution in the rivers Manpera and Nakkvagu. Industries are polluting ground water in the region.

The basin area of Krishna is covering the States of Maharashtra, Andhra Pradesh, and Karnataka. The important urban centres in Andhra Pradesh are Guntakal, Guntur, Hyderabad, Kurnool, Gudivada, Tenali, Machilipatnam, Vijayawada, Adoni, Mahaboob-Nagar, Bapatla, Chilakaluripet, Gudur, Kavali, Miryalguda, Nalgonda, Suryapet, Yemmiganur, Chikmagalur, Gangawati, Gokak, Harihar, Nipani, Rabkavi-Banhatti, Ranibennur, Shahabad; in Karnataka are Gadag-betagiri, Raichur, Hubli-Dharwad, Shimoga, Bijapur, Bellary, Gulbarga, Bhadravati, Hosepet, Davangere, Belgaum, Chitradurga, Bagalkot; and in Maharashtra are Karad, Pandharpur, Panvel, Satara, Kolhapur, Solapur, Pune, Ichalkaranji, Sangli and Barshi.

15.2 Water Quality Monitoring in Krishna Basin

The water quality monitoring of the River Krishna are being done in the basin by the State Pollution Control Boards of Maharashtra, Karnataka and Andhra Pradesh. The monitoring locations are on mainstream of River Krishna (26) and tributaries- Bhadra, Bhima, Ghataprabha, Malprabha, Muneru, Musi, Nira, Paleru, Tunga, Tungabhadra, Panchganga, Chandrabhaga, Kagina, Koyna, Mula, Mutha, Mula-Mutha, Venna, Pawana, Indrayani, Hundri, Kundu, Ghod, Sina, Urmodi, Nakkavagu and Vel. The ranges of water quality observed in River Krishna and its tributaries with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate, Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

15.2.1 Water Quality of River Krishna

The water quality of River Krishna with respect to pH, Conductivity and DO are largely meeting the water quality criteria at all the locations except DO at Rajapur Weir (1.7 mg/l) & Kurundwad in Kolhapur (2.8 mg/l) in Maharashtra and Hamsala Deevi (3.9 mg/l) in Andhra Pradesh and Conductivity at Hamsala Deevi (8570 μ mhos/cm) in Andhra Pradesh. The BOD ranges from 0.4 to 16.0 mg/l. The maximum value of BOD (16.0 mg/l) is observed at D/s of Devasagar Bridge in Karnataka. Other locations having high BOD are Krishna Bridge at Karad (10.5 mg/l), Rajapur Weir (9.6 mg/l), Krishna-Venna Sangam at Mahuli (8.4 mg/l), Wai & Kshetra Mahuli (8.0 mg/l), Sangli (7.5 mg/l), Kurundwad in Kolhapur & D/s of Islampur (6.5 mg/l) and Mahabaleshwar Dhom Dam (4.5 mg/l) in Maharashtra; Gadwal Bridge (7.9 mg/l), Thangadi at Mahaboobnagar (7.3 mg/l), Wadapally A/c with River Musi (4.8 mg/l) and A/c with Tungabhadra (3.2 mg/l) in Andhra Pradesh and U/s of Ugarkhurd Barrage & Ankali Bridge (3.2 mg/l) in Karnataka. The Faecal Coliform ranges from 2–9000 MPN/100ml whereas the Total Coliform ranges from 4–16000 MPN/100ml. The Total and Faecal Coliform does not meet the criteria at D/s of Devasagar Bridge in Karnataka (TC 16000 MPN/100ml & FC 9000 MPN/100ml). The water quality status of River Krishna is given in Annexure-I Table 15.1. The water quality status of mainstream of River Krishna with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 15.1 to 15.3.

Figure 15.1: Water Quality of River Krishna in Maharashtra

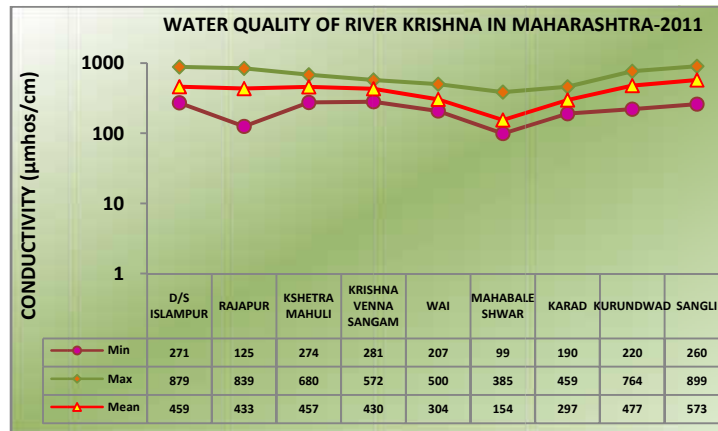
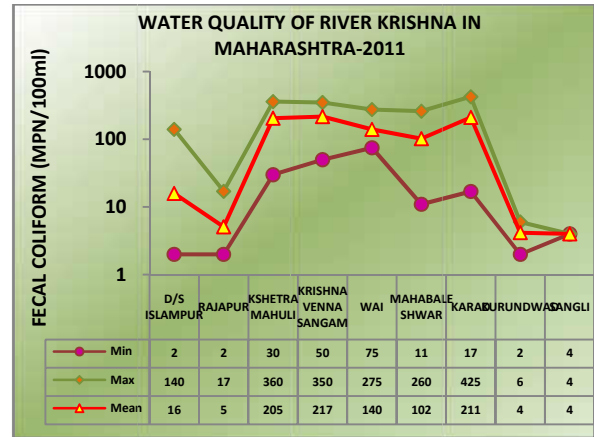
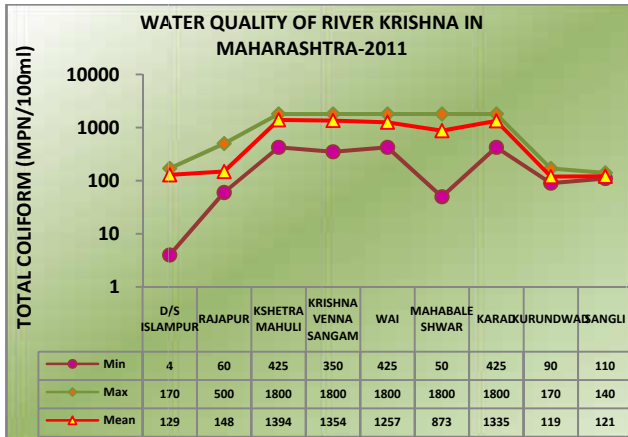
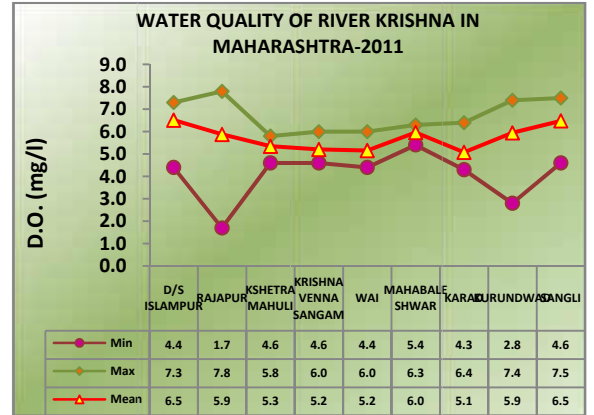
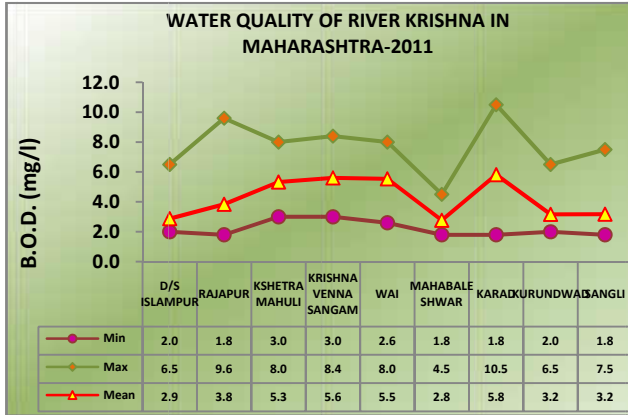
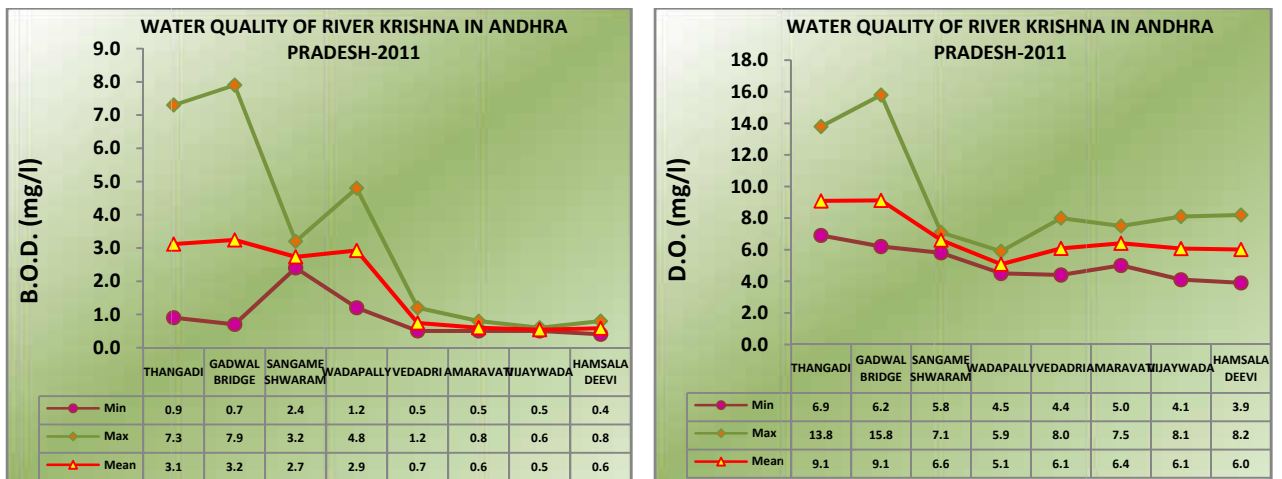
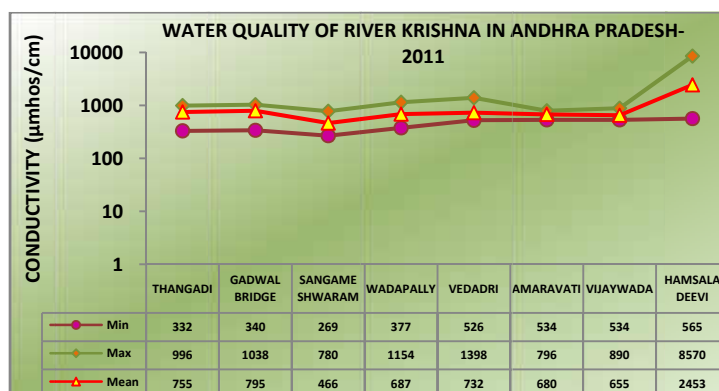
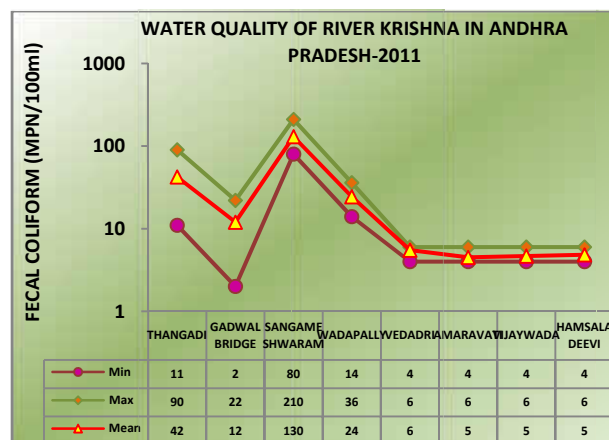
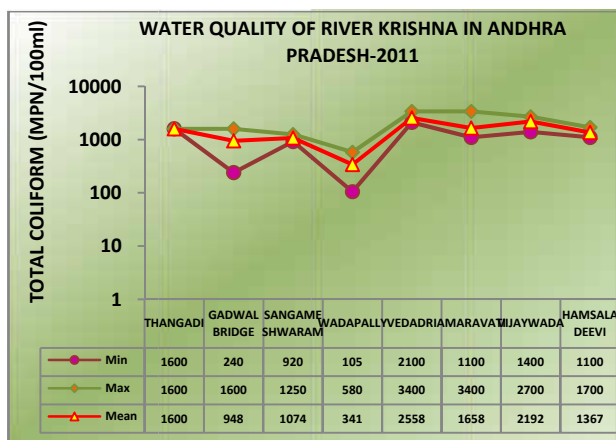


Figure 15.2: Water Quality of River Krishna in Karnataka



Figure 15.3: Water Quality of River Krishna in Andhra Pradesh





15.2.2 Water quality of tributary streams Panchganga and Bhima

The water quality of tributary streams Panchganga and Bhima indicates that conductivity ranges from 132 to 2184 $\mu\text{mhos/cm}$. DO varies from 1.1 to 8.5 mg/l. The lower values of DO is observed in River Bhima at Pune D/s Bandgarden (1.1 mg/l), Pune U/s Vithalwadi (1.9 mg/l), Pargaon (2.2 mg/l), A/c Daunt River (3.3 mg/l) & Koregaon Bridge (3.6 mg/l and River Panchaganga at Kolhapur D/s (1.3 mg/l) in Maharashtra. The BOD ranges from 0.3 to 67.5 mg/l. The maximum value of BOD (67.5 mg/l) is observed in River Panchaganga Kolhapur D/s in Maharashtra. River Panchaganga & Bhima are potentially polluted at all the locations having higher BOD levels in Maharashtra. The Faecal Coliform ranges from 2–16,000 MPN/100ml whereas the Total Coliform ranges from 90-16,000 MPN/100ml. Total Coliforms and Faecal Coliforms are observed higher in River Bhima at all the locations in Karnataka. The water quality of tributary streams Panchganga and Bhima during the year is given in Annexure-I Table.15.2.

15.2.3 Water Quality of tributary streams Ghatprabha, Malprabha, Tunghbhadra, Tungha, Bhadra, Musi, Palleru, Muneru, Kagina, Nakkavagu, Hundri and Kundu in Andhra Pradesh and Karnataka

The water quality of tributary streams Ghatprabha, Malprabha, Tunghbhadra, Tungha, Bhadra, Musi, Palleru, Muneru, Kagina, Nakkavagu, Hundri and Kundu

in Andhra Pradesh and Karnataka indicates that conductivity ranges from 90 to 2404 $\mu\text{mhos/cm}$. The highest value of conductivity is observed in River Nakkavagu at Bachugudem (2404 $\mu\text{mhos/cm}$) in Andhra Pradesh. DO vary from 0.6- 13.8 mg/l. The minimum value of DO (0.6) is observed in River Musi D/s at Hyderabad in Andhra Pradesh.

BOD ranges from 0.2 to 145 mg/l in these tributaries. The maximum value of BOD (145 mg/l) is observed in River Musi at Nagole Rangareddy in Andhra Pradesh. The other locations where BOD is exceeding the criteria are River Musi at Nagole Rangareddy (145.0 mg/l), D/s Hyderabad (76.0 mg/l) & U/s Hyderabad (7.5 mg/l); River Nakkavagu at Bachugudem Medak (18.0 mg/l); River Hundri at Joharpur Kurnool (3.6 mg/l); River Tunghabhadra at Kurnool U/s (3.4 mg/l) and River Kundu at Nandyal Kurnool (3.2 mg/l) in Andhra Pradesh and River Tungabhadra at D/s HPF (8.2 mg/l), Harihar Water Supply Intake & Jackwell Point (4.0 mg/l), Haralahalli Bridge (3.6 mg/l) & Ullanur (3.5 mg/l); River Bhadra at D/s Bhadravathi (4.5 mg/l); River Ghatprabha at Water Abstraction Point to Gokak Town (3.5 mg/l) and River Kagina at Shahabad Bridge (3.2 mg/l) in Karnataka.

The Faecal Coliform ranges from 2–9000 MPN/100ml whereas the Total Coliform ranges from 4-16,000 MPN/100ml. The maximum number of Total Coliform (16,000 MPN/100ml) and Faecal Coliform (9000 MPN/100ml) is observed in River Tunghabhadra at Ullanur & D/s of Gangawathi and River Kagina at Shahabad Bridge in Karnataka. The water quality of tributary streams Ghatprabha, Malprabha, Tunghbhadra, Tungha, Bhadra, Musi, Palleru, Muneru, Kagina, Nakkavagu, Hundri and Kundu in Andhra Pradesh and Karnataka during the year is given in Annexure-I Table.15.3.

15.2.4 Water Quality of tributary streams Nira, Venna, Koyna, Mula, Mula-Mutha, Mutha, Pawana, Indrayani, Chandrabhaga, Ghod, Sina, Urmodi and Vel in Maharashtra

The water quality of tributary streams Nira, Venna, Koyna, Mula, Mula-Mutha, Mutha, Pawana, Indrayani, Chandrabhaga, Ghod, Sina, Urmodi and Vel in Maharashtra indicates that conductivity ranges from 75 to 6317 $\mu\text{mhos/cm}$. The highest value of conductivity is observed in River Mutha at Deccan Bridge (6317 $\mu\text{mhos/cm}$). DO varies from 0.8- 8.5 mg/l. The lower value of DO is observed in River Mula at Sangam Bridge (0.8 mg/l) and Deccan Bridge & Near Veer Sawarkar Bhawan (0.9 mg/l); River Pawana at Pimprigaon (1.0 mg/l), Kasarwadi (1.1 mg/l), Sangavigaon (1.3 mg/l), Dapodi Bridge (1.4 mg/l) & Chinchwadgaon (1.8 mg/l); River Mula at Harrison (1.0 mg/l) & Aundh Bridge (1.4 mg/l); River Mula-Mutha at D/s Therur (1.3 mg/l) & Mundhawa Bridge (1.5 mg/l); River Nira at D/s Jubilant Organosis (1.4 mg/l) & Sangavi (3.1 mg/l); River Indrayani at D/s Moshigaon (1.5 mg/l), U/s Moshigaon (2.6 mg/l) & D/s Alandigaon (3.8 mg/l); River Vel at Shikrapur (2.3 mg/l); River Ghod at Shirur (2.7 mg/l); River Venna at Mahuli (2.9 mg/l) and River Sina Near Laboti Toll Naka (3.9 mg/l).

BOD ranges from 1.4 to 23.5 mg/l in these tributaries. The maximum value of BOD (23.5 mg/l) is observed in River Mutha near Veer Sawarkar Bhawan. BOD is exceeding water quality criteria at all the location on tributaries of River Krishna in Maharashtra. The Faecal Coliform ranges from 10–550 MPN/100ml whereas the Total Coliform ranges from 55-1800 MPN/100ml. The water quality of tributary streams Nira, Venna, Koyna, Mula, Mula-Mutha, Mutha, Pawana, Indrayani, Chandrabhaga, Ghod, Sina, Urmodi and Vel in Maharashtra during the year is given in Annexure-I Table.15.4.

CHAPTER XVI

Water Quality of Rivers in Penneru Basin

16.1 Penneru River System

The Penneru basin extends over an area of 55,213 sq km. Located in Peninsular India, it covers areas in the States of Karnataka and Andhra Pradesh. The total length of the river from the head to its outfall into the sea is 597 km of which about 61 km are in Karnataka and the balance of 536 km is in Andhra Pradesh.

The principal tributaries of the river are the Jayamangali, the Kunderu & the Sagilery from left and the Chitravati, the Papagni & the Cheyyeru from right.

The Penneru River has the lowest average flow, due to low annual average rainfall. The meagre water wealth of the basin has been utilized only for limited irrigational use, and additional support had to be obtained from the adjoining River Krishna through the Kurnool-Cuddapah (K.C.) and Tungabhadra canals. The Penneru and its tributaries do not have enough flow to support direct abstraction for larger towns so; infiltration-wells are used for most of the riverside towns. Only Nandyal town abstracts from the K.C. canal.

Major industries situated on the banks of the Penneru River are Paper Mills, Straw Board and Sugar industry. The pollution abatement measures like sewage treatment plants for treating municipal wastewater and effluent treatment plants for industries should be established so that indiscriminate discharge of raw effluent directly into the river body shall not interfere with the designated best uses of the river Penneru.

The basin area of Penneru is covering the States of Karnataka and Andhra Pradesh. The important urban centres in Andhra Pradesh are Proddatur, Hindupur, Anantapur, Cuddapah, Nellore, Nandyal, Dharmavaram, Kadiri, Madanapalle, Rayachoti and Tadipatri.

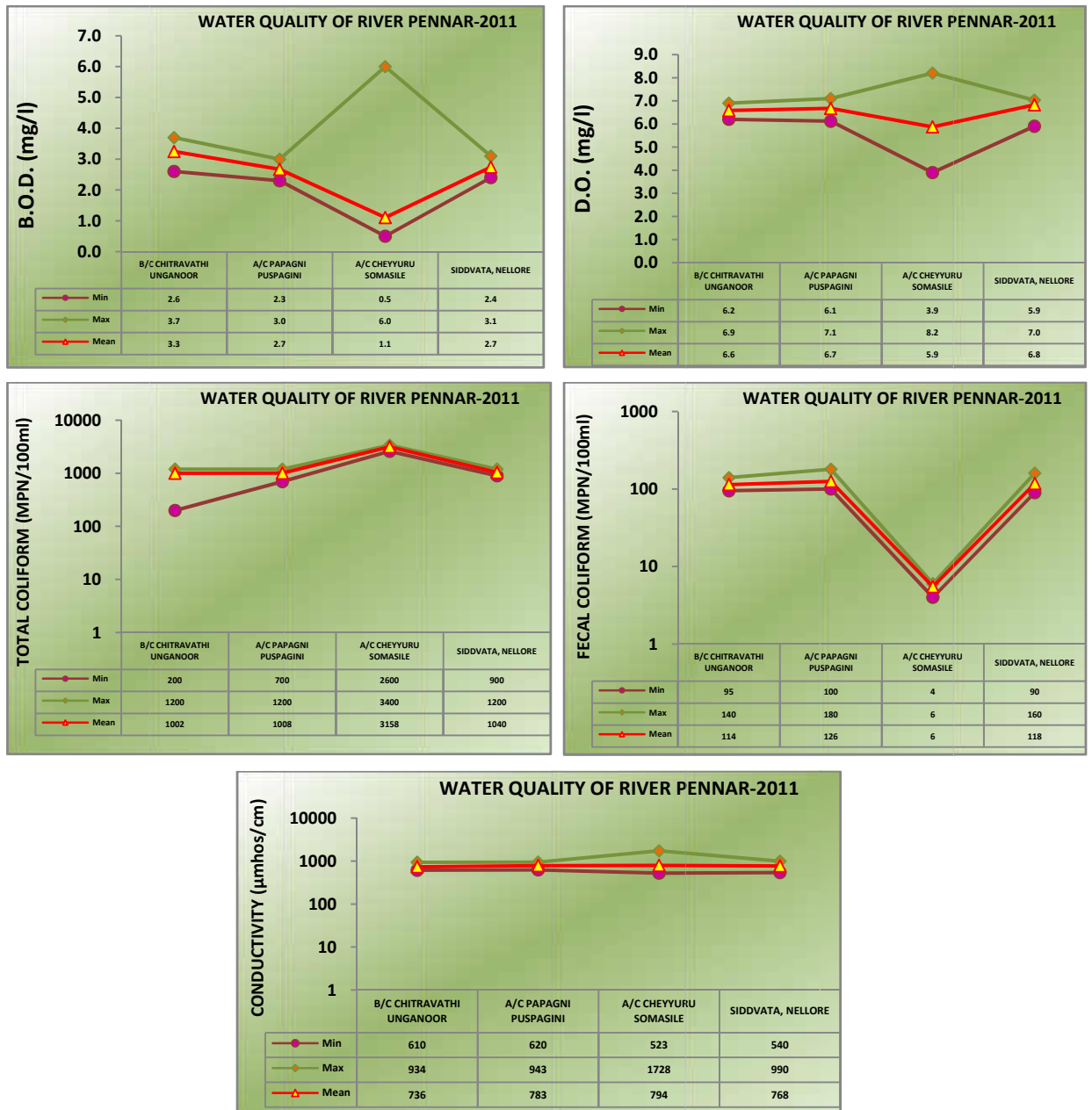
16.2 Water Quality Monitoring in Penneru Basin

The water quality monitoring of the River Penneru are being done in the basin by the State Pollution Control Board of Andhra Pradesh at 5 locations. The monitoring locations are on mainstream of River Penneru (5). The ranges of water quality observed in Penneru Basin with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate, Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

16.2.1 Water Quality of River Penneru

The water quality observed at four locations on Penneru River indicates that pH, DO, Conductivity, Fecal Coliform and Total Coliform are meeting the desired water quality criteria at all locations except DO at A/c with Cheyyuru Somasile. BOD is observed in the range of 0.5 – 6.0 mg/l and exceeding the criteria at all the locations. The water quality status of the River Penneru is given in Annexure-I Table 16.1. The water quality status of mainstream of River Penneru with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 16.1.

Figure 16.1: Water Quality of River Pennar



CHAPTER XVII

Water Quality of Rivers in Cauvery Basin

17.1 Cauvery River System

The Cauvery Basin extends over an area of 87,900 sq km in the States of Kerala, Karnataka and Tamil Nadu. The total length of the river from the head to its outfall into the sea is 800 km of which about 320 km are in Karnataka 416 km in Tamil Nadu and the remaining length of 64 km forms the common boundary between the States of Karnataka and Tamil Nadu.

The important tributaries, which join the Cauvery within the Karnataka State, are the Harangi, the Hemavati, the Shimsha and the Arkavati on the north (left bank) and the Lakshmantirtha, the Kabani or Kapila and the Suvarnavati on the south (right bank). In the south (right bank), they are the Bhavani, the Noyil and the Amaravati. The delta of Kaveri is so matured that the main river Kaveri has virtually lost its link with the sea, while Coleroon, the main distributaries, bears the brunt of the burden of flow. Like other rivers of South India, the Kaveri too has a rather limited water wealth because of moderate to low rainfall in the basin.

The basin area of Cauvery is covering the States of Karnataka and Tamil Nadu, The important urban centres in these states are Tumkur, Mandya, Mangalore, Mysore, Hassan, Bangalore, Channapatna, Dod, Ballapur, Ramanagaram, in Karnataka; Karaikal in Pondicherry; Valparai, Tamilnadu, Pollachi, Coimbatore, Erode, Thanjavur, Karur, Tiruchirappalli, Salem, Kumbakonam, Bhavani, Chidambaram, Coonoor, Devershola, Mannargudi, Mayiladuthurai, Mettupalaiyam Nagappattinam, Pattukkottai, Pudukkottai, Tiruchengodu, Udthagamandalam, Udumalaipettai, Villupum in Tamil Nadu. Industrial activity is also high in this basin, particularly in the Bangalore area (Karnataka) and the towns Mettur and Coimbatore in the Tamil Nadu State, followed by the districts of Mysore and Mandya in Karnataka and Periyar and Salem in Tamil Nadu.

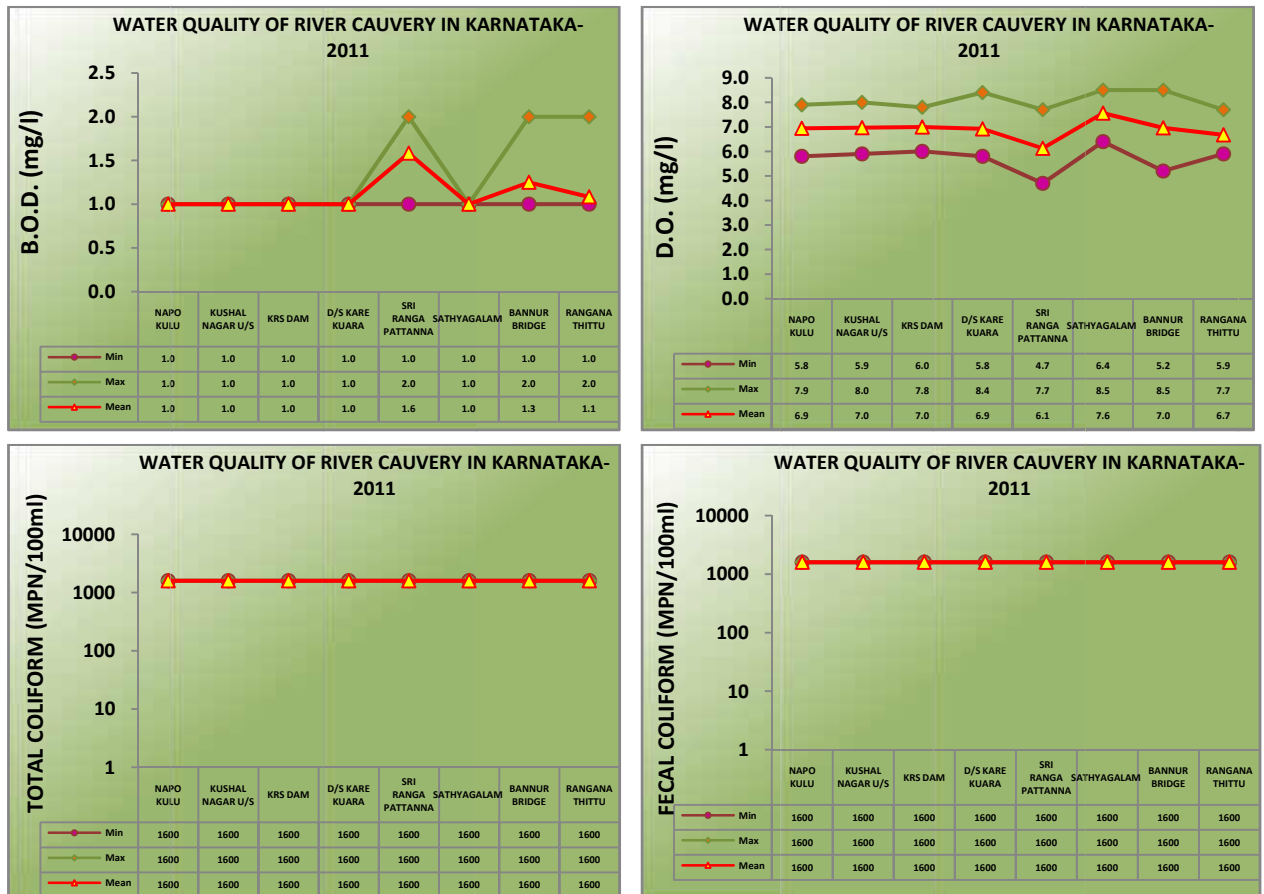
17.2 Water Quality Monitoring in Cauvery Basin

The water quality monitoring of the River Cauvery is being done in the basin by the State Pollution Control Board Karnataka, Tamil Nadu and Kerala. The monitoring locations are on mainstream of River Cauvery (29) and on tributaries are- Arkavati, Amravati, Bhavani, Kabbani, Laxmantirtha, Shimsa, Hemavati, Yagachi, Sarabanga and Thirumanimuthar. The ranges of water quality observed in Cauvery basin with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate, Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

17.2.1 Water Quality of River Cauvery

The Water Quality of River Cauvery at twenty locations indicates that DO is observed in the range of 1.7-10.9 mg/l and the minimum value is observed at Erode near Chirapalayam in Tamil Nadu. The water quality is meeting the desired water quality criteria at all locations with respect to Conductivity, Faecal Coliform and Total Coliform except Conductivity at Pitchavaram & Coleroon (3520 & 3640 μ mhos/cm respectively) and Total Coliform Kumbakonam at Thanjavur in Tamilnadu (6200 MPN/100ml). The BOD varies from 0.1-7.2 mg/l and the maximum value of BOD (7.2 mg/l) observed at Pitchavaram. Other locations having higher BOD are Komarapalayam at Namakal (3.4 mg/l), Thanjavur & Mayiladuthurai at Nagapattinam (3.9 mg/l), Tiruchirappalli D/s (4.2 mg/l), Kumbakonam at Thanjavur (4.6 mg/l), Vairapalayam at Namakal (4.7 mg/l), Mettur (5.0 mg/l), Erode near Chirapalayam (5.1 mg/l) and Trichy Grand Anaicut (5.3 mg/l) in Tamilnadu. The water quality of River Cauvery is presented in Annexure-I Table 17.1. The water quality status of River Cauvery with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 17.1 & 17.3.

Figure 17.1: Water Quality of River Cauvery in Karnataka



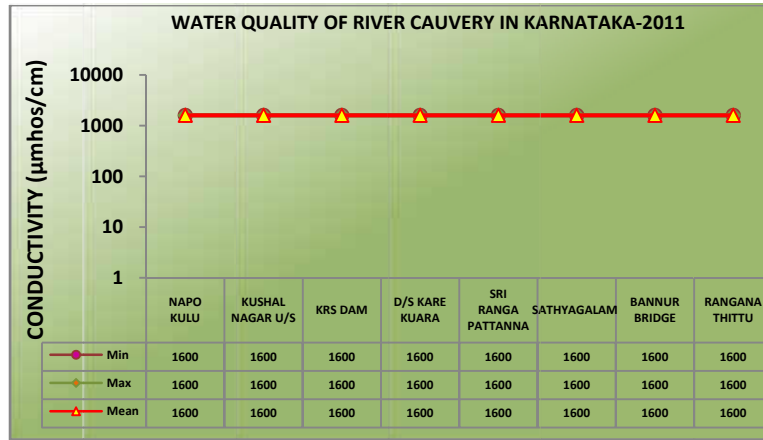
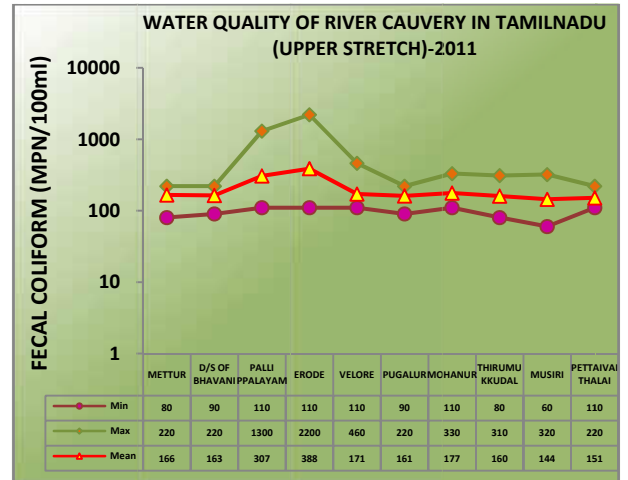
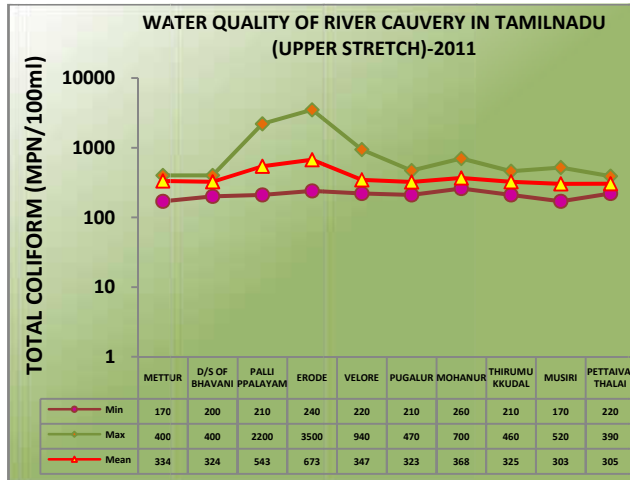
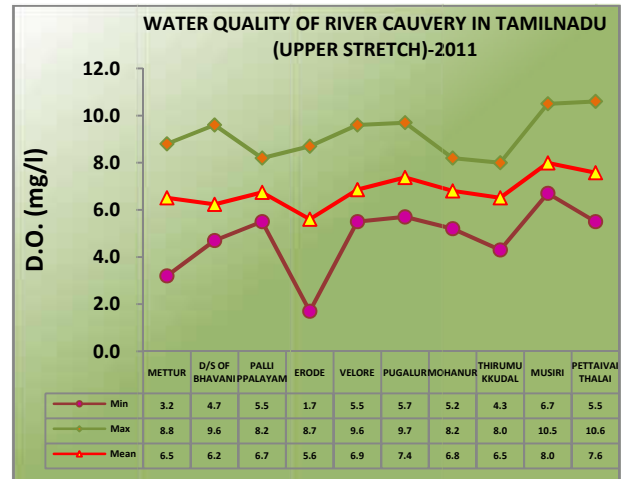
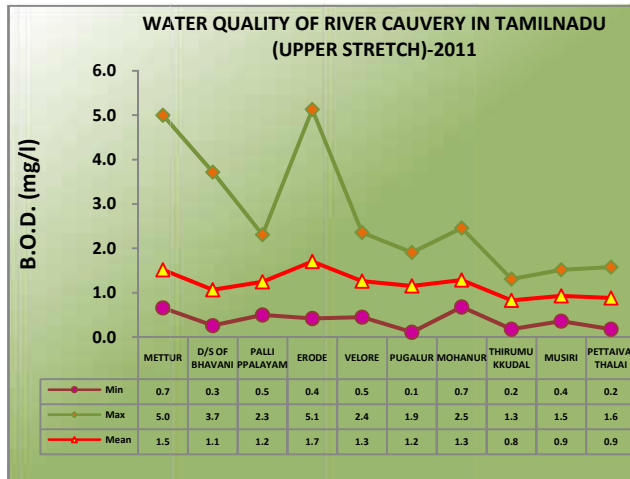


Figure 17.2: Water Quality of River Cauvery in Tamil Nadu (Upper Stretch)



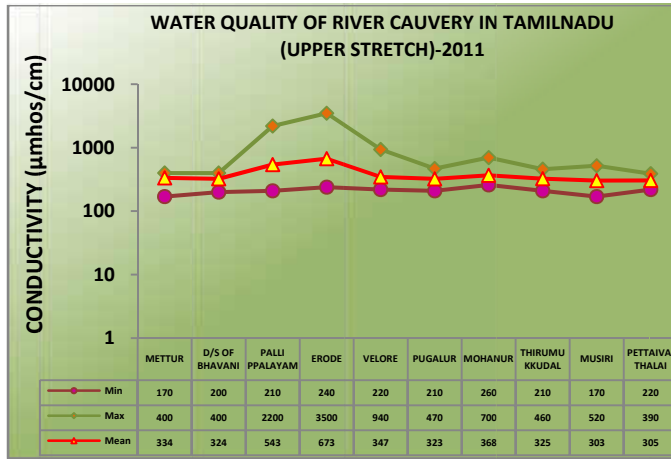
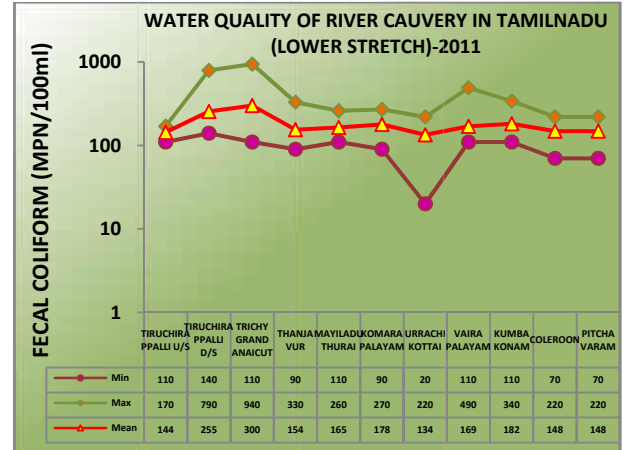
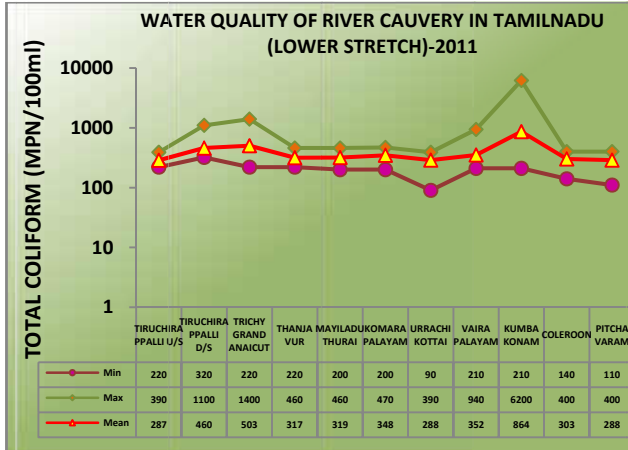
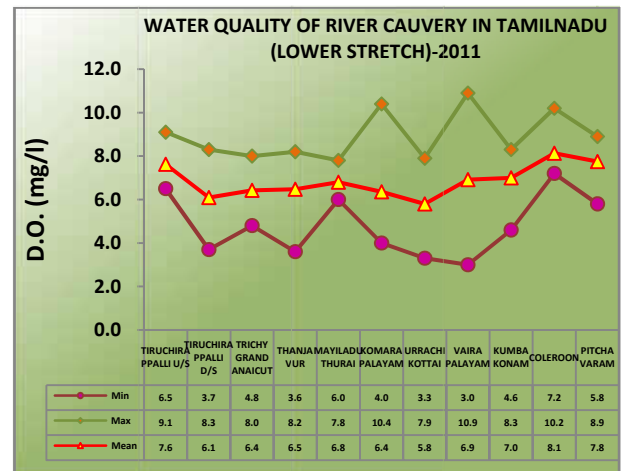
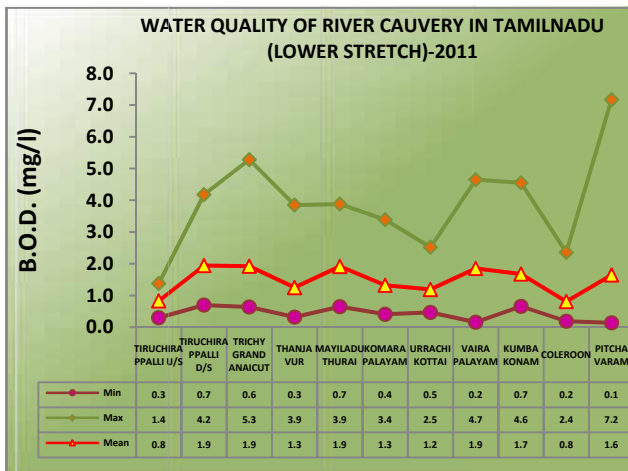
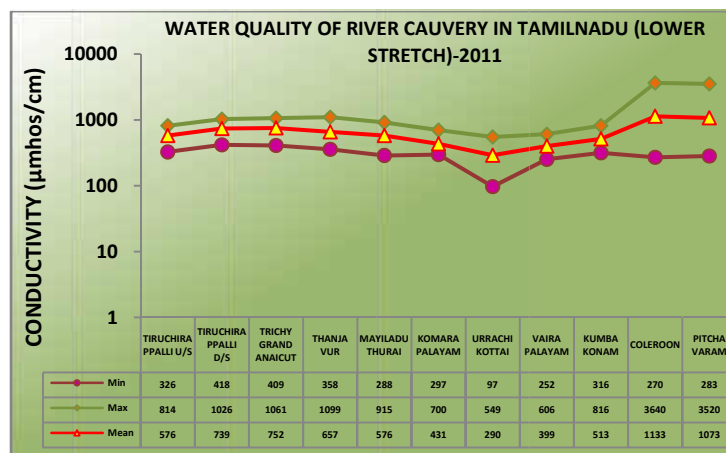


Figure 17.3: Water Quality of River Cauvery in Tamil Nadu (Lower Stretch)





17.2.2 Water Quality of tributary streams Amravati, Arkavathi, Bhavani, Hemavati, Kabbani, Lakshmantirtha, Sarabanga, Shimsha, Thirumanimuthar and Yagachi

The water quality of tributary streams Amravati, Arkavathi, Bhavani, Hemavati, Kabbani, Lakshmantirtha, Sarabanga, Shimsha, Thirumanimuthar and Yagachi indicates that Conductivity, Total Coliform and Faecal Coliform is meeting the water quality criteria at all the locations except in River Thirumanimuthar (Conductivity 3120 µmhos/cm, Total Coliform 16,00,000 MPN/100ml & Faecal Coliform 9,20,000 MPN/100ml) and River Sarabanga (Conductivity 5280 µmhos/cm, Total Coliform 9,20,000 MPN/100ml & Faecal Coliform 5,40,000 MPN/100ml) in Tamil Nadu.

DO varies from 0.3- 12 mg/l. The minimum value of DO (0.3 mg/l) is observed in D/s of Kalinganarayan Canal at Erode. Other locations having lower DO are River Sarabanga at Salem (0.6 mg/l) & River Thirumanimuthar at Salem (0.9 mg/l) in Tamil Nadu and River Arkavathi at T.G. Halli Reservoir (3.1 mg/l) & D/s of Kanakpura Town (3.3 mg/l) and River Lakshmantirtha at D/s Of Hunsur Town & D/s of Kattemalavadi (3.2 mg/l) in Karnataka. The BOD values ranges from 0.04-85 mg/l and the higher values are observed in River Sarabanga at Salem (85 mg/l), River Thirumanimuthar at Salem (83.7 mg/l); D/s of Kalinganarayan Canal (6.2 mg/l) & U/s of Kalinganarayan Canal (3.8 mg/l) and River Bhavani at Sirumugai (3.8 mg/l) in Tamil Nadu and River Arkavathi at T.G. Halli Reservoir (9.0 mg/l); River Lakshmantirtha at D/s Of Hunsur Town (5.0 mg/l) and River Shimsha at D/s of Highway Bridge, Yediyar (3.5 mg/l) in Karnataka. The Faecal Coliform ranges from 1-9, 20, 000 MPN/100ml whereas the Total Coliform ranges from 7- 16, 00,000 MPN/100ml. The water quality of tributary streams Amravati, Arkavathi, Bhavani, Hemavati, Kabbani, Lakshmantirtha, Sarabanga, Shimsha, Thirumanimuthar and Yagachi is given in Annexure-I Table 17.2.

CHAPTER XVIII

Water Quality of Medium and Minor Rivers, Canals and Creeks

18.1 Medium and Minor River System

The rivers and streams having catchment area less than 20,000 km² are categorized as medium and minor rivers. The medium and minor rivers are mainly confined to the coastal tract of India and are flowing in the States of Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Orissa, Andhra Pradesh, Haryana, Himachal Pradesh, Punjab, Rajasthan, Manipur, Meghalaya, Mizoram and Tripura; and Union Territory of Daman and Diu and Pondicherry.

18.2 Water Quality of Medium and Minor Rivers in Gujarat and Daman

The water quality monitoring of River Damanganga, Baleshwar Khadi, Purna, Kaveri, Dhadar, Ambika, Kolak, Mindhola, Par and Triveni Sangam in Gujarat and Daman is carried out by the respective State Pollution Control Boards. In River Damanganga DO varies from 1.4 mg/l to 7.4 mg/l. The low value of DO is observed at Kanchigaon D/s (1.4 mg/l) in Gujarat and Discharge Point Distillery (1.8 mg/l) & Zuari Cause Way Bridge (3.8 mg/l) in Daman. BOD is observed in the ranges from 0.7 mg/l to 354 mg/l. The higher values of BOD are observed at all the locations of River Damanganga with maximum at Discharge Point Distillery (1.8 mg/l) & Zuari Cause Way (354 mg/l) in Daman. Conductivity is not confirming with the criteria in River Damanganga at Daman Jetty, Motidaman (65700 µmhos/cm), Discharge Point Distillery (50300 µmhos/cm), Zuari Cause Way Bridge (9772 µmhos/cm) and Village Namdha, Vapi (2794 µmhos/cm) in Daman.

The high BOD is observed in River Dhadar at Kothada (19.0 mg/l), River Kolak at Railway Bridge No. 313 Vapi (10.7 mg/l) & Patalia Bridge (4.8 mg/l) and River Kaveri on Bridge at Billimora-Valsad Road, River Mindhola at State Highway Bridge Sachin & River Ambika at Bilimora (4.0 mg/l). The Conductivity is observed very high in River Kaveri on bridge at Billimora-Valsad road (38593 µmhos/cm), River Ambika at Billimora (27345 µmhos/cm) and Triveni Sangam near Somnath Temple (4480 µmhos/cm). The Faecal & Total Coliform are meeting the desired criteria except Total Coliform in River Purna on bridge at Surat-Navsari Highway (9300 MPN/100ml). The water quality status of rivers in Gujarat is presented in Annexure-I Table 18.1.

18.3 Water Quality of Medium and Minor Rivers in Goa and Maharashtra

The State Pollution Control Board of Goa carries out the water quality monitoring of River Zuari, Mandovi, Kalna, Valvant, Madai, Khandepar, Talpona, Bicholim, Chapora, Mapusa, Sal, Kushawati and Assonora. The water quality of all the

mentioned rivers in Goa is meeting the desired water quality criteria with respect to Conductivity and DO except DO in River Mapusa on Culvert on Highway Mapusa-Panaji (3.3 mg/l) and River Sal near Hotel Leela Mobor Cavellissim (3.9 mg/l). pH is not meeting the desired criteria in all the Rivers. BOD is meeting the desired water quality criteria except in River Sal at Pazorkhoni Cuncolim (5.8 mg/l); River Bicholim at Varazan Nagar & River Khandepar at Opa – Ponda (3.9 mg/l); River Sal near Hotel Leela Mobor (3.6 mg/l); River Mapusa on Culvert on Highway Mapusa-Panaji (3.3 mg/l) and River Kushawati near Bund at Kevona (3.2 mg/l). However, Total Coliform and Faecal Coliform is meeting the desired water quality criteria all of the locations.

The water quality monitoring of River Ulhas, Bhatsa, Kalu, Patalganga, Savitri, Mithi, Vashisti, Kan, Muchkundi, Surya, Tansa, Vaitarna, Amba, Pehlar and Kundalika is carried out by the State Pollution Control Board of Maharashtra. All the rivers are meeting the desired water quality criteria with respect to pH except in River Patalganga at D/s of Kharpada Bridge (5.2); River Kundalika near Salav Bridge (5.5); River Vaitarna near Road Bridge Gandhare Village (9.4); River Bhatsa at D/s Liberty Oil Mills, River Bhatsa at U/s Liberty Oil Mills & River Tansa River Near Road Bridge Village Dakewali (9.2); River Vashisti at D/s Three M Paper Mills Near Chiplun Water Intake Jackwell (8.9); River Savitri at Upsa Kendre Nangalwadi, River Savitri at Dadli Bridge, River Surya at U/s Surya Dam & River Surya River at MIDC Pumping Station (8.8); River Vashisti at U/s Three M Paper Mills & River Surya at Intake of Vasai-Virar W/S Scheme (8.7) and River Savitri at Shedav Doh (8.6).

Conductivity is not meeting the criteria in River Kundalika at Salav Bridge (33259 $\mu\text{mhos/cm}$); River Mithi (28018 $\mu\text{mhos/cm}$); River Savitri at Ovale village (13925 $\mu\text{mhos/cm}$), Muthavali village (12051 $\mu\text{mhos/cm}$) & Dadli Bridge (7392 $\mu\text{mhos/cm}$) and River Kalu at Atale Bridge (2323 $\mu\text{mhos/cm}$). The low value of DO is observed in River Mithi (1.2 mg/l), River Savitri at Ovale Village (2.5 mg/l), River Kalu at Atale Bridge (2.7 mg/l), River Kundalika at Arekhurd (3.7 mg/l), River Patalganga at D/s of Kharpada Bridge (3.8 mg/l) and River Kundalika near Salav Bridge (3.9 mg/l). BOD is not meeting the desired water quality criteria in all the rivers. Higher BOD is observed in River Savitri at Ovale Village (525 mg/l) & Muthavali Village (27.5 mg/l); River Mithi (175 mg/l); River Patalganga at Savroli Bridge (16 mg/l), D/s Kharpada Bridge (6 mg/l) & near Intake of MIDC W/W (5 mg/l); River Kundalika near Salav Bridge (12 mg/l), Are Khurd (8 mg/l) & Roha City (7 mg/l); River Kalu at Atale Village (15 mg/l); River Tansa near Road Bridge Village Dakewali (11 mg/l); River Vaitarna near Road Bridge Gandhare Village (10 mg/l); River Bhatsa at D/s Pise Dam (10 mg/l) & D/s Liberty Oil Mills (6 mg/l); River Kan near Sakri Water Works (10 mg/l); River Surya at U/s Surya Dam (7 mg/l) & MIDC Pumping Station Palghar (5 mg/l) and River Muchkundi at Waked (5.5 mg/l). The Total Coliform is meeting the criteria limit at all the locations. The water quality status of rivers in Goa and Maharashtra is presented in Annexure-I Table 18.2.

18.4 Water Quality of Medium and Minor Rivers in Kerala

The water quality monitoring of River Achenkoli, Ancharakandy, Ayroor, Bharathapuzha, Chalakudy, Chaliyar, Chandragiri, Chitthrapuzha, Corapuzha, Ithikkara, Kadalundy, Kadambayar, Kallada, Kallai, Karingode, Karmana, Karuvannur, Kavvai, Keecheri, Korayar, Kuppam, Kuttiyady, Mahe, Mamom, Manimala, Manjeswar, Meenachil, Mogral, Muvattapuzha, Neelaswaram, Neyyar, Pallickal, Pamba, Periyar, Peruvamba, Pullur, Puzhackal, Ramapuram, Shriya, Thallassery, Thirur, Uppala and Vamanapuram is carried out by the State Pollution Control Board of Kerala.

pH does not meet the criteria in River Kadambayar at Brahmapuram (5.0); River Kavvai at Kuttiyol Palam (5.8); River Puzhackal at Puzhackal Bridge & River Ramapuram at Ramapuram Bridge (6.0); River Mogral at Mogral Bridge (6.1); River Pamba at Chengannur (6.1), Pamba Down (6.2) & Thakazhy (6.3); River Karuvannur at Karuvannur Bridge (6.2); River Meenachil at Kidangoor, River Pullur at Pullur Bridge & River Thirur at Thalakkadathur Bridge (6.3); River Kuppam at Thaliparamba & Rayarom (6.4); River Manimala at Kalloopara & River Manimala at Thondra (6.4) and River Achenkoil at Chennithula, River Keecheri at Vadakkanchery Bridge & River Neelaswaram at Nambiarkal Dam (6.4). Conductivity is observed in the range of 25 $\mu\text{mhos/cm}$ to 50000 $\mu\text{mhos/cm}$ and high values are observed in River Ramapuram at Ramapuram Bridge (50000 $\mu\text{mhos/cm}$); River Mogral at Mogral Bridge (49200 $\mu\text{mhos/cm}$); River Uppala at Uppala Bridge (49000 $\mu\text{mhos/cm}$); River Neelaswaram at Hosdurg (46000 $\mu\text{mhos/cm}$) & Nambiarkal Dam (8100 $\mu\text{mhos/cm}$); River Kallai at Kallai Bridge (44000 $\mu\text{mhos/cm}$); River Kuppam at Thaliparamba (39360 $\mu\text{mhos/cm}$); River Corapuzha at Kanayankode (34000 $\mu\text{mhos/cm}$); River Chaliyar at Chungapally (30000 $\mu\text{mhos/cm}$); River Periyar near Alwaye-Eloor (6600 $\mu\text{mhos/cm}$) & Purappallikavu (3600 $\mu\text{mhos/cm}$); River Ancharakandy at Meruvamba (3170 $\mu\text{mhos/cm}$) and River Karmana at Moonnattumukku (2500 $\mu\text{mhos/cm}$) due to estuarine zone of these rivers on these locations.

DO varies from 0.0 mg/l to 8.1 mg/l and DO does not meet the desired criteria in River Karmana at Moonnattumukku (0.0 mg/l); River Kadambayar at Brahmapuram (0.3 mg/l) & Manckakadavu (0.5 mg/l); River Chitthrapuzha at Irumpanam (0.6 mg/l); River Periyar at Kalamassery (2.4 mg/l); River Manjeswar at Bajrakkara Bridge (2.8 mg/l); River Kallai at Kallai Bridge & River Puzhackal at Puzhackal Bridge (2.9 mg/l); River Ramapuram at Ramapuram Bridge (3.3 mg/l) and River Thirur at Thalakkadathur Bridge (3.6 mg/l).

The value of BOD varies from 0.1 mg/l to 18.0 mg/l. All the monitoring locations in Kerala on Medium and Minor River are meeting the criteria except River Karmana at Moonnattumukku (18.0 mg/l); River Kadambayar at Brahmapuram (9.4 mg/l) & Manckakadavu (4.4 mg/l) & River Chitthrapuzha at Irumpanam (3.6 mg/l) that indicates about the relatively low concentration of organic matter in

water bodies. The Total and Faecal Coliform is observed in the range of 4-22000 MPN/100ml and 2-11000 MPN/100ml respectively with maximum in River Karmana at Moonnattumukku (22000 MPN/100ml 11000 MPN/100ml). The water quality status of rivers in Kerala is presented in Annexure-I Table 18.3.

18.5 Water Quality of Medium and Minor Rivers in Andhra Pradesh, Karnataka, Orissa, Pondicherry and Tamil Nadu

The water quality monitoring of River Nagavalli & Rushikulya in Andhra Pradesh; Kali, Kumardhara & Netravathi in Karnataka; Budhabalanga, Kerandi, Nagavalli, Rushikulya & Vamsadhara in Orissa; Arasalar, Coringa, Gautami-Godavari & Mahe in Pondicherry and Palar, Tambiraparani & Vasista in Tamil Nadu respectively is carried out by the respective State Pollution Control Boards. The pH, Conductivity and DO is meeting the criteria at all the locations except DO in River Coringa (3.0 mg/l) in Pondicherry and Conductivity in River Mahe (48500 μ hos/cm) & River Gautami-Godavari (17990 & 10910 μ hos/cm) in Pondicherry; Rushikulya at Ganjam D/s (25280 μ hos/cm) in Orissa and Vasista at Salem (2840 μ hos/cm) in Tamil Nadu. BOD varies from 0.4- 340 mg/l.

BOD is observed more than the criteria limit in River Vasista at Salem (340 mg/l) & River Tambiraparani at Arumuganeri (8.0 mg/l), Kallidai Kurichi in Tirunelveli (8.0 mg/l), Tirunelveli (4.1 mg/l), D/s of Palayamkottai (3.9 mg/l) & Vellakoil (3.5 mg/l) in Tamil Nadu; River Budhabalanga at D/s Baripada Town (22 mg/l), Nagavalli at Jaykaypur D/s (3.7 mg/l) & Rushikulya at Ganjam D/s (3.3 mg/l) in Orissa and River Kali at D/s of West Coast Paper Mill (8.4 mg/l) in Karnataka. The Total and Faecal Coliform are observed in the range of 2-16,00,000 MPN/100ml and 2-9,20,000 MPN/100 ml respectively. The locations exceeding the criteria with respect to Total Coliform & fecal coliform are River Vasista at Salem (1600000 MPN/100ml & 920000 MPN/100ml) & River Palar at Vaniyambadi Water Supply Head Work (9200 MPN/100ml & 1700 MPN/100ml) in Tamil Nadu and River Budhabalanga at D/s Baripada Town (92000 MPN/100ml & 35000 MPN/100ml) & U/s Baripada Town (35000 MPN/100ml & 17000 MPN/100ml); River Nagavalli at Rayagada D/s (35000 MPN/100ml & 14000 MPN/100ml), Jaykaypur D/s (28000 MPN/100ml & 11000 MPN/100ml) & Penta U/s Jaykaypur Town (14000 MPN/100ml & 4600 MPN/100ml); River Rushikulya at Ganjam U/s (24000 MPN/100ml & 13000 MPN/100ml); River Kerandi at Intake Well of Nalco Refinery in Hal- Sunabeda (15000 MPN/100ml & 4300 MPN/100ml) & River Vamsadhara at Muniguda D/s (9400 MPN/100ml & 4900 MPN/100ml) in Orissa. The water quality status of rivers in Andhra Pradesh, Karnataka, Orissa, Pondicherry and Tamilnadu is presented in Annexure-I Table 18.4.

18.6 Water Quality of Medium and Minor Rivers in Himachal Pradesh, Punjab, Haryana and Rajasthan

The water quality monitoring of River Sukhna & Markanda in Himachal Pradesh, River Ghaggar in Haryana & Punjab and River Bandi, Ghaggar, Jawai, Luni & Kodra Dam in Rajasthan is carried out by the respective State Pollution Control Boards. The pH and Conductivity are meeting the criteria at all the locations except Conductivity in River Markanda at D/s Kala Amb (2650 μ mhos/cm) in Haryana. DO is observed in the range of 0.8-10.1 mg/l. The low values of DO are observed in River Markanda at D/s Kala Amb (0.8 mg/l) in Haryana; River Sukhna at Parwanoo (1.2 mg/l) in Himachal Pradesh; Kodra Dam at Mount Abu (1.6 mg/l), River Bandi at Hemawas Dam (1.7 mg/l) River Jawai at Jawai Dam (3.2 mg/l) & River Ghaggar When Entering In Rajasthan From Haryana near Rd No. 629 (3.5 mg/l) in Rajasthan and River Ghaggar at D/s Dhakansu Nallah (1.8 mg/l) & U/s Dhakansu Nallah (2.1 mg/l) in Punjab.

BOD is observed in the range of 0.2-535 mg/l. All the locations in River Ghaggar are grossly polluted. The locations having very high BOD are River Markanda at D/s Kala Amb (535.0 mg/l) and River Ghaggar at Ottu Weir (22.0 mg/l), Chandarpur Syphon (18.0 mg/l), GH-1 Road Bridge Sirsa (16.0 mg/l) & D/s Surajpur (3.6 mg/l) in Haryana; River Sukhna at Parwanoo (26.0 mg/l) in Himachal Pradesh; River Ghaggar at D/s Chhatbir (68.0 mg/l), D/s Jharmal Nadi (60.0 mg/l), D/s Sardulgarh (50.0 mg/l), D/s Dhakansu Nallah (36.0 mg/l), U/s Sardulgarh (34.0 mg/l), U/s Jharmal Nadi & U/s Dhakansu Nallah (24.0 mg/l), Bankarpur Dera Bassi & Moonak (20.0 mg/l), D/s Patiala (18.0 mg/l), Mubarakpur Rest House & Ratanheri (16.0 mg/l) in Punjab and Entering in Rajasthan from Haryana near Road No. 629 (4.6 mg/l) in Rajasthan.

The water quality of tributary stream Markanda at D/s of Kala Amb indicates that the river is grossly polluted due to effluent discharge from Ruchira Paper Mills. The number of Total and Faecal Coliform were in the range of 4-110000 MPN/100ml and 3-50000 MPN/100ml respectively. The river is grossly polluted at majority of monitoring locations due to the discharge of municipal and industrial wastewater. The water quality status of medium and minor rivers in Himachal Pradesh, Punjab, Haryana and Rajasthan is presented in Annexure-I Table 18.5. The water quality status of River Ghaggar with respect to BOD, DO, Total Coliform, Faecal Coliform and Conductivity is given in Figure 18.1 & 18.2.

Figure 18.1: Water Quality of River Ghaggar (Upper Stretch)

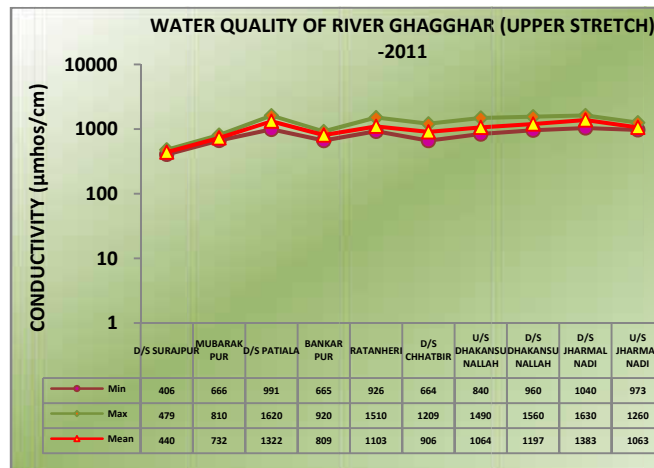
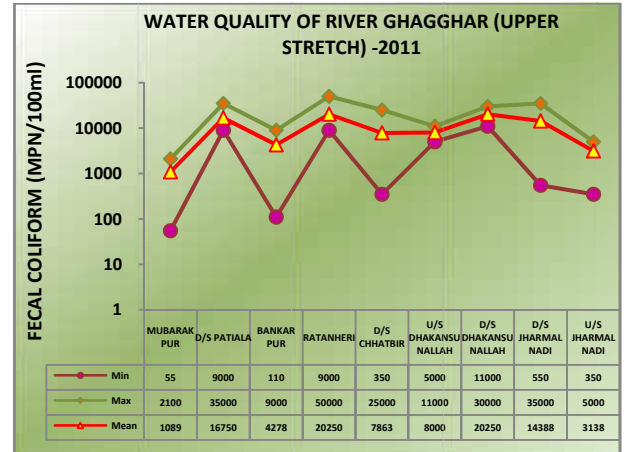
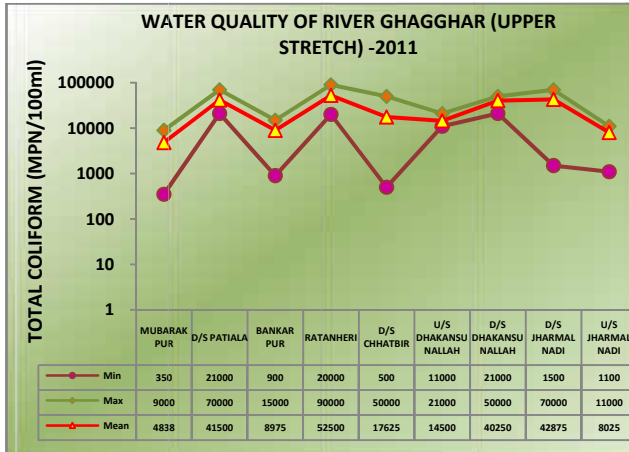
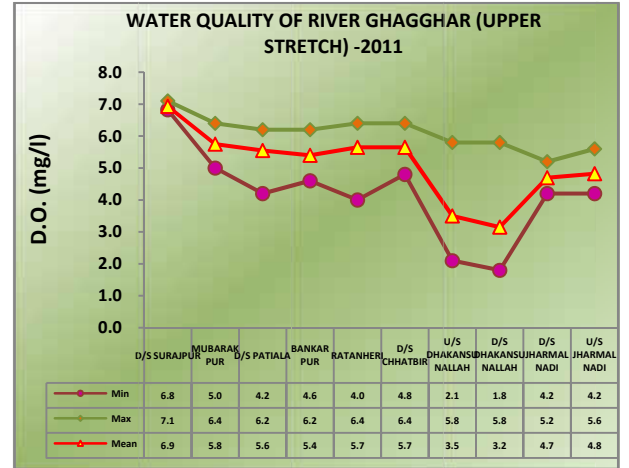
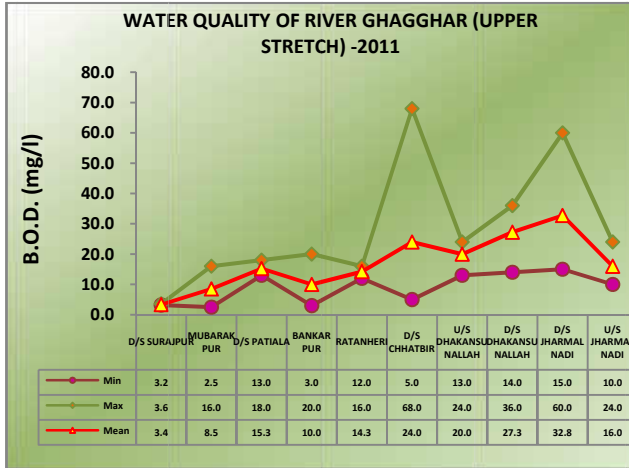
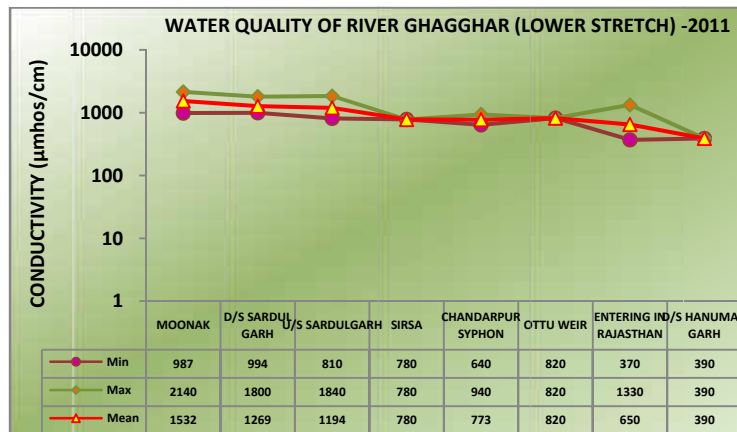
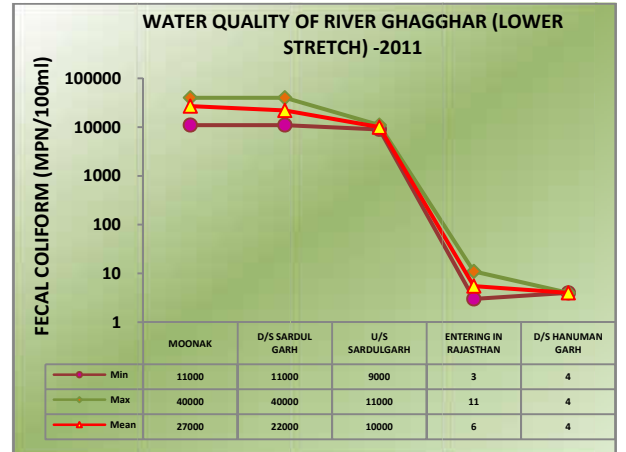
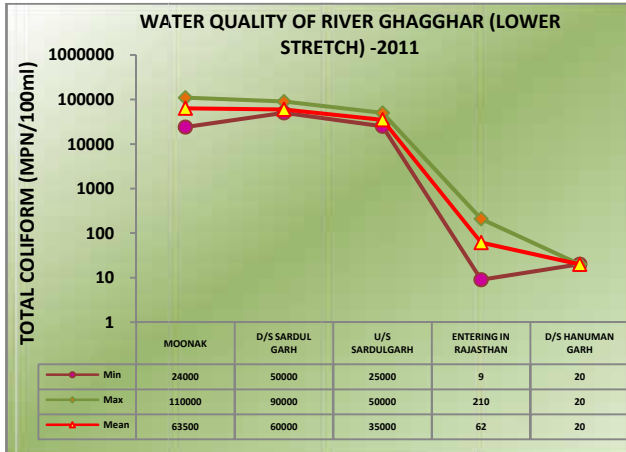
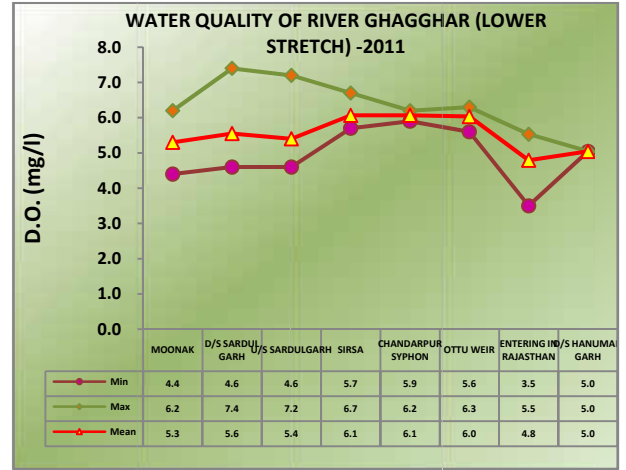
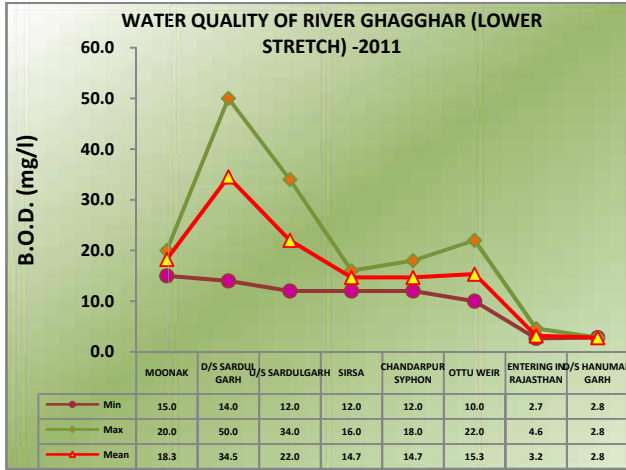


Figure 18.2: Water Quality of River Ghaggar (Lower Stretch)



18.7 Water Quality of Medium and Minor Rivers in Manipur, Meghalaya, Mizoram and Tripura

The water quality monitoring of River Barak, Chakpi, Imphal, Irang, Iril, Khuga, Khujairok, Lokchao, Maha, Manipur, Nambul, Sekmai, Thoubal & Wangjing in Manipur; Ganol, Kharkhla, Myntdu, Simsang & Umtrew in Meghalaya; Tlawing & Tuirial in Mizoram and Gumti & Haora in Tripura is carried out by the respective State Pollution Control Boards. pH is meeting the desired criteria at all the locations except in River Nambul at Bishnupur (4.8) in Manipur and Kharkhla at Jaintia Hills (2.5) in Meghalaya. The conductivity is meeting the desired criteria at all the locations. The DO meets the criteria at all the locations except in River Nambul at Hump Bridge (0.2 mg/l), Heirangoithong (0.3 mg/l), Naoremthong (3.5 mg/l) & Singda Dam (3.9 mg/l); River Imphal at Kangla Moat & River Wangjing at Wangjing Thoubal (2.9 mg/l); River Iril at Lilong (3.1 mg/l) and River Lokchao at Bishnupur (3.7 mg/l) in Manipur.

BOD varies from 0.1 to 167.1 mg/l. The locations having high BOD are River Nambul at Bishnupur (167.1 mg/l), Heirangoithong (30.5 mg/l), Hump Bridge (21.0 mg/l), Singda Dam (7.1 mg/l), Naoremthong (4.9 mg/l) & Samusang (4.3 mg/l); River Imphal at Kangla Moat (6.9 mg/l); River Iril at Lilong (6.2 mg/l); River Barak at Senapati (4.9 mg/l); River Thoubal at Litan (4.5 mg/l) & Phadom (4.4 mg/l); River Maha at Chandel (4.4 mg/l); River Manipur at Sekmaijan (4.2 mg/l); River Wangjing at Heirok (3.8 mg/l) & Wangjing Thoubal (3.2 mg/l) and River Thoubal at Yairipok (3.3 mg/l) in Manipur; River Umtrew at Byrnihat East (8.8 mg/l) & River Kharkhala at Jaintia Hills (7.5 mg/l) in Meghalaya and River Haora at Chandrapur (5.1 mg/l) & River Gumti at D/s South Tripura (4.2 mg/l) in Tripura. The Total and Faecal Coliform are meeting the criteria at all the locations except Faecal Coliform count (2800 MPN/100ml) which is exceeding in Myntdu River in Meghalaya. The water quality of Medium and Minor Rivers in Manipur, Meghalaya, Mizoram and Tripura is presented in Annexure-I Table 18.6.

18.8 Water Quality of Creeks, Sea water and Canals

The monitoring locations on creeks in Goa, Gujarat, Maharashtra and Orissa are one each on Dando mollo, Masma Khadi, Bassein, Bhayander, Dahanu, Dandi, Karambavane, Kharekuran Murbe, Mahim, Panvel, Sarawali and Savta; two locations on Thane and Vashi Creeks and five locations on Ulhas Creek. The sea water is monitored on 15 locations in the vicinity of Mumbai in Maharashtra and 3 locations in Orissa. Agartala Canal, Agra Canal, Cumbarjua Canal, Cuncolim Canal, Gang Canal, Gurgaon Canal, Kharda Canal, Masitawala Head Canal, Morambamarine Canal, Narmada Canal, NOAI Canal, Samarla Kota Canal, Talaganda Canal, Tulje Bagh Canal, Upper Ganga Canal and Western Yamuna Canal are monitored in Haryana, Goa, Gujarat, Rajasthan, Manipur, Delhi, Orissa, Uttarakhand, Andhra Pradesh, Tripura and West Bengal.

18.8.1 Water Quality of Creeks and Sea water

The water quality of the creeks and sea water with respect to pH, Conductivity, DO, BOD, Total Coliform (TC), Faecal Coliform (FC), Nitrite and Nitrate are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year. DO varies from 0.3 to 8.6 mg/l. BOD is observed in the range of 0.3 mg/l to 180 mg/l and is not meeting the desired criteria at all the locations except Sea Water at Puri, Paradeep and Gopalpur in Orissa. Conductivity is observed very high due to marine water insurgence and it ranges from 10-65760 μ mhos/cm. The Nitrate (NO_3^-) concentrations are observed in the range of 0.0-15.39 mg/l. The Total and Faecal Coliform count is meeting the criteria limit due to proximity of monitoring locations to sea except TC & FC in Masma Khadi at Olpad Road (9300 MPN/100ml & 4300 MPN/100ml) in Gujarat and TC in Sea Water at Gopal Pur (9200 MPN/100ml) in Orissa. The water quality status of the creeks and sea water is presented in Annexure-I Table 18.7.

18.8.2 Water Quality of Canals

The water quality of Agartala Canal, Agra Canal, Cumbarjua Canal, Cuncolim Canal, Gang Canal, Gurgaon Canal, Kharda Canal, Masitawala Head Canal, Morambamarine Canal, Narmada Canal, NOAI Canal, Samarla Kota Canal, Talaganda Canal, Tulje Bagh Canal, Upper Ganga Canal and Western Yamuna Canal with respect to pH, Conductivity, DO, BOD, Total Coliform (TC), Faecal Coliform (FC), Nitrite and Nitrate are presented as minimum, maximum and mean value to assess the extent of water quality variation of the canals throughout the year. In Western Yamuna Canal DO varies from 4.9 mg/l to 8.3 mg/l and BOD observed in the range of 0.9 - 22.0 mg/l with highest value at D/s of Yamuna Nagar (22 mg/l).

In other Canals, DO varies from 0 mg/l to 12.1 mg/l. The low value of DO is observed in Agra Canal at Madanpur Khadar (0 mg/l) in Delhi; Kharda Canal at North 24 Parganas & NOAI Canal at North 24 Parganas (0 mg/l) in West Bengal; Talaganda Canal at Naubazar Cuttack (0 mg/l) & Atharabanki (1.0 mg/l) in Orissa; Gurgaon Canal at GC-1 near Badarpur Border (0.6 mg/l) in Haryana; Agartala Canal near Pragati Vidyabhawan (1.1 mg/l) in Tripura and Morambamarine at Thoubal (3.2 mg/l) in Manipur. BOD range is observed from 0.0 mg/l to 123 mg/l and maximum found in Kharda Canal at North 24 Parganas (123 mg/l) NOAI Canal at North 24 Parganas (61 mg/l) in West Bengal; Gurgaon Canal GC-1 near Badarpur Border (38.0 mg/l) in Haryana; Agartala Canal near Pragati Vidyabhawan (35.3 mg/l) in Tripura; Agra Canal at Madanpur Khadar (25 mg/l) in Delhi; Talaganda Canal at Naubazar Cuttack (20.5 mg/l), Atharabanki (19 mg/l) & Jobra (7.9 mg/l) in Orissa; Morambamarine at Thoubal (8.1 mg/l) in Manipur; Cumbarjua Canal at Corlim (6.2 mg/l) in Goa and Upper Ganga Canal at D/s Hari ki Pauri (5.0 mg/l) in Uttarakhand.

The Total and Faecal Coliform does not meet the criteria at Kharda Canal at North 24 Parganas (9×10^8 & 5×10^8 MPN/100ml) & NOAI Canal at North 24 Parganas (14×10^7 & 11×10^7 MPN/100ml) in West Bengal; Agra Canal at Madanpur Khadar (46×10^7 & 24×10^7 MPN/100ml) in Delhi and Talaganda Canal at Naubazar Cuttack (16×10^4 & 16×10^4 MPN/100ml), Atharabanki (16×10^4 & 16×10^4 MPN/100ml) & Jobra (22000 & 14000 MPN/100ml). The water quality status of canals is presented in Annexure-I Table 18.7.

18.8.3 Water Quality of Drains

The water quality of drains with respect to Temperature, DO, pH, Conductivity, BOD, Nitrate +Nitrite-N, Faecal Coliform (FC) and Total Coliform (TC) are presented as minimum, maximum and mean value to assess the extent of water quality variation of the drains throughout the year.

The Drains in Delhi out falling in river Yamuna and in Chandigarh & Maharashtra are monitored and observed that they are exceeding the standard limit for discharging in fresh water streams. DO varies from 0 mg/l to 7.6 mg/l. BOD is observed in the range of 2 - 875 mg/l and the maximum value is observed at Tarapur Midc Nalla (Near Sump 2), Tarapur, Thane (875 mg/l) in Maharashtra. Faecal Coliform ranges from 2-1800 MPN/100ml whereas TC is observed in the range of 60- 1600000000 MPN/100ml and the highest value is observed at Shahdara Drain in Delhi. The water quality status of drains is presented in Annexure-I Table 18.7.

CHAPTER XIX

Water Quality of Lakes, Tanks and Ponds

19.1 Lantic Water Bodies

Lakes in India spread over an area of about 7.2 Lakh hectares. There are very few lakes in India, and among them most are quite shallow and none of any considerable size. In the hilly regions, there is abundance of lakes. Lakes are an integral part of a drainage basin and landlocked body of water with a horizontal surface water level.

The Lakes being monitored are Ajwah Lake (1), Anjunem Lake (1), Ankleshwar Reservoir (1), Anshupa Lake (1), Ashthamudi Lake (1), Bahour Lake (1), Bangla Fishery (1), Banjara Lake (1), Belboni Lake (1), Bhalswa Lake (1), Bhoothathankettu Reservoir (1), Bheemtal Lake (1), Bilawali Talav (1), Bindusaraovar (1), Brahamsarovar (1), Carambolim Lake (1), Chandola Lake (1), Chilka Lake (1), Choral Dam (1), Curtorim Lake (1), Dal Lake (13), Daloni Beel (1), Delo Reservoir (1), Dharoi Dam (1), Dhambur Lake (1), Dimna Lake (1), Edamalayar Reservoir (1), Fatehsagar (1), Fox Sagar (1), Gape Sagar Lake (1), Gobindsagar Lake (1), Gomti Lake (1), Govindgarh Tank (1), Hamisar Lake (1), Harike Lake (2), Hasmathpet Lake (1), Hazaribagh Meethajheel (1), Hebbalavalley Lake (1), Himayatsagar (1), Hitkasa Tailing Lake (1), Hussainsagar (1), IIT Delhi Lake (1), Jaisamand Lake (3), Jal Mahal Lake (1), Janunia Talav (1), Jet Sagar Lake (1), Kali Sindh Reservoir (1), Kankoria Lake (1), Kalyana Lake (1), Karwa Dam (1), Kawar Lake (1), Kayamkula Lake (1), Khandari Reservoir (1), Khaziar Lake (1), Koch Bihar Lake (1), Kodaikanal (1), Kodumgallor Lake (1), Kondacharala-Aava Lake (1), Kuwadava Lake (1), Lakhota Talav (1), Lakshminarayan Baridigh (1), Langarhouse Lake (1), Laxminarayana Chevuru (1), Lodha Talab (1), Loktak Lake (4), Lower Lake (1), Machhu- II Reservoir (1), Madhav Lake (1), Malav Lake (1), Malampuzha Reservoir (1), Mansar Lake (2), Mayem Lake (1), Mer Beel (1), Miralam Lake (1), Mirikh Lake (1), Moonsar Lake (1), Moti Jheel (1), Moticher Lake (1), Multai Lake (1), Nadiad City Lake (1), Nagchun Lake (1), Naini Lake (1), Nakki Lake (1), Nalsarovar (1), Narsimehta Talav (1), Noor Md. Kunta (1), Oruvathikotta Lake (1), Osteri Lake (1), Pangong Lake (1), Panzilla Lake (1), Paravur Lake (1), Pazhassi Reservoir (1), Periat Tank (1), Periyar Lake (1), Pichola Lake (1), Pongdam Lake (1), Pookotekayal Lake (1), Poondi Lake (1), Porur Lake (1), Pudumpukhri (1), Pulicate Lake (2), Pumlun Lake (1), Punnamadakayal Lake (1), Pushkar Lake (1), Rabindrasarovar (1), Raia Lake (1), Rajsamand Lake (2), Ramappa Lake (1), Ramgarh Lake -Uttarpradesh (1), Ranchi Lake (1), Ranjit Sagar Reservoir (1), Ranjitnagar Talav (1), Redd Hills Lake (1), Renuka Lake (1), Riwalkar Lake (1), Rudrasagar (1), Rumder Lake (1), Safilguda Lake (1), Sahastirling Sarovar (1), Saheb Bandh (1), Saipem Lake (1), Salaulim Lake (1), Samarpur Lake (1), Sanjay Lake (1), S aroornagar Lake (1), Sasthamcotta Lake (1), Shahpura Lake (1), Shameerpet Lake (1), Siliserh Lake (1), Sinchal Lake (1),

Sirpur Talav (1), Sohna Lake (1), Sukhna Lake (2), Sultanpur Lake (1), Surinsar Lake (2), Sursagar Lake (1), Tarkeshwar Lake (3), Tasek Lake (1), Thadlaskena Lake (1), Topchachi Lake (1), Tsomoriri Lake (1), Udaisagar Lake (1), Udthagamadalalam Lake (1), Ulsoor Lake (1), Umiam Lake (4), Upper Lake (4), Veeranam Lake (1), Vellayani Lake (1), Vembanad Lake (2), Vheraimata Talav (1), Ward Lake (1), Wuller Lake (5), Yashwant Sagar (1) and Yercaud Lake (1).

The tanks being monitoring are Bibinagar Tank (1), Chinna Waddepally Tank (1), Dharmasagar Tank (1), Gandhigudum Tank (1), Goysagar Tank (1), Kajipally Tank (1), Kistaraddypet Tank (1), Mallapur Tank (1), Premajipet Tank (1), Saki Tank (1), Thol Tank (1) and Waddepally Tank (1) and ponds are Amber Chevuru (1), Asani Kunta (1), Baskandi Pond (1), Bhadrakali Chevuru (1), Bindusagar (1), Bishnu Pushkar Pukhuri (1), Bor Beel (1), Bor Pukhuri (1), Botodrava Pond (1), Brahma Kund (1), Chanam Pukhuri (1), Chand Dubi Beel (1), Deepar Beel (1), Dhudia Talav (1), Dighali Pukhuri (1), Durgam Chevru (1), Durgiana Temple Sarovar (1), Elangabeel System Pond (1), Galabeel (1), Ganga Pukhuri (1), Gaurisagar Pond (1), Gopur Tank (1), Hanuman Tal (1), Harmandir Saheb Sarovar (1), Hiramam Pukhuri (1), Hordai Pukhuri (1), Indradyumna Pond (1), Jagannath Dighi (1), Jaipal Pukhuri (1), Kakwa Pond (1), Kalyan Sagar (1), Kapra Chevuru (1), Kongba Pond (1), Lakshadweep Pond (1), Lakoda Pond (1), Lalambung Pond (1), Lamjao Pukhuri (1), Langmeidong Pukhuri (2), Laxmi Pond (1), Lilong Pukhuri (1), Maahil Pond (1), Mahadeb Dighi (1), Mahamaya Mandir Pukhuri (1), Maibam Pond (1), Mananchira Pond (1), Markanda Pokhari (1), Mitha Talab (1), Moidangpok Pond (1), Moti Talab (1), Nalla Chevuru (1), Narendra Pokhari (1), Nehru Nagar Talab (1), Ngairangbam Pond (1), Ningthem Pukhuri (1), Olpad Village Pond (1), Padmanabha Swamy Temple Pond (1), Padum Pukhuri (1), Parvatisagar (1), Pedda Chevuru (1), Pipliya Pala Talab (1), Pragathinagar Chevuru (1), Raja Pukhuri (1), Rajadinia Pukhuri (1), Rajmaw Pukhuri (1), Rangadhamuni Chevuru (1), Rani Talab (1), Ranital Talab (1), Rihand Sarovar (1), Sai Chevuru (1), Santokh Singh Gurudwara Sarovar (1), Saranbeel (1), Shipahijala Pond (1), Shiv Ganga Pond (1), Sivasagar Tank (1), Subhagya Kund (1), Suraj Kund (1), Swetaganga Pond (1) and Tighi Talab (1). The number of monitoring locations on each lake is given in parenthesis.

The ranges of water quality observed in these water bodies with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate, Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

19.2 Water Quality of Lakes, Tanks and Ponds in Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry and Goa

The respective State Pollution Control Boards and Pollution Control Committee in Pondicherry carry out the water quality monitoring of Lakes, Tanks and Ponds in Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Pondicherry and Goa.

DO varies from 0.4 mg/l to 14.3 mg/l. Lakes, Ponds and Tanks having very low DO and not meeting the water quality criteria limits are Nalla Chevuru (0.4 mg/l), Mallapur Tank (0.5 mg/l), Durgam Chevuru (0.6 mg/l), Laxminarayana Chevuru, Miralam Lake & Pedda Chevuru (0.8 mg/l), Hussain Sagar Lake (0.9 mg/l), Sai Chevuru (1.5 mg/l), Kistareddypet Tank (2.0 mg/l), Noor Md. Kunta (2.1 mg/l), Gandigudem Tank (3.2 mg/l), Saroonagar Lake (3.3 mg/l), Pulicate Lake (3.5 mg/l) & Bibinagar Tank (3.8 mg/l) in Andhra Pradesh; Udhagamadalem Lake (2.5 mg/l) & Pulicate Lake (3.7 mg/l) in Tamil Nadu and Oruvathilkotta Lake (2.8 mg/l) in Kerala.

Lakes, Ponds and Tanks with high conductivity and is not meeting the water quality criteria are Pulicate Lake (55200 $\mu\text{mhos/cm}$) in Tamil Nadu; Pulicate Lake (53400 $\mu\text{mhos/cm}$), Sai Chevuru (19550 $\mu\text{mhos/cm}$), Asani Kunta (18150 $\mu\text{mhos/cm}$), Kajipally Tank (11180 $\mu\text{mhos/cm}$), Premajipet Tank (7444 $\mu\text{mhos/cm}$), Kistareddypet Tank (5360 $\mu\text{mhos/cm}$), Pedda Chevuru (3800 $\mu\text{mhos/cm}$), Gandigudem Tank (3260 $\mu\text{mhos/cm}$) & Noor Md. Kunta (2801 $\mu\text{mhos/cm}$) in Andhra Pradesh and Vembanadu Lake (48000 $\mu\text{mhos/cm}$), Ashthamudi Lake (42250 $\mu\text{mhos/cm}$), Kayamkulam Lake (42000 $\mu\text{mhos/cm}$), Paravur Lake (30780 $\mu\text{mhos/cm}$), Kodungalloor Lake (29000 $\mu\text{mhos/cm}$) & Oruvathilkotta Lake (2500 $\mu\text{mhos/cm}$) in Kerala.

BOD is observed in the range of 0.1 mg/l to 320 mg/l. Lakes, Ponds and Tanks with high concentration of organic matter and not complying to the standard limits for BOD are Asani Kunta (320.0 mg/l), Saroonagar Lake (136.0 mg/l), Kajipally Tank (115.0 mg/l), Pedda Chevuru (85.0 mg/l), Durgam Chevuru (80.0 mg/l), Mallapur Tank (70.0 mg/l), Nalla Chevuru (66.0 mg/l), Hussain Sagar Lake (58.0 mg/l), Noor Md. Kunta (43.0 mg/l), Premajipet Tank (39.0 mg/l), Laxminarayana Chevuru (37.0 mg/l), Miralam Lake (26.0 mg/l), Sai Chevuru (25.0 mg/l), Kistareddypet Tank (24.0 mg/l), Gandigudem Tank (12.0 mg/l), Bhadrakali Chevuru (7.2 mg/l), Himayat Sagar Lake (7.0 mg/l), Dharmasagar Tank (6.2 mg/l) & Bibinagar Tank (4.6 mg/l) in Andhra Pradesh; Ulsoor Lake (43.0 mg/l) & Heballa Valley Lake (8.0 mg/l) in Karnataka; Udhagamadalem Lake (20.6 mg/l), Kodai Kanal Lake (12.7 mg/l), Pulicate Lake (8.0 mg/l), Porur Lake (7.0 mg/l) & Veeranam Lake (3.9 mg/l) in Tamil Nadu; Salaulim Lake (6.3 mg/l) & Mayem Lake (4.2 mg/l) in Goa and Ashthamudi Lake (5.9 mg/l), Padmanabha Swamy Temple Pond (4.8 mg/l), Oruvathilkotta Lake (4.4 mg/l), Punnamada Kayal Lake (3.3 mg/l), Kayamkulam Lake (3.3 mg/l) & Kodungalloor Lake (3.2 mg/l) in Kerala.

The water quality of Lakes, Ponds and Tanks in respective states is meeting the water quality criteria with respect to Total Coliform and Fecal Coliform except in Bhadrakali Chevuru (92000 & 35000 MPN/100ml) in Andhra Pradesh; Heballa Valley Lake (16000 & 5400 MPN/100ml) and Vembanadu Lake (6000 & 3500 MPN/100ml) in Kerala; Redd Hills Lake (16000 & 9000 MPN/100ml) and Poondi Lake (13000 & 8000 MPN/100ml) in Tamil Nadu where TC & FC are observed higher than the desired criteria. The concentration of Nitrate (NO_3^-)

varies from 0.0 to 82.0 mg/l whereas the highest value is observed in Asani Kunta at Medak in Andhra Pradesh. The water quality status of Lakes, Tanks and Ponds in Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Pondicherry and Goa is presented in Annexure-I Table 19.1.

19.3 Water Quality of Lakes & Ponds in Gujarat, Madhya Pradesh and Rajasthan

The respective State Pollution Control Boards carry out the water quality monitoring of Lakes and Ponds in Gujarat, Madhya Pradesh and Rajasthan. DO varies from 1.2 to 11.3 mg/l with minimum at Pushkar Lake (1.2 mg/l), Jaisamand Lake, Lodha Talab & Jalmahal Lake (1.8 mg/l), Siliserh Lake (2.0 mg/l), Nakki Lake (2.3 mg/l), Jet Sagar Lake (2.7 mg/l) & Udaisagar Lake (3.2 mg/l) in Rajasthan and Sursagar Lake (3.2 mg/l) & City Lake (3.3 mg/l) in Gujarat.

BOD is observed in the range of 0.0 mg/l to 27 mg/l with maximum at Gape Sagar Lake (27 mg/l) in Rajasthan. Other Lakes and Tanks having high BOD and not meeting the standard of BOD are Jaisamand Lake (26.5 mg/l); Siliserh Lake (23.0 mg/l); Jalmahal Lake (14.0 mg/l); Lodha Talab (12.8 mg/l); Pushkar Lake (9.5 mg/l); Udaisagar Lake (7.8 mg/l); Jet Sagar Lake (4.1 mg/l); Nakki Lake (3.8 mg/l) and Fateh Sagar Lake (3.4 mg/l) in Rajasthan; Sursagar Lake (12.0 mg/l); City Lake (10.0 mg/l); Narsimehta Lake (8.0 mg/l); Ajwah Lake (5.0 mg/l) and Nalsarovar (4.0 mg/l) in Gujarat and Shahpura Lake (8.5 mg/l); Upper Lake at Karbala Talab (5.5 mg/l), Yatch Club (4.5 mg/l), Bairagarh Club (4.5 mg/l) & Intake Point Bhopal (4.1 mg/l); Lower Lake (4.5 mg/l); Govindgarh Lake (4.3 mg/l); Janunia Talab (4.3 mg/l); Periat Lake (3.6 mg/l) and Kerwa Dam (3.1 mg/l) in Madhya Pradesh.

The water quality of Lakes and tanks in respective states is meeting the water quality criteria with respect to Total Coliform and Faecal Coliform at most of the locations except in Moticher Lake (24000 & 4300 MPN/100ml) in Gujarat. The concentration of Nitrate (NO_3^-) varies from Nil to 4.41 mg/l. The water quality status of Lakes & Ponds in Gujarat, Madhya Pradesh and Rajasthan is presented in Annexure-I Table 19.2.

19.4 Water Quality of Lakes & Ponds in Haryana, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh and Uttarakhand

The respective State Pollution Control Boards carry out the water quality monitoring of Lakes and Ponds in Haryana, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh and Uttarakhand.

All the lakes and ponds monitored are meeting the required level of water quality criteria in respect of DO, pH and conductivity at most of the locations except DO in Laxmi Pond (0.0 mg/l) & Maahil Pond (3.6 mg/l) in Uttar Pradesh; Riwersar Lake (0.8 mg/l) & Khaziar Lake (1.1 mg/l) in Himachal Pradesh and Mansar Lake

(1.9 mg/l) & Surinsar Lake (2.2 mg/l) in Jammu & Kashmir and Conductivity in Maahil Pond (2716 μ mhos/cm) in Uttar Pradesh. BOD is observed in the range of 0.3 mg/l to 22 mg/l with highest in Laxmi Pond (22.0 mg/l in Uttar Pradesh. All Lakes & Ponds are exceeding the desired water quality criteria with respect to BOD except Dal Lake in Jammu & Kashmir; Brahmisarovar Lake in Haryana and Gobindsarovar Lake in Himachal Pradesh. The Total Coliform and Faecal Coliform varies from 14 to 92,000 MPN/100ml and 1 to 30,000 MPN/100ml respectively. Lakes & ponds having TC and FC more than the desired criteria are Laxmi Pond (92,000 & 17,000 MPN/100ml), Maahil Pond (35,000 & 4700 MPN/100ml) & Samarpur Jheel (8100 & 6300 MPN/100ml) in Uttar Pradesh and Harike Lake (50,000 & 30,000 MPN/100ml) in Punjab. The water quality status of Lakes and Ponds in Haryana, Chandigarh, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh and Uttarakhand is presented in Annexure-I Table 19.3.

19.5 Water Quality of Lakes, Tanks & Ponds in Assam, Manipur, Meghalaya and Tripura

The respective State Pollution Control Boards carry out the water quality monitoring of Lakes, Tanks & Ponds in Assam, Manipur, Meghalaya and Tripura.

DO varies from 0.4 mg/l to 16.0 mg/l. The high values of DO in Subhagya Kunda Pond in Assam indicate that these ponds are septic or eutrophicated. DO is observed lower than the desired criteria in Elangabeel System Pond (0.4 mg/l), Bor Beel (3.3 mg/l), Botodriya Satra Pond & Hardoi Pukhuri (3.4 mg/l), Sivasagar Pond (3.5 mg/l), Goysagar Tank (3.6 mg/l) & Gaurisagar Tank (3.9 mg/l) in Assam and Lilong Pukhuri (2.9 mg/l), Kongba Bazar Pond (3.0 mg/l), Kakwa Bazar Pond (3.1 mg/l), Lalambung Pond & Chanam Pukhuri (3.2 mg/l), Moidangpok Pond (3.6 mg/l), Langmeidong Pukhuri & Hiranmei Pukhuri (3.7 mg/l), Maibam Lokpaching Pond & Nangthem Pukhuri (3.8 mg/l) & Lamjao Pukhuri (3.9 mg/l) in Manipur whereas all other locations monitored are meeting the required level of DO. Conductivity is observed higher than the water quality criteria at Elangabeel system pond (2740 μ mhos/cm) in Assam.

BOD is observed in the range of 0.4 mg/l to 50 mg/l. Lakes, Ponds and Tanks having BOD more than criteria are Elangabeel System Pond (50.0 mg/l), Subhagya Kunda Pond (12.0 mg/l), Bor Pukhuri (11.6 mg/l), Padum Pukhuri & Dighali Pukhuri (11.0 mg/l), Bishnu Puskar Pukhuri (8.8 mg/l), Deepar Beel (8.2 mg/l), Rajadinia Pukhuri (8.0 mg/l), Botodriya Satra Pond (7.8 mg/l), Ganga Pukhuri (6.8 mg/l), Bor Beel (6.7 mg/l), Jaipal Pukhuri (6.2 mg/l), Saran Beel (6.1 mg/l), Raja Pukhuri (5.2 mg/l), Mahamaya Mandir Pukhuri (5.0 mg/l), Gala Beel (4.8 mg/l), Gophur Pond (4.6 mg/l), Gaurisagar Pond (4.5 mg/l), Daloni Beel, Baskandi Pond & Hordai Pukhuri (4.2 mg/l), Rajmaw Pukhuri (4.0 mg/l), Mer Beel (3.8 mg/l) & Goysagar Tank (3.4 mg/l) in Assam; Kongba Bazar Pond (29.8 mg/l), Kakwa Bazar Pond (5.8 mg/l), Pumlen Lake & Lamjao Pukhuri (4.3 mg/l), Langmeidong Pukhuri (4.2 mg/l) & Ngairangbam Pond (4.0 mg/l) in Manipur; Umiam Lake (12.0 mg/l) & Ward Lake (9.0 mg/l) in Meghalaya and Laxmi

Narayan Bari (3.8 mg/l) & Rudrasagar (3.4 mg/l) in Tripura. The water quality of Lakes, Tanks and Ponds in respective states is meeting the water quality criteria with respect to Total Coliform and Faecal Coliform except Total Coliform in Ganga Pukhuri (21000 MPN/100ml) in Assam and Faecal Coliform in Umiam Lake (3800 MPN/100ml) & Ward Lake (3500 MPN/100ml) in Meghalaya. The water quality status of Lakes, Tanks and Ponds in Assam, Manipur, Meghalaya and Tripura is presented in Annexure-I Table 19.4.

19.6 Water Quality of Lakes and Ponds in Bihar, Jharkhand, Orissa and West Bengal

The respective State Pollution Control Boards carry out the water quality monitoring of Lakes and Ponds in Bihar, Jharkhand, Orissa and West Bengal.

DO varies from 2.9 mg/l to 20.9 mg/l. The high values of DO observed in Tarkeshwar Lake at Hanuman Ghat (20.9 mg/l), Hathishala Ghat (17.9 mg/l) & Mainh Ghat (17.5 mg/l) in West Bengal and Narendra Pokhari (20.6 mg/l), Swetaganga Pond (19.9 mg/l), Markanda Pokhari (17.9 mg/l), Bindusagar Pond (15.3 mg/l) & Indradyumna Pond (15.0 mg/l) in Orissa. DO is observed lower than the desired criteria in Parvati Sagar (2.9 mg/l) in Orissa; Dimna Lake (3.3 mg/l) in Jharkhand and Rabindrasarovar (3.6 mg/l) in West Bengal whereas all other locations monitored are meeting the required level of DO. Conductivity is observed higher than the water quality criteria at Chilka Lake in Orissa (48,010 μ mhos/cm).

BOD is observed in the range of 0.2 mg/l to 190 mg/l. BOD is observed higher than the criteria at all the locations except in Tighi Talab in Bihar and Dimna Lake & Topchachi Lake in Jharkhand. The water quality of Lakes, Tanks and Ponds in respective states is exceeding the water quality criteria with respect to Total Coliform and Faecal Coliform except Chilka Lake in Orissa and Ranchi Lake, Dimna Lake & Topchachi Lake in Jharkhand. The water quality status of Lakes and Ponds in Bihar, Jharkhand, Orissa and West Bengal is presented in Annexure-I Table 19.5.

CHAPTER XX

Assessment of Groundwater Quality

20.1 Ground Water Quality Monitoring

The groundwater occurrence and availability is largely governed by the state of cementation and compaction of the formation, which control the pore volume. The geological formations encountered in the country may be broadly divided into three categories-the unconsolidated, the semi-consolidated and the consolidated. In India a sizable proportion of population is dependent upon ground water for drinking and other household utilities besides its use in irrigation at large. Due to limited cost effective treatment options for polluted ground water, the affected resource is generally lost for drinking and other utilities.

20.2 State wise Groundwater Quality Monitoring

To assess the problem of groundwater quality deterioration, network of groundwater quality monitoring is extended to 807 locations. The State-wise number of groundwater monitoring locations is given below.

Table 20.1: State wise Distribution of Groundwater Monitoring Stations

State	Well
ANDHRA PRADESH	32
ASSAM	32
BIHAR	70
CHANDIGARH	7
CHHATISSGARH	8
DAMAN, DIU, DADRA AND NAGAR HAVELI	12
DELHI	70
GOA	10
GUJARAT	83
HIMACHAL PRADESH	41
JAMMU & KASHMIR	12
KERALA	34
LAKSHDWEEP	15
MADHYA PRADESH	32
MAHARASHTRA	50
MANIPUR	10
MEGHALAYA	7
MIZORAM	2
NAGALAND	10
ORISSA	15
PONDICHERRY	15
PUNJAB	22
RAJASTHAN	87
TAMIL NADU	2
TRIPURA	21
UTTAR PRADESH	40
UTTRAKHAND	19
WEST BENGAL	49
Total	807

The ranges of water quality observed in groundwater with respect to Temperature, pH, DO, Conductivity, BOD, Nitrate +Nitrite, Total Coliform (TC) and Faecal Coliform (FC) are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year.

20.3 Status of Ground Water Quality in Andhra Pradesh

The water quality monitoring of ground water in Andhra Pradesh is carried out by Andhra Pradesh Pollution Control Board. pH of groundwater is observed in the range of 6.9-8.3. Conductivity varies from 211-6995 $\mu\text{mhos/cm}$ and is meeting the criteria limit for drinking as well as irrigation purposes except few locations viz. Bore well at Panchayat office Bollaram (V), Medak (6995 $\mu\text{mhos/cm}$), near Rama Temple, Vishakhapatnam (3616 $\mu\text{mhos/cm}$), bore well east of Saicheuvu, Paidipally (V) Warangal (3568 $\mu\text{mhos/cm}$), bore well near CKM college Warangal (2749 $\mu\text{mhos/cm}$), bore well at Kurnool (2391 $\mu\text{mhos/cm}$). Fluoride concentration in the ground water range from 0.2-2.15 mg/l, high value of Fluoride is observed at B/W – Swarnamukhi river, Srikalahasti, Chittoor dist (2.15 mg/ l); B/W Manakondur (V), Karimnagar (1.93 mg/ l); B/W Paidipally (V), Warangal (1.84 mg/ l); B/W near Tungbhadra river, Kurnool (1.64 mg/ l); O/W near ashponds of NTPC, Kundanpally, Ramagundam(1.61 mg/ l); B/W near CKM College; Warangal dist (1.51 mg/ l). The quality of ground water in Andhra Pradesh is presented in Annexure-I Table 20.1.

20.4 Status of Ground Water Quality in Assam

The water quality monitoring of ground water in Assam is carried out by respective State Pollution Control Board. pH of groundwater is observed in the range of 5.25-7.05 and observed below 6.5 at Kabri Angolong, Ledo Margherita, Numaligarh, HS School, Kokrajhar, Goalpara, Hialakandi, Tinsukia dist in Assam. Fluoride concentration is observed in the range of 0.26 – 1.0 mg/ l. The quality of ground water in Assam is presented in Annexure-I Table 20.2.

20.5 Status of Ground Water Quality in Manipur, Tripura and Meghalaya

The water quality monitoring of ground water in Manipur, Tripura and Meghalaya is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 5.0-7.9 and observed below the criteria at Mawlai, Shillong (5.0) and Shangpung (5.8) in Meghalaya. Conductivity varies from 59-348 $\mu\text{mhos/cm}$ and is meeting the criteria limit for drinking as well as irrigation purposes. BOD is not meeting the criteria at Mawlai, Shillong (4.0 mg/l) in Meghalaya. Fluoride concentration is observed in the range of 0.03-0.1 mg/ l. The quality of ground water in Manipur, Tripura and Meghalaya is presented in Annexure-I Table 20.3.

20.6 Status of Ground Water Quality in Chhattisgarh and Madhya Pradesh

The water quality monitoring of groundwater in Chhattisgarh and Madhya Pradesh is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 7.3-8.2 and meet the water quality criteria. Conductivity varies from 340-2182 $\mu\text{mhos/cm}$. BOD and Total Coliform are meeting the desired criteria at all the locations. Fluoride concentration in ground water is observed in the range 0.05- 0.3 mg/ l. The quality of ground water in Chattisgarh and Madhya Pradesh is presented in Annexure-I Table 20.4.

20.7 Status of Ground Water Quality in Himachal Pradesh and Chandigarh

The water quality monitoring of ground water in Himachal Pradesh and Chandigarh is carried out by respective State Pollution Control Board and Chandigarh Pollution Control Committee. pH of groundwater is observed in the range of 6.6-8.9, pH value 8.9 is observed at hand pump at Recongpeo. Conductivity varies from 226-1409 $\mu\text{mhos/cm}$. Total Coliform is meeting the desired criteria at all the locations. Fluoride concentration is observed in the range of 0.03- 0.74 mg/ l. The quality of ground water in Himachal Pradesh and Chandigarh is presented in Annexure-I Table 20.5.

20.8 Status of Ground Water Quality in Jammu and Kashmir

The water quality monitoring of ground water in Jammu and Kashmir is carried out by respective Jammu and Kashmir Pollution Control Board. pH of groundwater is observed in the range of 6.1-9.4. pH value 9.4 is observed at R.S. Pura, Tehsil. Conductivity varies from 106-2000 $\mu\text{mhos/cm}$. The quality of ground water in Jammu and Kashmir is presented in Annexure-I Table 20.6.

20.9 Status of Ground Water Quality in Kerala

The water quality monitoring of ground water in Kerala is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 5.1-7.6 and does not meet the water quality criteria at few locations such as Vadavathoor- Kottayam (6.4); well at Eloor (6.3), Nedumangad in Thiruvananthapuram (6.2); Punkunnam Trissur Distt (6.1), Malapuram (6.1), Laloor in Thrissur (5.9); well at Punalur (5.4), Chellora Trenching ground, (5.3); Ollur in Thrissur (5.3), Kannur (5.2), Pappanamkode, (5.1); Nedumangad, Thiruvananthapuram (4.5). Conductivity varies from 54-891 $\mu\text{mhos/cm}$. BOD and Total Coliform is meeting the desired criteria at all the locations. Fluoride concentration is observed in the range of 0.005- 0.22 mg/ l. The quality of ground water in Kerala is presented in Annexure-I Table 20.7.

20.10 Status of Ground Water Quality in Tamil Nadu and Pondicherry

The State Pollution Control Board/ Pollution Control Committee carry out the water quality monitoring of ground water in Pondicherry and Tamil nadu. pH of groundwater is observed in the range of 6.0-8.5, pH value 6.0 is observed at Karuvadikuppam, 6.1 at Kalapet, Pondicherry Univ, 6.4 at Thengaithittu area Pondicherry, 6.4 at Kurumbapet. Conductivity varies from 143-3417 $\mu\text{mhos/cm}$. Conductivity 3417 $\mu\text{mhos/cm}$ is observed at Muthiyalpet area Pondicherry. BOD is observed meeting the desired criteria. Nitrate is observed in the range of 0.05-0.55 mg/l. The quality of ground water in Tamil nadu and Pondicherry is presented in Annexure-I Table 20.8.

20.11 Status of Ground Water Quality in Daman and Dadra Nagar Haveli

The water quality monitoring of ground water in Daman is carried out by respective Pollution Control Committees. pH of groundwater is observed in the range of 7.0-7.5 and meeting the water quality criteria at all monitoring locations. Conductivity varies from 515-2506 $\mu\text{mhos/cm}$ and is meeting the desired criteria at all locations except at village Dadra (2506 $\mu\text{mhos/cm}$). BOD is observed high at all the locations and is observed in the range of 6-8 mg/l. nitrate is observed in the range of 0.3 – 5.1 mg/l. Fluoride concentration is observed in the range of 0.01- 0.66 mg/ l The quality of ground water in Daman and Dadra Nagar Haveli, is presented in Annexure-I Table 20.9.

20.12 Status of Ground Water Quality in Maharashtra and Goa

The water quality monitoring of ground water in Maharashtra and Goa is carried out by respective Pollution Control Board. pH of groundwater is observed in the range of 5.8-8.6 in the state of Maharashtra and pH ranges from 5.1-6.5 in Goa, and Maharashtra and is not meeting the water quality criteria at well at Kudai Industrial estate (5.8), at Zuari Nagar (5.9), at Verna Indl estate (6.2), at Pilerne Indl estate (6.2), at Sancoale industrial estate (6.3); well at Korlim Industrial estate (6.3). Conductivity varies from 50-5670 $\mu\text{mhos/cm}$ and is meeting the desired criteria at all locations except at Malegaon, Taluka- Barmati (5670 $\mu\text{mhos/cm}$); bore well at Katpur near Z.P. School (4970 $\mu\text{mhos/cm}$); Savali in Sangli (4405 $\mu\text{mhos/cm}$); Rasulwadi- Sambarwadi in Sangli (4306 $\mu\text{mhos/cm}$); Wahegaon, Zila Parishad School (3885 $\mu\text{mhos/cm}$); dug well at Sakharali, vill Sakharali (3819 $\mu\text{mhos/cm}$). BOD is observed high at MSW site at Raipur (23 mg/l); dug well at Gunjalwadi (10.0 mg/l); Burudgaon (9.0 mg/l); Sangersa in Gondia (7.0 mg/l); Koradi (7.0 mg/l); Brahamni , Kamleshwar, Nagpur (7.0 mg/ l); Mira Bhayander (5.0 mg/l); MSW site, Sangersa, Gondia (7.0 mg/l); Bhandewari, Nagpur (7.0 mg/ l); bore well at Rasegaon (6.0 mg/ l); dug well near Wardha city railway station (6.0 mg/ l); Khapargeda , Nagpur (6.0 mg/ l); Taloja-Raigad; (5.0 mg/ l); MSW site, Pathardi Nasik (5.0 mg/l); Gangapur, Aurangabad (5.0 mg/l); Taluka-Solapur (5.0 mg/l); Taluka- Tumsar (5.0 mg/ l); Taluka-Ballarpur (5.0 mg/ l); Shinde village (5.0 mg/ l); Mira –Bhayander (5.0 mg/ l); Village Naregaon, Taluka- Aurangabad (4.0 mg/ l), village Wahagaon, Taluka-

Paithan (4.0 mg/ l), TPS Durgapur (4.0 mg/ l); taluka-Shirur (4.0 mg/ l); Taluka-Mohul (4.0 mg/ l); bore well at Katpur (4.0mg/ l); Sawargaon, Yavatmal (4.0 mg/ l); Dug well at Ranjangaon (4.0 mg/l). The concentration of Nitrate is observed in the range of 0.1 – 23.5 mg/l. Fluoride concentration is observed in the range of 0.03- 1.82 mg/ l. high concentration of Fluoride is observed at B/W at Katpur near J P School (1.81 mg/ l); B/W at Bahe railway station, Dahegaon vill (1.8 mg/ l); B/W near Chincholi vill, Solapur dist (1.8 mg/ l); B/W at Shate Vasti, Tuljapur vill, Solapur dist. (1.6 mg/ l). The quality of ground water in Maharashtra and Goa is presented in Annexure-I Table 20.10.

20.13 Status of Ground Water Quality in Gujarat

The water quality monitoring of ground water in Gujarat is carried out by Gujarat Pollution Control Board. pH of groundwater is observed in the range of 7.6-8.4 in the state of Gujarat. Conductivity varies from 546-12018 μ mhos/cm and is meeting the desired criteria at all locations except well at Pandesara, Industrial (12018 μ mhos/cm); Sachin GIDC (11213 μ mhos/cm); Olpad (8406 μ mhos/cm), water works of Navsari near Dhudia Talav (3542 μ mhos/cm); Vadodara (Indl-Nandesari) (2590 μ mhos/cm). BOD is observed in the range of 1.0 – 3.0 mg/l. Fluoride concentration is observed in the range of 0.005- 1.15 mg/ l. The value 1.15 mg/l of Fluoride is observed at Junagadh. The quality of ground water in Gujarat is presented in Annexure-I Table 20.11.

20.14 Status of Ground Water Quality in Rajasthan

The water quality monitoring of ground water in Rajasthan is carried out by State Pollution Control Board. pH of groundwater is observed in the range of 6.7-8.6 and is meeting the water quality criteria all locations except at well at 1 km Jodhpur town (8.6). The conductivity varies from 685-21,500 μ mhos/cm and is not meeting the desired criteria at well at Balotra (21,500 μ mhos/cm) ; well at Sangaria, Jodhpur (18,300 μ mhos/cm); well at village Nandwan, Jodhpur (14,200 μ mhos/cm); well at Sakrana Bera, Balotra (13200 μ mhos/cm); well U/s 1 km from Jodhpur Town (12100 μ mhos/cm); well near Bandi river bridge Pali (11,650 μ mhos/cm); tube well of Girdhari Lal, Bhituja (10,100 μ mhos/cm); well of Pema Ram mali, Bhituja (9,600 μ mhos/cm); well of bhik singh, Sakrana Bera, Balotra (9,450 μ mhos/cm); Sh Pol Singh Purohit, Pali (8,850 μ mhos/cm); CWR of PHED, Bhituja (8,150 μ mhos/cm); well of Loomji Choudhary, Pali town (u/s1 km from Plai town (6600 μ mhos/cm);well of Bilma Ram Patel, Salawas, Jodhpur (5,400 μ mhos/cm); Near Khanpura Talab, Ajmer (5100 μ mhos/cm); Village Vinayakia, Jodhpur (Hukum Singh Rathore (4500 μ mhos/cm); well at Birja Ram, Khetri Nagar, Jhunjhunu (4350 μ mhos/cm);well at Bhura Ram, Khetri Nagar, Jhunjhunu (4200 μ mhos/cm); opp Private Bus stand, Ajmer well at Bhura Ram, Khetri Nagar, Jhunjhunu (3950 μ mhos/cm); well in front of Singhania Police station (3850 μ mhos/cm);bore well of Rajasthan Housing Board, Bhiwadi (3300 μ mhos/cm); RICO tube well, Ria, Shahjanpur (3280 μ mhos/cm);bore well of Sh. Umesh Kumar, Bhutija (3200 μ mhos/cm); Sh. Girdhari Singh Raj Purohit, vill

Punyata (2820 $\mu\text{mhos/cm}$); village Bager- Meo, Tehsil Ramgarh, Alwar (2530 $\mu\text{mhos/cm}$); near Shri Kalyaneshwar temple, Jaisingh Pura, Khurd, Jaipur (2450 $\mu\text{mhos/cm}$); near Aloo factory Kacchi Basti, Sardarpura, (2350 $\mu\text{mhos/cm}$); Udaipur tube well of M/s Parihar Industries, Jasol (2300 $\mu\text{mhos/cm}$); new Fatehpura, Udaipur (2300 $\mu\text{mhos/cm}$). BOD is observed in the range of 0.0-21.0 mg/l and the locations having BOD more than the criteria are well (U/s 1 km. from Pali Town (21 mg/l), village Vinayakia, Jodhpur (Hira Lal Kumhar) (8.0 mg/l). Total Coliforms are meeting the desired criteria at all the locations. Fluoride concentration is observed in the range of 0.47 – 2.96 mg/ l. High values of Fluoride is observed at Sh Bhana Ram Kalal, Dharu Nagar, vill Mandia (2.96 mg/ l); well of Chand Ram Dewra, vill Sangaria, Jodhpur (2.12 mg/l); well of Loom Ji Chaudhary near Nayagaon, Pali town (1.58 mg/ l) ; well of Birma Ram Patel, Salawas, Jodhpur (1.56 mg/ l). The quality of ground water in Rajasthan is presented in Annexure-I Table 20.12.

20.15 Status of Ground Water Quality in Uttar Pradesh and Uttarakhand

The ground water quality monitoring in Uttar Pradesh and Uttarakhand is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 6.4-8.1 and the value of 6.4 is observed at Kanoria Chemicals, Sonbhadra. Conductivity varies from 225-3163 $\mu\text{mhos/cm}$ and is not meeting the water quality criteria at Site2 indl area nr Amin Sons, Unnao and at Bus stand Unnao (2605 $\mu\text{mhos/cm}$). BOD observed high at Sardar-nagar (5.0 mg/l); Captain Ganj (4.0 mg/l) in Uttar Pradesh. Total Coliform is meeting the desired criteria. Fluoride concentration is observed in the range of 0.3- 2.95 mg/ l. High values of Fluoride is observed at Jajmau Indl area (2.95 mg/ l); at Roadways Bus station, Unnao (2.45 mg/ l); Magawara Indl area, M/s Jamjam Tanneries, Unnao (2.1 mg/ l); hand pump in Sarowani block, Rae Bareilly (1.88 mg/ l); site 2 indl area M/s Amin sons, Unnao (1.8 mg/ l); site I indl area M/s Woodwarm Chemical Ltd, Unnao (1.6 mg/ l). The quality of ground water in Uttar Pradesh and Uttarakhand is presented in Annexure-I Table 20.13.

20.16 Status of Ground Water Quality in Orissa

State Pollution Control Board carries out the water quality monitoring of ground water in Orissa. pH of groundwater is observed in the range of 6.1-8.1 and meet the water quality criteria except at Kalpana, Laxmi Nagar area, Bhuvneshwar 6.1. Conductivity varies from 120-1396 $\mu\text{mhos/cm}$ and meeting the desired criteria. Fluoride concentration is observed in the range of 0.05- 0.31 mg/ l. The quality of ground water in Orissa is presented in Annexure-I Table 20.14.

20.17 Status of Ground Water Quality in Bihar

State Pollution Control Board carries out the water quality monitoring of ground water in Bihar. pH of groundwater is observed in the range of 7.2 – 8.6 and meet the water quality criteria except at Gaya and well at Gopalganj. Conductivity

varies from 356-1015 $\mu\text{mhos/cm}$ and is meeting the desired criteria. Fluoride concentration is observed in the range of 0.4- 1.0 mg/ l. The quality of ground water in Bihar is presented in Annexure-I Table 20.15.

20.18 Status of Ground Water Quality in West Bengal

State Pollution Control Board carries out the water quality monitoring of ground water in West Bengal. pH of groundwater is observed in the range of 5.9-8.3 and meets the water quality criteria except at Bolpur near Railway station (5.9); SDO office, Bishnupur town (6.4). Conductivity varies from 123-8600 $\mu\text{mhos/cm}$ and meeting the criteria for beneficial uses except at exide ind Haldia (8600 $\mu\text{mhos/cm}$); Amtola on Daimond Harbor Road (5145 $\mu\text{mhos/cm}$); Cossipore North Kolkata (2290 $\mu\text{mhos/cm}$). BOD is observed in the range of 0.0-4.0 mg/l

and the value 4.0 mg/l is observed at Hot Spring at Bakreshwar. Total coliform is meeting the desired criteria at all the locations. Fluoride concentration is observed in the range of 0.03- 14 mg/ l. High values of Fluoride is observed at Hot spring at Bakreshwar (14 mg/ l). The quality of ground water in West Bengal is presented in Annexure-I Table 20.16.

TABLE 4.1 :- WATER QUALITY OF RIVER BEAS - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)								
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean						
WATER QUALITY CRITERIA			> 4 mg/l						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml						< 5000 MPN/100ml					
1001	BEAS AT US MANALI	HIMACHAL PRADESH	2.5	14.0	9.0	8.4	10.3	9.0	7.2	8.0	8.0	68	101	85	0.1	0.3	0.1	0.06	0.42	0.20	0	920	106	11	2400	397						
1002	BEAS AT DS KULLU	HIMACHAL PRADESH	5.6	14.0	10.0	8.0	10.2	9.0	7.1	8.3	8.0	69	165	102	0.2	0.4	0.3	0.04	0.89	0.40	33	350	153	160	2400	954						
1003	BEAS AT DS AUT	HIMACHAL PRADESH	5.0	14.1	11.0	8.2	10.5	9.0	7.3	8.5	8.0	65	178	96	0.1	0.5	0.2	0.04	0.64	0.30	2	140	58	27	2400	653						
1004	BEAS AT US PANDOH DAM	HIMACHAL PRADESH	5.5	18.0	13.0	8.1	10.6	9.0	7.0	8.2	8.0	56	130	94	0.1	0.2	0.2	0.24	0.71	0.40	7	79	34	34	920	317						
1005	BEAS AT EXIT OF TUNNEL DEHAL POWER HOUSE	HIMACHAL PRADESH	5.0	21.0	14.0	7.9	12.0	10.0	7.3	8.4	8.0	56	227	112	0.1	0.4	0.2	0.08	0.69	0.50	23	920	213	160	2400	1072						
1550	UIS MANDI	HIMACHAL PRADESH	8.0	20.0	16.0	7.1	11.1	9.0	7.2	8.7	8.0	66	164	117	0.1	0.4	0.2	0.01	1.39	0.50	17	350	100	220	2400	722						
1006	BEAS AT DS MANDI	HIMACHAL PRADESH	6.5	21.0	16.0	7.8	10.3	9.0	7.4	8.4	8.0	86	220	155	0.2	0.6	0.5	0.08	1.53	0.70	27	920	445	540	2400	1855						
2604	BEAS AT DS JASINGPUR	HIMACHAL PRADESH	8.9	22.0	19.0	7.8	9.0	8.0	7.5	8.7	8.0	97	361	211	0.2	0.8	0.5	0.15	1.48	0.50	4	11	7	22	170	72						
1007	BEAS AT DS ALAMPUR	HIMACHAL PRADESH	20.0	22.0	19.0	8.3	9.1	8.0	8.2	8.9	8.0	130	356	202	1.0	1.0	0.6	0.10	1.18	0.40	6	14	9	94	280	123						
1008	BEAS AT DS DEHRAOPIPUR	HIMACHAL PRADESH	9.0	24.0	19.0	7.5	9.6	8.0	7.1	8.4	8.0	124	638	280	0.1	1.1	0.7	0.00	7.07	1.10	0	21	10	12	540	157						
1009	BEAS AT DS PONG DAM	HIMACHAL PRADESH	14.0	23.0	20.0	5.0	9.9	8.0	7.6	8.3	8.0	141	254	177	0.1	1.1	0.5	0.04	0.61	0.40	2	14	7	8	140	92						
1693	BEAS AT TALWARA HW	PUNJAB	12.0	16.0	15.0	7.4	8.0	8.0	7.2	7.8	8.0	280	290	285	0.2	0.4	0	0.60	1.00	0.80	0	11	3	50	50	50						
1694	UIS PATHANKOT	PUNJAB	18.0	18.0	18.0	6.6	7.8	7.0	7.3	7.9	8.0	310	322	316	0.8	1.2	1	1.00	2.20	1.60	90	100	95	500	500							
1695	UIS PATHANKOT	PUNJAB	10.0	18.0	15.0	6.8	7.6	7.0	6.8	7.5	7.0	303	366	334	0.9	1.5	1	1.00	2.60	2.00	110	300	158	500	900	600						
1010	BEAS AT MIRTHAL BRIDGE, GURDASPUR	PUNJAB	13.0	17.0	15.0	7.2	8.8	8.0	7.2	8.0	8.0	74	303	177	0.2	0.8	0.5	0.04	1.40	0.60	11	110	66	170	1600	662						
1294	BEAS AT 1KM D/S OF EFFL DISH. POINT AT MUKERIAN	PUNJAB	9.0	19.0	14.0	6.7	7.6	7.0	6.5	7.8	7.0	286	366	334	0.4	1.2	1	0.00	1.80	1.00	110	500	370	50	1100	738						
1011	BEAS AT G.T. ROAD UNDER BDG. NEAR KARULI NALA	PUNJAB	8.0	18.0	14.0	7.2	7.4	7.0	7.2	7.6	7.0	203	327	317	0.7	1.0	0.8	1.40	2.20	1.80	90	200	200	133	500	700	567					
1696	UIS GOINDWAL	PUNJAB	9.0	19.0	16.0	6.4	7.2	7.0	6.9	7.6	7.0	298	319	310	0.4	1.0	1	1.40	1.80	2.00	90	300	180	500	900	650						
1012	BEAS AT 100M D/S INDUST. DISCH. GOINDWAL	PUNJAB	18.0	21.0	17.0	6	7.2	7.0	7.2	7.7	7.0	312	327	320	0.2	1.2	0.7	1.40	2.60	1.80	110	300	185	500	1000	725						
1697	BEAS AT HARIKE	PUNJAB	10.0	20.0	16.0	6.6	7.2	7.0	7.2	7.7	8.0	300	312	304	0.6	0.8	1	1.00	2.20	1.50	90	220	130	500	700	550						
2601	BEAS AT DS MANALI	HIMACHAL PRADESH	3.5	14.0	10.0	8.2	9.6	9.0	6.7	8.1	8.0	49	99	74	0.1	0.5	0.2	0.20	0.95	0.40	11	920	189	130	2400	889						
2602	BEAS AT DS KULLU	HIMACHAL PRADESH	5.4	15.0	10.0	8.1	9.8	9.0	7.2	8.2	8.0	67	278	114	0.1	0.5	0.2	0.04	0.85	0.30	22	540	130	220	2400	990						
2603	BEAS AT DS PANDOH DAM	HIMACHAL PRADESH	6.0	17.5	14.0	7.9	12.5	9.0	7.1	8.4	8.0	54	159	96	0.1	0.3	0.2	0.01	0.98	0.50	7	240	62	49	1600	606						

TABLE 4.2 :- WATER QUALITY OF RIVER SATLUJ - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)								
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean						
WATER QUALITY CRITERIA			> 4 mg/l						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml						< 5000 MPN/100ml					
1867	SATLUJ @C WITH RIVER SPIT AT KHAB, DISTT KANUR	HIMACHAL PRADESH	1.8	8.0	6.0	5.8	9.3	8.0	7.7	8.5	8.0	202	372	288	0.1	1.2	0.3	0.03	0.27	0.10	4	350	63	4	2400	493						
2611	SATLUJ AT KHAB	HIMACHAL PRADESH	1.8	8.0	6.0	5.9	9.2	8.0	7.9	8.5	8.0	204	345	288	0.1	1.8	0.4	0.03	0.25	0.10	2	540	76	7	2400	421						
1389	SATLUJ AT NEPTHA ZAKHAI	HIMACHAL PRADESH	2.6	8.0	6.0	6.7	9.4	8.0	7.8	8.4	8.0	97	348	208	0.1	0.4	0	0.01	0.51	0.00	2	220	85	11	2400	1020						
1086	SATLUJ AT US RAMPUR	HIMACHAL PRADESH	3.3	8.0	7.0	6.4	9.4	8.0	7.7	8.4	8.0	209	219	209	0.1	3.2	0.6	0.01	0.30	0.30	4	540	128	8	2400	540						
1087	SATLUJ AT DS RAMPUR	HIMACHAL PRADESH	3.3	8.5	7.0	6.1	9.2	8.0	8.0	8.4	8.0	133	281	219	0.2	2.6	0.7	0.03	0.87	0.20	2	920	204	18	2400	857						
1013	SATLUJ AT US TATAPANI	HIMACHAL PRADESH	6.0	10.0	8.0	6.5	9.7	8.0	7.7	8.4	8.0	87	1022	355	0.2	1.1	0.4	0.02	0.88	0.30	4	240	90	16	2400	950						
1014	SATLUJ AT US SLAPPER	HIMACHAL PRADESH	5.8	22.0	14.0	8.2	11.5	10.0	7.5	8.5	8.0	115	307	225	0.1	0.4	0.2	0.18	1.89	0.60	17	350	159	130	2400	1586						
1015	SATLUJ AT DS SLAPPER	HIMACHAL PRADESH	5.0	22.0	14.0	8.6	12.0	10.0	7.5	8.4	8.0	169	303	214	0.1	2.4	0.5	0.18	1.86	0.70	22	540	207	240	2400	1606						
1016	SATLUJ AT DS BHAKHRA	HIMACHAL PRADESH	9.0	22.0	17.0	7.4	9.9	9.0	7.3	8.7	8.0	163	293	202	0.1	1.0	0.5	0.00	0.57	0.30	2	70	14	6	150	59						
1017	HEADWORKS, NANGAL	PUNJAB	18.0	22.5	20.0	6.9	8.2	8.0	7.4	7.8	8.0	209	318	272	2.4	3.0	2.7	1.40	2.20	1.90	110	500	305	110	1500	703						
1018	SATLUJ AT 100M D/S NANGAL	PUNJAB	18.0	22.5	20.0	6.9	8.2	8.0	7.4	7.8	8.0	209	318	272	2.4	3.0	2.7	1.40	2.20	1.90	110	500	305	110	1500	703						
1293	SATLUJ AT 1 KM D/S OF ZENITH	PUNJAB	19.0	24.0	22.0	6.2	7.4	7.0	7.4	7.9	8.0	318	592	442	8.0	13.8	11.0	3.00	8.60	5.30	500	3000	1275	1100	9000	4150						
1814	SATLUJ AT DS KRATPUR SAHB	PUNJAB	19.0	22.0	21.0	7.2	7.8	7.0	7.2	7.5	7.0	213	320	279	0.8	2.8	2.0	1.80	2.00	2.00	50	500	178	110	900	503						
1019	SATLUJ AT DS HEAD WORKS ROPAR	PUNJAB	19.0	22.0	21.0	7.0	7.5	7.0	7.2	7.5	7.0	213	390	336	2.8	4.0	3.3	2.40	4.20	3.30	110	1100	637	500	25000	9000						
1380	SATLUJ AT DS NFL	PUNJAB	19.0	23.0	21.0	6.0	7.6	7.0	7.4	7.8	8.0	214	338	289	1.4	3.0	2.4	2.00	2.20	2.00	300	500	433	700	1100	803						
1690	UIS BUDHA NALLAR (UPPER)	PUNJAB	18.0	25.0	22.0	6.5	6.9	7.0	7.2	7.4	7.0	280	287	284	1.6	1.9	2.0	2.90	5.60	4.00	300	50000	12975	1100	90000	23625						
1020	SATLUJ AT 100M D/S BUDHA NALA CONFL. LUDHIANA	PUNJAB	18.0	25.0	22.0	4.1	4.3	4.0	6.8	7.0	7.0	345	484	388	14.0	32.0	22.0	5.20	23.20	12.00	9000	50000	29000	26000	90000	64000						
1021	SATLUJ AT BOAT BDG. DHARMKOTNAKODAR ROAD, JALANDHAR	PUNJAB	20.0	25.0	23.0	6.1	7.3	6.0	7.1	7.2	7.0	168	502	326	2.4	2.8	2.7	3.20	10.80	6.00	900	6000	2500	2500	11000	8375						
1381	SATLUJ AT DS EAST BASIN	PUNJAB	11.0	16.0	15.0	3.8	4.8	4.0	7.2	7.6	7.0	512	640	556	4.5	6.1	5.0	2.60	7.80	5.00	9000	35000	21000	21000	50000	40333						
1691	UIS HUSSANIWALA - HW FERROZPUR	PUNJAB	21.0	25.0	23.0	7.0	7.3	7.0																								

1988	SIRSA AT D/S NALAGARH DISTT.	HIMACHAL PRADESH	17.0	31.0	24.0	5.8	10.5	8.0	7.5	8.3	8.0	306	880	583	0.5	2.0	1.3	0.10	4.00	1.20	6	88	30	28	240	86
1989	SWANAN AT D/S NANGAL DISTT. UNA	HIMACHAL PRADESH	18.0	31.0	24.0	6.4	11.2	8.0	7.5	8.8	8.0	358	514	443	0.1	2.3	1.2	0.00	2.76	1.00	2	30	14	12	220	116
2616	SHUEL AT D/S SURGANI	HIMACHAL PRADESH	7.0	17.0	13.0	7.2	11.7	9.0	7.4	8.5	8.0	101	227	155	0.1	0.6	0.4	0.06	0.98	0.50	4	11	6	34	110	58
1307	CHUNTI KOL * (MAULANA AZAD BRIDGE)	JAMMU & KASHMIR	7.0	10.0	9.0	4.3	7.5	6.0	7.3	7.8	8.0	168	238	209	4.0	7.0	5.0									
2607	SUKETI KHAD AT D/S MANDI	HIMACHAL PRADESH	7.6	28.0	19.0	6.7	10.8	8.0	7.1	8.6	8.0	88	329	233	0.3	4.0	1.1	0.21	1.81	0.90	220	1600	773	1600	2400	2327
2608	BINWA AT D/S PAPROLA/BALUNATH	HIMACHAL PRADESH	8.5	25.0	19.0	7.0	8.7	8.0	7.2	8.4	8.0	75	136	99	0.1	1.0	0.5	0.13	1.02	0.50	6	19	11	17	180	100
2609	NEULAI AT D/S THURAL	HIMACHAL PRADESH	9.5	24.0	21.0	7.1	8.3	8.0	6.7	8.6	8.0	78	276	129	0.1	0.7	0.4	0.12	1.26	0.60	1	9	6	17	350	113
2610	SPLITI AT KHAS	HIMACHAL PRADESH	1.6	7.0	5.0	5.6	9.4	8.0	7.4	8.6	8.0	97	424	197	0.1	0.4	0.2	0.01	0.38	0.10	2	240	39	11	1600	292
2612	BASPA AT D/S RESOURV BASPA PROJECT	HIMACHAL PRADESH	1.3	7.0	5.0	6.1	9.3	8.0	7.6	8.3	8.0	77.6	320	136	0.1	0.8	0.3	0.03	0.35	0.10	2	94	25	6	540	174
1306	GAWKADAL, SRG * (SHERGHARI, SRG)	JAMMU & KASHMIR	7.0	10.0	9.0	5.6	9.5	8.0	7.3	7.8	8.0	145	240	184	2.0	6.0	4.0									
1304	JHELAM AT ANANTNAG D/S	JAMMU & KASHMIR	7.0	21.0	13.0	7.5	8.5	8.0	7.3	7.8	8.0	180	330	240	1.0	4.0	2.0									
1410	JHELAM AT DALAGATE (INLET), SRINAGAR	JAMMU & KASHMIR	7.0	10.0	8.0	7.2	8.0	8.0	7.3	7.6	7.0	120	192	152	2.0	7.0	5.0									
1411	JHELAM AT CHATTABAL WEIR (OUTLET)	JAMMU & KASHMIR	8.0	9.0	8.0	5.5	7.0	6.0	7.5	7.8	8.0	156	189	172	4.0	6.0	5.0									

TABLE 5.1 - WATER QUALITY OF RIVER GANGA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N* NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			
1491	BHAGIRATHI AT GANGOTRI	UTTARAKHAND	3.0	8.0	5.5	8.0	8.9	8.5	7.7	8.1	7.9	88	102	95				0.00	0.30	0.15							
1484	ALKANANDA B/C MANDAKINI AT RUDRA PRAYAG	UTTARAKHAND	10.0	21.0	16.6	8.6	12.2	9.6	7.2	8.7	8.0	105	193	145				0.00	0.50	0.08	700	4300	2500	9300	9300	9300	9300
1485	MANDAKINI B/C ALKANANDA AT RUDRAPRAYAG	UTTARAKHAND	10.0	20.0	16.6	7.0	9.8	8.8	7.3	8.7	8.0	67	205	115				0.00	0.50	0.08	1500	2100	1800	4300	46000	25150	
1486	ALKANANDA A/C MANDAKINI AT RUDRAPRAYAG	UTTARAKHAND	10.0	22.0	17.6	8.6	10.3	9.3	7.6	8.6	8.1	84	194	150	0.6	0.8	0.7	0.00	0.50	0.08	9300	24000	16650	46000	48000	46000	
1487	ALKANANDA B/C TO BHAGIRATHI AT DEVPRAYAG	UTTARAKHAND	12.0	22.0	18.4	7.7	11.4	9.1	7.4	8.6	8.1	104	196	141	0.6	1.9	1.2	0.00	0.60	0.09	900	9300	5100	4300	15000	9650	
1488	BHAGIRATHI B/C WITH ALKANANDA AT DEVPRAYAG	UTTARAKHAND	12.0	22.0	18.3	7.6	9.8	8.6	7.4	8.5	8.0	92	188	135	1.0	1.0	1.0	0.00	0.40	0.06	400	900	650	2100	4300	3200	
1489	ALKANANDA A/C WITH BHAGIRATHI AT DEVPRAYAG	UTTARAKHAND	12.0	22.0	18.4	8.0	10.2	8.7	7.4	8.5	8.1	106	167	132	0.6	0.8	0.7	0.00	0.50	0.08	9300	46000	27650	24000	110000	67000	
1765	GANGA AT RISHIKESH US	UTTARAKHAND	11.4	19.5	17.1	8.0	11.0	9.1	7.0	8.4	7.7	94	148	121	0.2	3.0	1.7										
1020	A/C R-SONG NR SATYANARAYAN TEMPLE D/S RAIVALA	UTTARAKHAND	16.0	26.0	21.9	5.2	11.0	7.8	6.8	8.6	7.7	117	480	305	1.4	7.6	4.5										
1061	GANGA AT HARIDWAR D/S	UTTARAKHAND	16.1	24.5	20.0	4.2	8.8	6.7	6.7	8.5	7.6	122	305	196	0.6	11.0	5.6										
2127	UPPER GANGA RIVER D/S ROORKEE	UTTARAKHAND	12.2	31.0	19.6	6.4	10.4	8.3	6.8	8.4	7.8	123	208	157	1.0	3.8	2.5										
1062	GANGA AT GARHMUKTESHWAR	UTTAR PRADESH	13.5	25.0	19.6	7.0	10.0	8.2	7.2	7.5	7.4	181	200	221	2.8	4.5	3.4	0.00	0.73	0.50	310	2100	1162	700	4300	2497	
2488	GANGA US, ANOOPSHAHAR	UTTAR PRADESH	13.0	24.0	18.3	7.0	10.6	8.4	7.0	8.0	7.4	100	285	196	1.6	3.8	2.8	0.00	0.74	0.21	110	1100	673	430	2000	1377	
2489	GANGA AT NARORA (BULANDSHAHR)	UTTAR PRADESH	13.0	24.0	18.5	7.2	10.5	8.3	7.2	8.2	7.6	110	480	230	2.2	6.1	3.6	0.00	0.96	0.23	150	1200	783	640	2400	1713	
2490	GANGA AT KACHHA GHAT, ALIGARH	UTTAR PRADESH	14.0	25.0	19.2	7.4	11.6	8.7	7.0	7.8	7.9	110	240	189	1.8	6.5	3.1	0.00	0.80	0.23	70	610	420	150	1400	850	
2490	AT KACHHA GHAT, ALIGARH	UTTAR PRADESH	14.0	25.0	20.3	7.6	9.2	8.3	7.2	7.7	7.4	116	285	206	2.2	6.8	3.7	0.00	0.95	0.28	300	1300	840	930	2900	1743	
1063	GANGA AT KANNAULI US (RAJGHAT)	UTTAR PRADESH	15.0	32.0	25.6	6.0	9.8	7.9	7.1	8.5	8.0	53	541	327	3.4	6.2	4.5	0.00	5.46	2.25	700	9000	3042	2800	20000	10075	
1066	GANGA AT KANNAULI D/S	UTTAR PRADESH	15.0	32.0	25.6	6.0	10.1	7.8	7.2	8.6	8.0	55	544	324	4.2	9.0	5.5	0.88	4.33	2.25	900	9000	3508	4300	40000	20208	
1145	GANGA AT BITHOOR (KANPUR)	UTTAR PRADESH	15.0	32.0	25.6	6.2	14.3	8.7	7.4	8.6	8.2	450	558	510	2.6	5.6	4.0	0.24	3.88	1.70	900	4300	1700	1100	21000	7750	
1067	GANGA AT KANPUR US (RANIGHAT)	UTTAR PRADESH	15.0	32.0	25.6	6.0	12.8	8.6	7.4	9.1	8.2	49	560	316	3.0	5.5	4.3	0.46	3.95	2.03	900	26000	6667	1100	15000	31992	
1068	AT KANPUR D/S (JAJMAU PUMPING STATION)	UTTAR PRADESH	15.0	32.0	25.8	4.0	11.5	6.9	7.1	8.8	8.0	55	637	381	6.6	9.6	8.4	1.12	4.74	2.77	4000	93000	38942	23000	240000	151333	
1147	GANGA AT DALMAU (RAI BAREILLY)	UTTAR PRADESH	15.0	25.0	20.7	6.8	9.5	7.8	7.1	8.6	7.9	146	415	281	3.4	4.2	3.8	0.78	1.10	0.85	4600	6300	5300	6800	8700	7776	
2498	GANGA AT KALA KANKAR, RAEBARELI	UTTAR PRADESH	16.0	25.0	20.9	6.8	9.0	7.7	7.0	8.6	7.8	149	409	261	3.3	4.0	3.8	0.76	0.98	0.84	4100	6300	4980	6800	8800	7510	
1046	AT ALLAHABAD (RASOOLABAD)	UTTAR PRADESH	21.0	29.0	25.6	6.0	9.8	7.2	7.4	8.4	8.0	278	488	387	2.8	6.0	4.2	1.40	1.88	1.71	3000	3500	3358	7000	9000	7750	
2487	GANGA AT KADACHAT, ALLAHABAD	UTTAR PRADESH	21.0	29.5	25.7	6.1	10.1	7.6	7.4	8.4	7.9	266	480	374	2.3	4.8	3.6	1.39	1.85	1.65	2100	2492	2500	6000	8000	4167	
1049	AT ALLAHABAD D/S (GANGA)	UTTAR PRADESH	21.5	30.5	26.2	6.0	9.4	7.2	7.4	8.4	8.0	271	598	500	2.6	5.6	4.0	1.44	1.70	1.61	2800	5000	3408	6000	14000	8583	
2485	GANGA US, VINDHYACHAL, MIRZAPUR	UTTAR PRADESH	19.0	32.0	27.4	5.9	11.1	8.7	7.6	8.3	8.0	201	537	387	2.3	10.5	3.7	0.00	6.50	1.96	40	700	332	110	5400	1995	
2486	GANGA D/S, MIRZAPUR	UTTAR PRADESH	18.0	33.0	27.1	5.1	10.3	7.7	7.3	8.2	7.8	207	555	396	2.9	4.5	3.6	0.00	7.80	2.29	230	7000	2377	490	17000	5708	
1070	AT VARANASI US (ASSIGHAT)	UTTAR PRADESH	18.0	27.0	22.3	7.5	7.8	7.6	7.5	7.8	7.6	224	265	250	3.7	4.2	3.9										
1071	AT VARANASI D/S (MALVIYA BRIDGE)	UTTAR PRADESH	18.5	27.5	22.8	7.0	7.2	7.1	7.9	8.1	8.0	240	290	272	5.2	9.6	8.0										
1073	GANGA AT TRIGHAT (GHAZIPIUR)	UTTAR PRADESH	19.5	28.5	23.8	7.0	7.4	7.3	7.9	8.2	8.0	232	270	257	4.1	4.4	4.3										
1074	GANGA AT BUXAR BIHAR	BIHAR	19.0	31.0	24.4	7.8	9.0	8.4	7.6	8.5	8.2	287	402	345	2.7	2.8	2.8	1.39	1.54	1.65	1100	9000	3122	2800	16000	6867	
2551	GANGA AT BUXAR, RAMREKHAGHAT																										

TABLE 5.2 :- WATER QUALITY OF RIVER YAMUNA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1492	YAMUNA AT YAMUNOTRI	UTTARAKHAND	4.0	7.9	6.0	8.2	8.5	8.4	7.6	7.6	7.6	60	88	74				0.00	0.40	0.20						
1493	YAMUNA AT HANUMANCHATTI	UTTARAKHAND	8.6	11.5	10.1	8.7	9.3	9.0	7.7	7.9	7.8	97	124	111				0.00	0.40	0.20						
1494	YAMUNA AT US DAK PATTHAR	UTTARAKHAND	10.3	22.2	18.3	8.2	11.2	8.3	7.2	8.2	7.8	124	220	171	0.2	1.6	0.9	0.00	0.40	0.06	150	400	275	210	2300	1255
1490	YAMUNA AT US DAK PATTHAR	UTTARAKHAND	12.2	23.4	19.3	7.0	8.9	7.7	7.4	8.1	7.8	118	276	185	1.2	5.8	2.7	0.00	0.50	0.07	430	8300	4865	12	24000	4015
1553	YAMUNA, US PAONTA SAHIB	HIMACHAL PRADESH	11.0	26.0	20.5	6.1	10.2	8.0	7.0	8.2	7.6	273	646	482	0.8	1.6	1.1	0.00	0.61	0.19	4	15000	1616	10	93000	11596
1554	YAMUNA, D/S PAONTA SAHIB	HIMACHAL PRADESH	13.0	26.0	21.7	6.4	10.2	8.2	7.4	8.1	7.8	187	426	321	0.6	1.6	1.1	0.00	0.85	0.34	5	17	10	10	26	16
1117	YAMUNA AT HATHNIKUND	HARYANA	11.0	25.0	20.6	6.2	13.2	9.1	7.3	8.6	7.8	360	273	1.0	3.0	1.4				400	240000	31218	2300	1100000	133350	
1496	YAMUNA AT KALANAU, YAMUNA NAGAR	HARYANA	13.0	32.0	24.7	6.1	9.4	7.5	7.5	8.7	7.9	212	603	372	1.0	2.0	1.1				700	93000	27020	9300	460000	150630
1118	YAMUNA AT SONEPAT	HARYANA	11.0	30.0	24.5	5.7	9.2	6.9	7.4	8.7	7.9	224	780	438	1.0	4.0	2.3				900	540000	69933	4300	1600000	26611
1123	YAMUNA AT WAZIRABAD	DELHI	11.8	31.5	24.0	5.0	10.3	7.8	7.7	8.6	9.0	231	1090	594	1.0	4.0	2.2				400	45000	9125	1100	240000	45764
1121	YAMUNA AT NIZAMUDDIN	DELHI	12.5	30.0	23.7	0.0	4.5	0.8	7.3	8.5	7.8	353	1905	1154	4.0	26.0	15.5				430000	21000000	4200000	93000	110000000	25000000
1375	YAMUNA AT OKHLA BRIDGE (INLET OF AGRA CANAL)	DELHI	13.5	30.0	23.7	0.0	3.5	0.5	7.2	8.5	7.8	403	1829	969	3.0	26.0	13.0				230000	110000000	110000000	43000	160000000	190000000
1407	YAMUNA AT MAZAWALI	UTTAR PRADESH	14.0	32.0	26.1	0.0	4.4	1.8	7.2	7.8	7.5	353	1397	391	4.0	36.0	14.5				43000	24000000	3263222	93000	110000000	25000000
2495	YAMUNA AT KESIGHAT, VRINDAVAN	UTTAR PRADESH	13.0	13.0	13.0	2.1	2.1	2.1	6.9	6.9	6.9	5.9	5.9	5.9	14.4	14.4	14.4				21000	21000	70000	70000	70000	70000
1123	YAMUNA AT MATHURA US	UTTAR PRADESH	14.0	35.5	28.1	0.0	8.0	3.8	7.3	8.1	7.7				5.0	41.0	11.4				9000	4300000	718000	43000	46000000	5877333
2494	YAMUNA AT VISHRAMGHAT, MATHURA	UTTAR PRADESH	13.0	13.0	13.0	0.8	0.8	0.8	7.0	7.0	7.0				15.4	15.4	15.4				37000	37000	37000	70000	70000	70000
1124	YAMUNA AT MATHURA D/S	UTTAR PRADESH	15.0	35.0	27.6	2.8	7.2	4.8	7.4	8.3	7.8	368	1590	1058	5.0	17.0	8.8				23000	1500000	2374000	93000	110000000	14000000
1125	YAMUNA AT AGRA US	UTTAR PRADESH	10.0	33.0	26.0	2.1	7.3	4.3	7.4	8.1	7.8	332	1466	1070	3.0	11.0	7.0				17000	700000	284900	33000	1500000	694300
1126	YAMUNA AT D/S OF AGRA	UTTAR PRADESH	15.0	35.0	28.4	0.2	6.3	3.1	7.5	8.3	7.9	349	1766	1142	4.0	29.0	11.0				23000	4600000	6389100	49000	110000000	23000000
2493	RIVER YAMUNA AT SHAHPUR	UTTAR PRADESH	15.0	15.0	15.0	3.8	3.8	3.8	7.3	7.3	7.3	193	193	193	11.8	11.8	11.8				37000	37000	37000	37000	37000	38000
1498	YAMUNA AT BATESWAR	UTTAR PRADESH	16.0	38.0	28.1	0.0	13.5	6.9	7.3	8.5	8.0	367	1730	1126	3.0	15.0	8.5				6800	930000	223780	15000	4600000	753800
1127	YAMUNA AT ETAWAH	UTTAR PRADESH	16.0	38.0	27.7	2.2	15.4	8.8	7.6	8.8	8.2	395	1866	1061	1.0	15.0	8.1				4000	400000	99030	23000	930000	298200
1499	YAMUNA AT JIHIKA BIC WITH CHANSA ETAWAH	UTTAR PRADESH	15.0	37.0	27.2	4.8	17.0	9.7	7.6	8.7	8.2	306	1390	744	1.0	7.0	4.2				9000	900000	137630	22000	2100000	417900
1129	YAMUNA AT ALLAHABAD	UTTAR PRADESH	16.9	26.5	21.9	5.8	8.2	7.4	7.3	7.7	7.5	109	708	433	1.8	3.8	2.6	0.00	2.03	1.39	22	22000	3195	110	92000	13416
1069	YAMUNA AT ALLAHABAD D/S (BALUA GHAT)	UTTAR PRADESH	22.2	30.0	26.7	2.4	8.4	6.5	7.2	8.3	7.9	285	1101	610	1.6	6.6	2.5	1.20	1.56	1.33	1200	1700	1450	2600	3000	2833

TABLE 5.3 :- WATER QUALITY OF TRIBUTARY STREAMS SUSWA, GOLA, RAMGANGA, KALINADI (E), VARUNA, SAI, GOMTI, RAPT, SARYU, GHAGHRA, RIHAND, SONE, GANDAK, SIKRANA, BURHI GANDAK, HARBORA, KAMLA, MANUSMAR, KOSHI, DAHA, DHOUS, FARMAR, RAM REKHA AND SIRSA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
																											> 4 mg/l
2724	SUSWA RIVER AT MOTHRAWALA, DEHRADUN	UTTARAKHAND	16.8	30.7	24.6	1.6	5.2	3.9	6.4	8.4	7.5	585	835	733	3.6	38.0	23.0	0.00	8.40	0.70	140000	150000	145000	1600	720000	112033	
2728	GOLA RIVER AT HALDWANI	UTTARAKHAND	12.0	15.0	13.5	8.2	10.0	9.1	7.0	8.0	7.5	260	255	250	2.0	2.2	2.1										
1064	RAMGANGA AT KANNAUJ (BEFORE CONFL)	UTTAR PRADESH	15.0	32.0	25.7	4.5	9.7	7.1	6.7	8.5	7.8	58	748	430	4.2	12.4	5.9	0.83	7.32	3.79	400	7000	2992	900	28000	11775	
2497	KALINADI (EAST) AT KHARRKHODA-PARIKSHIT GARH RD, VILL. KOL, NEERUL	UTTAR PRADESH	10.0	30.0	21.8				7.4	7.7	7.6	1340	2040	1733	70.0	100.0	86.0	0.00	10.40	5.52	230000	340000	260000	240000	355000	329167	
1480	KALINADI (EAST) AT US OF GULAOITHI TOWN IN BULANDSHAR	UTTAR PRADESH							7.5	7.7	7.6	806	1942	1532	57.0	161.0	100.0	0.20	1.20	0.70	2300000	46000000	23000000	7500000	110000000	55000000	
1065	KALINADI (EAST) AT KANNAUJ (BEFORE CONFL)	UTTAR PRADESH	15.0	32.0	25.6	5.4	7.7	6.6	7.2	8.7	7.9	148	564	406	4.0	16.0	7.0	0.68	8.12	3.72	700	15000	3567	2800	64000	20842	
2482	VARUNA AT RAMESHWAR, VARANASI	UTTAR PRADESH	18.0	27.5	22.8	7.4	7.6	7.5	7.6	7.9	7.8	234	270	252	3.8	4.3	4.1				8000	13000	10500	14000	17000	15500	
2483	VARUNA BIC WITH RIVER GANGA AT VARANASI	UTTAR PRADESH	18.0	27.5	22.8	5.2	5.8	5.5	8.3	8.5	8.4	270	304	287	18.4	27.6	23.0				70000	79000	74500	94000	110000	102000	
1361	SAI AT INNOV AFTER DRAIN OUTFALL	UTTAR PRADESH	14.0	31.0	23.8	5.6	11.5	8.8	7.4	8.6	7.9	263	552	399	2.2	4.0	4.0	2.7	0.00	4.60	1.70	230	2200	1093	1100	4300	2708
2484	SAI AT JALAPUR, JAUNPUR	UTTAR PRADESH	18.5	27.5	23.0	7.3	7.5	7.4	7.7	7.8	7.7	230	262	246	3.8	4.4	4.1				11000	11000	11000	14000	14000	14000	
1350	GOMTI AT SITAPUR US AT WATER INTAKE	UTTAR PRADESH	18.5	31.0	25.0	5.9	10.9	8.5	7.5	8.2	7.9	166	451	355	2.0	10.0	3.1	0.00	3.60	1.47	270	790	444	1100	2200	1560	
1351	GOMTI AT LUCKNOW US AT WATER INTAKE POINT	UTTAR PRADESH	21.0	31.5	27.8	5.5	10.3	7.9	7.4	8.1	7.9	184	458	355	2.5	9.3	3.6	0.00	4.70	1.71	700	2200	1560	2200	3500	2950	
1352	GOMTI AT LUCKNOW D/S	UTTAR PRADESH	21.0	31.5	27.8	2.5	4.4	3.6	7.2	7.8	7.4	215	521	427	4.2	10.5	7.5	0.00	8.30	3.74	49333	94000	70800	79333	130000	103567	
1353	GOMTI AT JAUNPUR D/S	UTTAR PRADESH	18.5	27.7	23.1	7.2	7.4	7.3	7.9	8.0	7.9	236	274	255	4.2	4.4	4.3				17000	17000	17000	21000	21000	21000	
1072	GOMTI AT VARANASI	UTTAR PRADESH	19.0	27.0	22.8	7.4	7.6	7.5	7.6	7.9	7.7	232	252	244	3.8	4.2	4.0				13000	13000	13000	17000	17000	17000	
2491	RAPTI AT RAJGHAT, GORAKHPUR	UTTAR PRADESH	14.0	31.0	24.0	6.8	7.8	7.5	8.1	8.2	8.1	258	486	387	2.9	7.5	3.6	0.22	1.02	0.55	100	210	158	280	440	363	
1363	RAPTI AT R. HOININ NR																										

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
2065	POINT OF OIL INDIA LTD.	ASSAM	20.0	30.0	26.3	6.0	8.0	6.8	7.7	8.1	7.9	207	264	242	0.8	2.0	1.2	0.10	0.14	0.12	0	360	120	0	730	244
1530	PAGDIA, NALBARI TOWN, NALBARI FOREST	ASSAM	18.0	27.0	23.5	5.0	6.3	6.0	6.6	6.8	6.7	98	185	141	1.3	7.0	3.6	0.10	0.12	0.11	0	360	120	0	360	120
2063	JAI BHARALI NEAR BISWANATH CHARALI, SONITPUR	ASSAM	21.0	27.0	24.0	8.7	9.0	8.9	6.9	7.5	7.3	68	126	94	0.3	0.3	1.3	0.10	0.10	0.10	0	360	120	0	2300	767
2237	KALONG AT U/S OF ANANDARAM DEKAL PHUKAN BRIDGE, NAGAON	ASSAM	28.0	31.0	29.3	5.2	10.3	7.6	6.5	6.8	6.7	82	244	142	1.9	3.7	3.0	0.10	0.14	0.11	300	360	330	730	2300	1515
2059	KOLONG AT MARIGACHAN MANAS AT NH-37 CROSSING, BARPETA, DISTRICT	ASSAM	19.0	33.0	27.7	5.7	8.5	7.1	7.0	8.0	7.6	72	188	111	0.7	2.4	1.6	0.10	0.14	0.11	0	700	233	0	730	487
2060	"MORA BHARALI AT TEZPUR	ASSAM	20.0	32.0	25.3	5.9	7.3	6.9	6.6	8.0	7.2	134	446	293	0.9	3.8	2.2	0.10	0.19	0.13	0	360	90	0	1400	530
2058	DISANG AT DILLIGHAT, DIBRUGARH	ASSAM	16.0	26.0	22.0	4.5	7.1	5.8	6.5	8.6	7.3	67	307	178	1.5	6.3	2.9	0.10	0.16	0.16	0	360	120	300	1500	1067
1298	DISANG AT GUNDAMHAT	ASSAM	18.0	26.0	22.5	3.5	5.4	4.7	6.4	7.1	6.8	57	57	57	1.0	2.6	1.7	0.10	0.15	0.13	0	360	120	300	910	560
1255	HANJI AT N.H. CROSSING, JORHAT	ASSAM	19.0	27.0	23.5	6.4	6.7	6.4	6.5	7.6	7.1	65	134	106	1.2	3.2	2.3	0.12	0.17	0.15	0	360	120	110	730	400
1527	BHODDOI AT JORHAT	ASSAM	19.0	27.0	24.5	6.4	7.3	6.1	6.4	7.6	7.1	75	157	127	0.7	3.6	2.3	0.10	0.16	0.12	0	910	547	300	15000	6033
1531	"MORA BHARALI AT TEZPUR	ASSAM	21.0	27.0	24.8	6.6	7.1	6.9	7.0	8.5	7.9	134	255	189	0.8	4.5	2.4	0.10	0.15	0.12	0	300	100	300	1500	967
1423	BARAK AT PANCHAGRAM	ASSAM	15.0	16.0	15.7	7.0	7.3	7.2	6.8	7.5	7.2	85	156	127	0.8	3.7	2.0	0.10	0.12	0.11	0	300	230	300	910	637
1528	BHARALI AT GUWAHATI	ASSAM	20.0	31.0	27.5	0.0	0.0	0.0	6.8	7.2	7.1	690	788	739	32.0	50.0	41.5	0.19	0.38	0.27	0	2000	970	1100	15000	8467
1529	DEEPAR BILL	ASSAM	21.0	31.5	28.1	2.3	7.1	5.5	7.2	7.4	7.3	172	404	249	2.0	6.4	4.8	0.11	0.26	0.20	0	300	100	0	15000	5243
2068	UIS OF KATHAKAL, MATLUJURI	ASSAM	8.5	16.0	12.8	7.1	7.3	7.2	6.9	7.6	7.2	92	176	139	1.2	4.0	2.6	0.10	0.15	0.11	0	910	423	300	1500	1100

TABLE 6.4 :- WATER QUALITY OF TRIBUTARY STREAMS TEESTA, DIKHU, MANEY KHOLA, RANICHU, KUNDLI, DIKHOW, KOHORA, BOGINADI, RANGA, KAPILI, BEKI, SANKOSH, BARAK, SONAI, KUSHIYARA, KAROLA, KALJANI & PACHNAI – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA																											
1801	TEESTA AC RIVERS LACHENCHU AND LACHINGCHU AT CHUNGTHANG	SIKKIM				> 4 mg/l			6.5-8.5						< 3 mg/l								< 2500 MPN/100ml			< 5000 MPN/100ml	
1807	TEESTA AC RANICHU AT SINGTAM	SIKKIM				20.0	26.0	23.1	5.9	7.0	6.5	250	280	268	2.3	3.4	2.6	2.20	2.50	2.31	23	50	28	10	130	79	
1808	TEESTA AC RANICHU AFTER MEETING THE INDI EFFLUENTS FROM THE TOWN RANICHU	SIKKIM				16.0	28.0	20.2	5.5	7.0	6.3	260	320	293	3.3	4.4	3.9	2.20	3.20	2.70	50	700	123	130	251		
1809	TEESTA AT MELLI DOWNSTREAM	SIKKIM				14.0	24.0	19.3	6.0	6.5	6.1	260	300	283	4.0	4.5	4.3	2.00	3.20	2.70	40	170	80	110	300	258	
1947	TEESTA AT SILIGURI	WEST BENGAL	14	24	19.1	8.0	10.0	8.6	7.0	7.3	7.3	108	114	111	0.3	6.2	2.9	0.05	0.45	0.25	11000	225000	77333	17000	390000	116167	
1802	DIKHU B/C RIVER TEESTA NEAR NHPC HYDROELECTRIC POWER PROJECT, SIKKIM	SIKKIM				20.0	28.0	22.9	6.0	6.8	6.4	270	280	278	2.0	3.4	2.4	2.00	2.50	2.30	22	60	27	40	140	91	
1803	MANEY KHOLA AT BURTK NEAR ARMY BASE CAMP, 4 KM U/S OF GANGTOK, SIKKIM	SIKKIM				18.0	30.0	22.4	6.0	7.0	6.5	260	320	293	2.3	4.2	3.2	2.00	3.10	2.32	23	80	35	50	170	114	
1804	MANEY KHOLA AC RAY KHOLA AT ADAMPOOL AFTER MEETING WASTE OF STP, GANGTOK	SIKKIM				18.0	23.1	23.1	6.0	6.8	6.2	230	280	256	2.4	3.8	3.3	2.00	2.50	2.37	26	70	37	60	170	132	

TABLE 6.4 :- WATER QUALITY OF TRIBUTARY STREAMS TEESTA, DIKHU, MANEY KHOLA, RANICHU, KUNDLI, DIKHOW, KOHORA, BOGINADI, RANGA, KAPILI, BEKI, SANKOSH, BARAK, SONAI, KUSHIYARA, KAROLA, KALJANI & PACHNAI – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA																											
1805	AFTER CONFLUENCE OF RANICHU AND RORACHU AT RANIPOL, SIKKIM	SIKKIM				18.0	28.0	22.4	6.0	6.8	6.4	250	300	277	3.0	4.3	3.6	2.00	3.00	2.54	33	90	48	90	280	172	
1806	RANICHU BEFORE CONFLUENCE WITH RIVER TEESTA AT SINGTAM	SIKKIM				16.0	25.0	20.0	6.0	6.5	6.2	240	300	283	3.2	4.5	3.8	2.00	3.00	2.53	30	110	52	80	240	190	
2229	KUNDLI AT KUNDLI/SAPARKHWA, SADI, ASSAM	ASSAM	15	27	22	6.1	8.8	7.4	7.3	7.3	7.5	91	237	144	0.7	1.8	1.3	0.10	0.19	0.14				300	910	453	
2231	DIKHOW AT DIKHOW BDG SIVASAGAR	ASSAM	20	27	23.5	4.5	7.2	7.2	6.8	7.5	7.2	90	228	150	0.4	2.1	1.6	0.10	0.30	0.15	0	360	90	1	2800	1003	
2232	KOHORA AT N.H. CROSSING, KOHORA	ASSAM	18	36	29	5.9	7.5	6.7	6.8	7.3	7.1	51	115	76	0.7	3.4	1.8	0.10	0.17	0.12	0	360	90	270	4300	1493	
2233	BOGINADI NR BDG NH-52, LAKSHIMPUR	ASSAM	17.0	25.0	22.3	8.1	8.7	8.5	6.6	7.5	7.1	94	143	128	2.5	3.3	2.8	0.10	0.10	0.10	0	300	75	0	730	273	
2234	RANGA NADI D/S OF HYDEL PROJECT	ASSAM	20.0	26.0	23.5	7.7	8.5	8.3	6.6	7.4	7.1	85	150	116	1.0	5.2	3.0	0.10	0.12	0.11	0	360	90	0	730	273	
2236	KAPILI AT DHARMTUL BRIDGE, NH-31, MARGON	ASSAM	26.0	28.0	27.0	6.3	9.0	7.3	6.4	6.5	6.5	74	92	85	1.2	2.0	1.5	0.10	0.11	0.10	0	910	455	1	2300	1001	
2238	BEKI AT NH-37 CROSSING AT BARPETA ROAD	ASSAM	18.0	31.0	24.5	6.4	7.8	7.1	6.3	7.6	6.8	133	159	145	0.8	5.2	3.2	0.10	0.13	0.11	0	360	90	0	910	485	
2239	SANKOSH, DHUBRI	ASSAM	22.0	31.0	27.5	6.4	7.1	6.9	7.0	7.9	7.4	67	126	98	0.4	1.2	0.7	0.10	0.16	0.14	0	910	423	0	916	230	
2240	BARAK AT D/S OF SILCHAR	ASSAM	9.0	15.3	12.6	7.0	7.2	7.1	6.7	7.5	7.2	100	184	145	2.0	4.0	2.8	0.10	0.19	0.14	0	360	220	720	2000	1373	
2241	SONAI AT SONAI	ASSAM	8.5	27.5	15.8	6.5	7.9	7.3	6.9	7.5	7.2	33	171	94	0.7	6.0	3.8	0.10	0.13	0.11	0	910	303	0	2300	887	
2242	KUSHIARA AT KARIMGANJ	ASSAM	8.5	15.0	12.5	7.0	7.3	7.1	6.7	7.6	7.2	70	153	123	0.7	2.5	1.6	0.10	0.18	0.13	0	360	120	300	910	503	
2523	KAROLA D/S OF JALPAIGURI, NEAR MIN BHAWAN	WEST BENGAL	19.0	33.0	26.4	6.1	9.9	7.7	6.6	7.3	7.0	8	106	79	1.1	6.1	2.9	0.02	0.42	0.19	7000	280000	92818	11000	2200000	11000	
2524	KALJANI D/S OF ALIPIRDWAR, MUNICIPALITY DISCHARGE POINT PANCHNAI AT NH-52 CROSSING, ORANG	WEST BENGAL	19.0	32.0	26.1	6.3	8.6	7.4	6.6	7.6	7.2	125	182	139	0.8	4.7	2.7	0.03	0.36	0.19	8000	260000	72200	17000	320000	102100	
2235	ORANG	ASSAM	18.0	24.0	21.5	8.2	8.6	8.4	6.7	8.2	7.5	94	134	110	0.5	5.3	2.0	0.10	0.13	0.11	0	2300	575	0	4300	1525	

TABLE 7.1 :- WATER QUALITY OF RIVER MAHI AND ITS TRIBUTARY STREAMS SHIVNA, JAMMER, MALEI, CHILLAR, ANAS & PANAM – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA																											
1232	MAHI D/S CONF WITH R. CHAP (UNDER SAGWARA-SARHI RD. BDG.)	RAJASTHAN	21.0	36.5	28.4	3.2	8.4	5.4	8.1	9.1	8.5	390	1310														

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C	D.O. (mg/l)	pH	CONDUCTIVITY (µmhos/cm)	B.O.D. (mg/l)	NITRATE-N+ NITRITE-N (mg/l)	FECAL COLIFORM (MPN/100ml)	TOTAL COLIFORM (MPN/100ml)																
Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean															
1231	MAHI AT VIRPUR	GUJARAT	22.0	28.0	26.0	7.0	8.8	7.7	7.1	8.6	8.1	278	902	403	0.9	5.0	3.1	0.00	0.16	0.05	2	8	4	7	26	16
WATER QUALITY OF TRIBUTARY STREAMS SHIVNA, JAMMER, MALEI, CHILLAR, ANAS & PANAM - 2011																										
2102	SHIVNA AT RAMGHAT, MANDSAUR	MADHYA PRADESH	20.0	32.0	26.8	7.2	8.5	7.3	7.2	8.6	7.8	305	550	423	1.4	4.0	2.5	0.03	2.18	0.93						
2103	JAMMER AT DHOLOWAD, RATLAM	MADHYA PRADESH	25.0	32.0	28.7	5.4	7.6	7.1	7.2	8.1	7.6	112	440	312	1.0	3.0	2.0	0.00	1.80	0.72						
2104	MALEI AT JAORA	MADHYA PRADESH	25.0	29.0	26.8	6.8	7.5	7.2	7.1	8.5	7.6	114	520	364	0.6	1.2	0.9	0.00	2.46	1.48						
2105	CHILLAR AT SHALPUR	MADHYA PRADESH	24.0	30.0	27.4	6.4	7.5	7.1	7.0	7.8	7.5	302	490	426	1.0	3.0	2.1	0.04	4.58	0.99						
1228	ANAS AT DAHOD, (KUSHALGARH), PANCHMAHAL	GUJARAT	26.0	28.0	27.0	6.9	7.0	7.0	8.4	8.6	8.5	433	903	668	5.0	5.0	5.0	0.09	0.26	0.17	4	4	4	17	17	
1227	PANAM AT LUNAWADA	GUJARAT	26.0	28.0	27.0	3.0	8.0	5.5	8.5	8.6	8.6	376	406	391	3.0	5.0	4.0	0.00	0.06	0.03	2	7	5	8	21	15

TABLE 8.1 : - WATER QUALITY OF RIVER SABARMATI AND ITS TRIBUTARY STREAM SHEDI- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA												> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml		
1482	SABARMATI AT MAHUDI JAIN TEMPLE, 150 KM. FROM ORIGIN	GUJARAT	22.0	22.0	22.0	7.1	7.1	7.1	8.1	8.1	8.1	506	506	506	4.0	4.0	4.0	0.47	0.47	0.47	90	90	90	430	430	430
1222	SHEDI AT KHEDA	GUJARAT	28.0	28.0	28.0	7.4	7.9	7.7	8.3	8.5	8.4	2060	3830	2945	2.9	32.0	17.5	0.18	0.36	0.27	6	7	7	20	40	30

TABLE 9.1 : - WATER QUALITY OF RIVER, NARMADA AND ITS TRIBUTARY STREAMS GOUR & KATNI- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA												> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml		
1241	NARMADA AT MANOLA NR RD BDG	MADHYA PRADESH	20.0	32.0	25.5	7.4	8.2	7.8	7.2	7.8	7.4	293	618	464	1.4	2.6	1.9	0.50	1.70	0.85	0	7	1	28	240	87
44	NARAI AT SETIANGHAT	MADHYA PRADESH	37.0	38.0	37.5	6.8	6.2	6.3	7.7	8.4	8.1	339	340	284	1.2	2.5	2.0	0.65	1.77	1.06	6	17	10	20	1600	370
1240	NARMADA AT NORSINGHPUR	MADHYA PRADESH	20.0	31.0	24.0	7.4	8.4	8.0	7.2	7.8	7.5	624	618	593	1.3	1.4	1.4	1.00	1.60	1.30	11	11	64	38		
1234	NARMADA AT HOSHANGABAD US	MADHYA PRADESH	37.0	37.0	37.0	7.4	9.9	8.6	7.9	8.2	8.0	250	250	255	0.9	1.8	1.3	0.57	1.37	0.88	4	4	18	1600	576	
2123	NARMADA AT KORIGHAT	MADHYA PRADESH	37.0	37.0	37.0	7.1	8.9	7.9	7.8	8.5	8.0	296	300	269	1.2	2.1	1.8	0.00	1.40	0.90	6	11	8	140	1600	613
1235	NARMADA AT HOSHANGABAD DIS	MADHYA PRADESH	26.0	38.0	37.0	6.8	7.1	7.0	7.8	7.9	8.2	299	370	299	1.1	2.9	2.1	0.00	1.77	1.03	2	8	6	27	1600	631
2106	RIVER NARMADA AT NEMAWAR	MADHYA PRADESH	18.0	32.0	25.2	6.2	7.6	7.0	7.1	8.4	7.5	221	470	336	0.8	3.0	1.8	0.06	0.96	0.48						
2099	NARMADA AT LALPUR, JABALPUR	MADHYA PRADESH	14.7	35.0	23.4	7.2	8.1	7.6	7.2	8.7	7.5	217	651	355	0.8	2.8	1.6	0.00	1.70	0.75				4	480	100
1245	NARMADA AT CHANDOD	GUJARAT	25.0	29.0	26.4	6.9	8.2	7.1	8.4	7.9	222	404	274	1.1	5.0	2.3	0.07	0.34	0.18	0.6	14	5	4	34	16	
WATER QUALITY OF TRIBUTARY STREAMS GOUR & KATNI- 2011																										
2100	GOUR AT BHOGA DOOR, JABALPUR	MADHYA PRADESH	13.4	33.0	22.4	3.8	8.1	7.2	7.2	8.3	7.6	312	810	482	1.4	3.8	2.4	0.09	2	0.73	0	28	2	4	460	111
2101	KATNI RIVER NEAR NAGAR NGAM	MADHYA PRADESH	10.4	32.0	21.4	7.4	8.2	7.8	7.2	7.9	7.5	296	729	536	1.1	2.4	1.7	0.00	1.88	0.97				25	240	82

TABLE 10.1 : - WATER QUALITY OF RIVER TAPI AND ITS TRIBUTARY STREAMS GIRNA, KIM, RANGAVALI, DENWA, PURNA, AMRAVATI, BORI, BURAI, GOMAI, HIWARA, MOR, MORNA, PANZARA, PEDHI, TITUR & WAGHUR - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA												> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml		
1313	TAPI AT AJNANI VILLAGE	MAHARASHTRA	27.0	41.5	34.4	4.9	6.9	6.1	7.1	8.7	7.7	172	992	536	2.6	8.0	5.3	0.25	4.33	2.42	9	26	16	22	84	41
1251	TAPI AT BHUSAWAL US	MAHARASHTRA	24.0	40.0	32.0	3.9	7.0	5.7	7.0	8.3	7.5	173	993	604	2.4	8.0	5.7	0.36	4.14	2.50	13	26	17	30	90	54
1314	TAPI AT UPHAD VILLAGE	MAHARASHTRA	27.0	40.0	31.4	5.1	7.1	6.2	7.2	8.7	7.6	175	952	573	2.2	10.0	4.7	0.30	5.82	3.14	13	26	19	27	80	50
46	TAPI AT UKAI, SHERULA BRIDGE	GUJARAT	28.0	29.0	27.5	6.2	7.3	7.0	7.5	8.0	7.7	339	384	352	1.2	1.8	1.5	0.00	0.20	0.10	230	750	2215	430	10000	3170
1247	TAPI AT MANDAVI	GUJARAT	27.0	28.0	27.7	7.2	7.6	7.4	7.8	8.1	8.0	318	390	359	1.5	2.5	1.9	0.02	0.32	0.22	230	900	677	930	2100	1510
47	TAPI AT KATHORE, (NH-8 BRIDGE)	GUJARAT	26.0	29.0	27.0	7.0	7.4	7.2	7.2	8.0	7.7	495	563	535	1.7	2.1	2.0	0.30	0.40	0.30	33	900	566	930	2800	1908
1248	TAPI AT SURAT US KATHORE	GUJARAT	26.0	29.0	27.5	6.9	7.3	7.1	7.8	8.1	8.0	472	585	525	1.5	2.2	1.9	0.20	0.30	0.30	900	1500	1058	2100	4300	2775
1982	TAPI AT RANDEK BRIDGE, SURAT	GUJARAT	27.0	27.0	27.0	6.8	7.1	7.0	7.8	7.9	7.9	621	697	659	1.2	2.6	1.9	0.09	0.45	0.27	900	1500	1200	2000	2300	2150
1983	TAPI NR BARDOLI (KAPP BRIDGE)	GUJARAT	27.0	31.0	29.0	5.5	6.7	6.1	7.8	7.9	7.9	339	364	352	2.1	2.7	2.4	0.17	0.28	0.23	400	4300	2350	2300	24000	13150
2071	TAPI AT ONGC BRIDGE AT SURAT	GUJARAT	26.0	28.0	27.5	3.2	5.6	4.4	7.1	7.9	7.5	2417	41836	25418	2.5	9.0	4.9	0.10	0.40	0.20	430	9000	2815	1500	15000	5850
WATER QUALITY OF TRIBUTARY STREAMS GIRNA, KIM, RANGAVALI, DENWA, PURNA, AMRAVATI, BORI, BURAI, GOMAI, HIWARA, MOR, MORNA, PANZARA, PEDHI, TITUR & WAGHUR - 2011																										
1252	GIRNA AT MILEGAON (MANMAD)	MAHARASHTRA	24.0	28.0	25.8	4.8	6.8	5.7	7.3	8.1	7.7	199	698	417	2.4	7.0	4.3	0.00	2.77	1.74	7	26	17	20	90	50
1252	GIRNA AT JALGAON	MAHARASHTRA	24.0	39.0	32.0	5.1	7.3	6.0	7.2	8.8	7.7	155	1043	664	2.2	10.0	5.4	0.30	4.60	2.51	11	27	18	26	60	43
2070	KIM AT SAHOL BRIDGE, OLPAJ HANSOTI ROAD, DIST. SURAT	GUJARAT	26.0	36.0	27.8	4.3	6.7	5.7	7.7	8.1	7.9	698	1190	830	1.8	3.4	2.6	0.10	0.50	0.30	900	4300	2250	4300	7500	5175
1907	RANGAVALI DIS OF NAVAPUR	MAHARASHTRA	26.5	39.0	30.7	4.0	7.2	5.8	7.2	8.1	7.7	168	855	487	2.0	8.0	5.2	0.50	5.87	2.75	11	26	19	33	50	39
2127	DENWA NEAR SARNI, ROAD BRIDGE	MADHYA PRADESH	36.0	38.0	37.3	5.3	8.9	7.5	7.3	8.2	7.8	330	1040	521	1.0	3.6	2.2	0.00	12.90	3.40	12	12	12	20	1600	647
2155	PURNA A/C MORNA, NANDURA VILL	MAHARASHTRA	20.0	25.0	21.9	2.7	6.4	5.2	6.5	8.4	7.8	537	1890	995	3.6	12.0	6.6	0.17	12.85	3.25	26	240	116	90	500	346
2652	AMRAVATI DIS DONDAICHA, DHULE	MAHARASHTRA	27.0	37.0	29.3	4.8	7.1	6.2	7.1	8.1	7.5	176	937	520	2.2	10.0	5.0	0.27	5.54	3.03	14	22	17	33	60	51
2658	BORI DIS OF AMALNER, JALGAON	MAHARASHTRA	26.5	36.5	31.4	5.4	7.2	6.4	7.2	8.4	7.6	174	890	507	2.2	8.0	4.0	0.25	3.82	2.47	17	22	20	40	150	68
2659	BURAI BEFORE CONFLUENCE TO TAPI, MUKUDAS, DHULE	MAHARASHTRA	24.5	39.0	28.4	4.7	7.2	6.2	7.1	8.1	7.6	163	921	510	2.6	8.0	4.8	0.33	5.43	3.51	17	40	26	30	70	53

TABLE 11.1 : - WATER QUALITY OF RIVER MAHANADI - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml					
1851	MAHANADI AT SIHAWA	CHHATTISGARH	25.0	33.0	28.0	7.3	9.3	8.2	7.7	7.8	7.7	143	590	296				0.20	2.40	0.80	220	220	220	11	11	11
1264	MAHANADI AT RUDRI US AT DHAMTORI RESERVOIR	CHHATTISGARH	25.0	33.0	28.0	7.3	8.5	7.8	7.4	7.8	7.6	140	614	347				1.00	2.30	1.40				33	300	101
1099	MAHANADI AT US OF RAJIM	CHHATTISGARH	22.0	33.0	28.0	6.8	8.4	7.7	7.3	7.9	7.7	261	716	372				1.00	2.50	1.40				24	500	158
1852	MAHANADI AT ARRANG, RAIPUR	CHHATTISGARH	26.0	34.0	30.0	6.7	8.5	7.6	7.4	7.8	7.7	242	672	392				1.30	2.30	1.80	350	350	350	33	40	37
1100	MAHANADI AT KHARAD	CHHATTISGARH	24.0	33.0	29.0	6.4	7.5	6.9	7.5	8.5	7.7	186	366	233	1.3	1.4	1.4	1.39	2.70	2.07				12	20	15
1282	MAHANADI AT SHEORINARAYAN VILLAGE	CHHATTISGARH	25.0	33.0	29.0	7.1	7.3	7.2	7.5	7.5	7.5	265	375	320	1.4	1.4	1.4	2.33	2.69	2.51				17	18	18
1467	MAHANADI A/C WITH RIVER MAND	CHHATTISGARH	24.0	33.0	28.0	6.7	8.0	7.1	7.5	8.5	8.0	90	284	213	1.1	1.3	1.2	1.30	1.68	1.48				10	22	18
1101	MAHANADI AT INTERSTATE BOUNDRY	CHHATTISGARH	24.0	32.0	27.0	7.1	7.4	7.3	7.4	7.7	7.5	248	301	272	0.9	1.6	1.2	1.16	1.93	1.26				43	240	127
1281	MAHANADI AT HIRAKUD RESERVOIR	ORISSA	24.0	32.0	27.0	5.8	9.4	7.6	7.4	8.3	7.9	120	261	189	0.9	2.0	1.4	0.03	5.71	0.92	330	1500	1015	700	4300	1937
1270	MAHANADI AT SAMBALPUR US	ORISSA	24.0	34.0	27.0	5.9	9.4	7.5	7.2	8.3	7.8	130	305	199	0.8	2.1	1.5	0.01	0.49	0.18	310	5400	1329	700	9200	2415
1271	MAHANADI AT SAMBALPUR D/S	ORISSA	22.0	31.0	26.0	5.3	9.6	6.8	7.2	8.2	7.8	121	333	238	0.6	3.3	2.5	0.02	1.30	0.51	2100	92000	26925	4300	160000	45192
2405	SAMBHALPUR FDS AT HUMA	ORISSA	20.0	30.0	25.0	6.3	9.1	7.5	7.5	8.4	8.0	139	272	186	1.0	2.9	1.9	0.01	0.68	0.22	140	13000	3184	700	26000	5181
1272	MAHANADI D/S (AFTER CONFL WITH R. ONG SONEPUR U/S)	ORISSA	20.0	31.0	26.0	4.3	9.4	7.3	7.6	8.4	7.9	148	285	203	0.7	2.1	1.3	0.02	1.58	0.39	230	2100	819	630	4300	1616
1274	MAHANADI A/C R.TEL. (SONEPUR D/S)	ORISSA	20.0	32.0	27.0	4.9	9.8	7.2	7.5	8.4	8.0	173	344	237	0.8	2.8	1.8	0.02	1.03	0.34	700	2800	1332	1100	9200	2625
1275	MAHANADI AT TIKARPADA	ORISSA	22.0	31.0	27.0	5.6	9.3	7.3	7.1	8.4	8.0	122	261	188	0.8	2.4	1.5	0.06	0.47	0.19	460	4300	1578	580	8400	3293
1276	MAHANADI AT NARSINGHPUR	ORISSA	18.0	33.0	25.0	6.3	9.3	7.8	7.7	8.4	8.0	153	256	202	0.6	1.8	1.3	0.14	3.58	0.66	220	1500	763	260	2800	1508
1277	MAHANADI AT CUTTACK US	ORISSA	20.0	32.0	28.0	5.2	10.5	8.1	7.1	8.5	8.0	142	304	198	0.7	2.4	1.4	0.01	2.06	0.49	140	1400	475	140	1700	1023
1278	MAHANADI AT CUTTACK D/S	ORISSA	21.0	34.0	29.0	6.0	8.4	7.4	7.5	8.4	8.0	141	295	197	1.8	3.6	2.4	0.06	3.30	0.59	1100	160000	25475	1100	160000	35583
2409	CUTTACK FDS (SERUA) AT SANKHATIRASA	ORISSA	19.0	32.0	27.0	5.7	9.9	7.5	7.4	8.4	8.0	143	364	210	1.3	3.3	2.2	0.06	2.11	0.48	310	7900	2946	310	13000	5018
2406	MUNDAL(WATER INTAKE POINT OF BHUBANESWAR CITY	ORISSA	20.0	32.0	27.0	5.9	9.5	7.6	7.4	8.4	8.0	142	255	202	1.0	2.9	1.4	0.10	0.74	0.35	78	2200	975	170	3500	1718
2404	POWER CHANNEL D/S NEAR BURLA	ORISSA	24.0	34.0	27.0	5.1	8.2	6.7	7.6	8.4	7.9	126	244	184	1.0	2.3	1.7	0.02	4.38	0.69	80	940	412	80	1700	829
ESTUARINE ZONE																										
2407	PARADEEP US (BEFORE INDUSTRIAL ACTIVITY AT PARADEEP)	ORISSA	22.0	36.0	28.0	6.2	9.4	7.5	7.6	8.4	8.0	166	13190	2453	0.6	2.1	1.3	0.21	3.19	0.78	700	3100	1524	700	7000	3017
1639	MAHANADI AT PARADEEP D/S	ORISSA	22.0	35.0	28.0	6.0	7.9	6.8	7.7	8.3	8.0	1275	39670	2	0.7	3.0	2.1	0.25	3.87	1.40	80	13000	1893	80	54000	6148

TABLE 11.2 : - WATER QUALITY OF TRIBUTARY STREAMS SEONATH, KHAROON, HASDEO, KELO, IB,BHEDEN, KUAKHALDAYA, KATHAJODI, SANKHA, TEL AND BIRUPA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml					
1107	SEONATH AT US RAJNANDGAON	CHHATTISGARH	18.0	31.0	22.0	7.2	8.1	7.5	7.4	7.6	7.5	309	332	320	1.1	2.1	1.5	0.38	0.62	0.49	270	270	270	120	2400	658
1845	SEONATH RIVER WATER SUPPLY WELL DURG	CHHATTISGARH	21.0	31.0	24.0	7.3	7.7	7.5	7.3	7.5	7.4	321	338	329	1.4	1.9	1.6	0.40	0.40	0.40				210	2400	828
1266	SEONATH AT SHINGA A/C KHAROON	CHHATTISGARH	25.0	30.0	28.0	7.4	7.8	7.6	7.2	7.9	7.6	228	674	389				0.20	2.20	1.20				11	300	106
1265	KHAROON AT RAIPUR US	CHHATTISGARH	24.0	34.0	29.0	7.5	8.7	8.1	7.7	7.8	7.7	240	610	344				1.10	2.20	1.40				30	240	85
1847	KHAROON RIVER B/C KHAPRI DRAIN, DURG, RAIPUR ROAD BRIDGE	CHHATTISGARH	21.0	30.0	24.0	7.3	7.9	7.6	7.4	7.6	7.5	318	339	330	1.4	1.9	1.6	0.30	0.50	0.50				210	2400	820
1846	KHAROON RIVER A/C KHAPRI DRAIN	CHHATTISGARH	21.0	30.0	23.0	7.1	7.8	7.5	7.5	7.6	7.5	325	347	336	1.6	2.2	1.9	0.50	0.60	0.60				240	2400	995
1853	KHAROON RIVER BUNDRI, RAIPUR	CHHATTISGARH	24.0	34.0	29.0	7.1	8.5	7.7	7.8	7.9	7.8	196	632	333				1.20	2.10	1.50	240	240	240	27	50	41
1105	HASDEO AT US KORBA	CHHATTISGARH	25.0	27.0	26.0	5.5	6.9	6.4	7.1	7.2	7.1				0.9	2.3	1.4	1.05	1.57	1.31				70	230	122
1106	HASDEO AT US OF CHAMPA	CHHATTISGARH	24.0	34.0	28.0	6.3	7.5	6.9	7.5	8.5	7.9	176	274	236	1.4	1.8	1.6	1.39	2.05	1.73				7	23	16
1849	KELO RIVER US OF RAIGARH	CHHATTISGARH	24.0	32.0	27.0	7.1	7.5	7.3	7.4	7.6	7.5	247	292	266	1.1	1.9	1.4	1.17	1.29	1.22				64	240	153
1850	KELO RIVER D/S OF RAIGARH	CHHATTISGARH	24.0	32.0	27.0	7.0	7.3	7.2	7.5	7.8	7.6	258	298	278	1.6	2.8	2.1	1.19	1.36	1.26				120	460	276
1267	IB AT SUNDARGARH, ORISSA	ORISSA	23.0	35.0	28.0	5.3	8.7	7.4	7.4	8.3	7.9	82	183	144	0.5	2.6	1.5	0.02	2.12	0.39	68	1700	624	140	17000	2353
1268	IB AT JHARSUGUDA (INTAKE)	ORISSA	22.0	32.0	27.0	5.4	9.0	7.3	6.8	8.4	7.8	96	206	146	0.8	2.5	1.5	0.00	1.48	0.34	130	13000	2367	220	17000	4088
1300	IB AT RAJ NAGAR US	ORISSA	20.0	33.0	27.0	5.7	9.1	7.5	7.3	8.3	7.9	95	228	157	1.0	2.2	1.4	0.01	1.19	0.25	110	1400	711	700	2800	1439
1269	IB AT BRAJRAJNAGAR (INTAKE) D/S	ORISSA	20.0	32.0	27.0	5.9	9.6	7.5	7.4	8.3	8.0	90	288	162	1.2	2.4	1.8	0.02	1.57	0.42	110	3100	1288	790	6300	2728
2403	BHEDEN B/C WITH IB RIVER	ORISSA	18.0	31.0	25.0	5.0	9.7	7.4	7.2	8.2	7.8	115	393	249	0.7	2.4	1.6	0.01	1.24	0.43	130	790	297	230	1400	683
1279	KUAKHAI AT BHUBANESWAR US	ORISSA	23.0	35.0	29.0	5.3	8.8	7.0	7.1	8.2	7.7	167	256	202	1.6	2.8	2.1	0.06	7.05	1.29	200	11000	2958	790	17000	6316
1280	KUAKHAI AT BHUBANESWAR D/S	ORISSA	26.0	35.0	29.0	5.2	11.0	6.7	7.1	8.0	7.5	156	348	251	2.2	6.5	4.0	0.06	7.46	3.19	4600	54000	16342	7900	92000	25058
2410	KUAKHAI AT BHUBANESWAR FUIS	ORISSA	23.0	34.0	29.0	7.0	10.3	8.8	7.4	8.2	7.9	129	248	191	1.0	2.4	1.8	0.01	1.09	0.29	70	1400	478	70	2100	932
2411	DAYA AT BHUBANES																									

TABLE 13.1 :- WATER QUALITY OF RIVER SUBARNAREKHA – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5			< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1641	SUBARNAREKHA AT RAJGHAT NEAR BIKAR BORDER	ORISSA	16.0	32.0	22.4	6.8	8.2	7.7	7.4	8.4	8.0	126	408	249	0.8	2.0	1.5	0.04	0.98	0.25	460	15000	2923	1200	43000	7300
2399	SUBARNAREKHA AT CHANDIL DAM	JHARKHAND	16.0	36.0	27.0	3.0	8.3	7.5	7.4	7.6	7.5	152	184	164	0.2	0.6	0.5	3.80	7.12	5.67						
48	SUBARNAREKHA AT CHANDIL BDG	JHARKHAND	17.0	37.0	26.7	7.4	8.2	7.9	7.4	7.7	7.6	152	174	166	0.2	1.0	0.6	0.00	7.24	4.80						
24	SUBARNAREKHA AT JAMSHEDPUR	JHARKHAND	17.0	38.0	27.8	6.4	7.8	7.1	7.4	7.8	7.5	162	296	184	1.4	2.8	2.0	0.00	8.10	6.55						
49	SUBARNAREKHA AT D/S JAMSHEDPUR,(TATA NAGAR)	JHARKHAND	15.0	34.0	26.3	4.2	8.0	6.2	7.4	8.2	7.7	170	201	181	1.8	3.8	2.6	0.00	9.30	6.63						
2387	SUBARNAREKHA AT GHATISLA ROAD BRIDGE	JHARKHAND	16.0	34.0	26.5	6.4	8.6	7.8	7.3	7.6	7.5	132	164	155	0.2	0.6	0.4	3.72	8.40	5.18						
23	SUBARNAREKHA AT RANCHI (TATISILWAJ)	JHARKHAND	16.0	31.0	24.3	4.5	8.0	6.3	6.5	7.5	7.0				3.0	6.0	4.4				230	430	330	1200	2100	1650
2385	AT NAMKUM ROAD BRIDGE	JHARKHAND	17.0	28.0	23.7	3.5	7.8	5.9	6.5	8.0	7.0				3.0	7.0	5.2				280	280	280	1500	1500	1500
2386	SUBARNAREKHA AT MURI RD BDG	JHARKHAND	17.0	27.0	23.2	6.8	8.0	7.5	6.5	7.6	7.0				1.0	5.5	2.5				280	280	280	1500	1500	1500
2395	SUBARNAREKHA AT HATIA DAM	JHARKHAND	16.0	28.0	22.6	6.9	8.3	7.6	6.6	7.8	7.2				1.0	4.0	2.3				230	280	255	1200	1500	1350
2397	SUBARNAREKHA AT GATASUD DAM	JHARKHAND	15.0	28.0	23.5	7.0	8.2	7.8	6.8	8.1	7.3				1.0	7.0	3.3				110	110	110	750	750	750

TABLE 14.1 :- WATER QUALITY OF RIVER GODAVARI – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5			< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1312	GODAVARI AT JAYAKWADI DAM, AJRANACABAD	MAHARASHTRA	20.0	40.0	27.3	6.0	7.8	6.8	7.4	8.3	8.0	328	1432	574	2.8	12.0	4.7	0.01	3.62	1.10	2	7	3	34	140	86
2177	GODAVARI RIVER NEAR SOMESHWAR TEMPLE	MAHARASHTRA	24.0	26.0	25.5	4.8	7.0	5.9	7.4	8.2	7.7	176	675	313	2.5	14.5	6.5	0.29	4.68	1.51	8	70	21	22	280	77
2182	GODAVARI RIVER AT SAIKHEDA	MAHARASHTRA	24.0	27.0	25.0	2.7	6.9	5.5	7.0	8.3	7.6	132	764	363	2.8	12.5	6.6	0.54	4.49	1.71	9	40	17	24	90	47
2179	GODAVARI AT HANUMAN GHAT, NASHIK CITY	MAHARASHTRA	25.0	27.0	26.1	3.8	6.4	5.2	7.1	7.7	7.3	270	1290	467	4.6	13.5	8.8	0.04	5.86	2.63	14	70	37	50	700	152
2183	GODAVARI AT NANDUR- MADHESHWAR DAM	MAHARASHTRA	24.0	29.0	25.0	5.7	6.9	6.4	7.2	8.0	7.6	173	758	359	2.5	6.0	4.1	0.09	3.84	1.91	8	50	16	26	150	55
2181	GODAVARI AT KAPLA- GODAVARI CONFLUENCE POINT, TAPOVAN	MAHARASHTRA	25.0	28.0	25.8	1.2	6.7	3.9	7.1	7.8	7.4	210	780	571	4.0	37.0	13.9	0.09	5.32	2.84	17	90	35	40	900	165
2180	GODAVARI RIVER NEAR TOPOVAN	MAHARASHTRA	24.0	26.0	25.6	1.8	6.5	4.2	7.2	7.9	7.5	201	1112	511	4.5	28.0	12.9	0.62	6.24	2.81	17	90	45	70	900	194
1096	GODAVARI AT PANCHAVATI AT RAMKUND	MAHARASHTRA	24.0	27.0	26.0	4.0	6.4	5.2	7.1	7.8	7.5	206	860	344	2.2	16.0	9.5	0.06	3.61	1.88	17	60	28	50	500	160
1211	GODAVARI AT NASIK D/S	MAHARASHTRA	24.0	27.0	25.8	1.9	7.0	4.8	6.4	7.8	7.3	214	699	383	2.4	28.0	11.2	0.68	3.84	1.89	11	50	25	40	350	103
1095	GODAVARI AT U/S OF GANGAPUR DAM,NASHIK	MAHARASHTRA	24.0	26.0	25.0	5.8	6.9	6.5	7.1	7.9	7.5	145	302	201	2.2	9.0	4.2	0.09	3.43	1.27	7	14	11	22	50	34
2160	GODAVARI AT U/S OF AJRANACABAD RESERVOIR, KAIGAON TOKKA NEAR KAIGAON BRIDGE	MAHARASHTRA	18.0	40.0	28.4	3.4	7.5	6.3	7.1	8.9	8.1	519	1430	970	2.8	7.2	4.8	0.12	4.50	1.35	2	9	3	50	140	85
2158	GODAVARI AT U/S OF PAITHAN AT PAITHAN INTAKE PUMP HOUSE AT JAYAKWADI	MAHARASHTRA	20.0	40.0	27.3	6.1	7.6	6.8	7.5	8.7	8.1	407	930	537	3.0	8.0	4.4	0.16	3.62	1.23	1	9	3	34	140	84
2159	GODAVARI AT D/S OF PAITHAN AT PATHEGAON BRIDGE	MAHARASHTRA	20.0	40.0	27.4	5.2	7.7	6.4	7.3	8.8	8.1	398	1402	733	3.0	12.0	5.1	0.07	6.42	1.87	2	7	3	50	170	98
2161	GODAVARI AT JALNA INTAKE WATER PUMP HOUSE, SHAHABAD	MAHARASHTRA	22.0	32.0	27.6	2.3	7.1	6.1	6.9	8.9	8.0	405	1959	935	3.1	18.7	6.2	0.22	5.62	2.10	2	6	3	50	140	83
12	GODAVARI AT DHALEGAON	MAHARASHTRA	20.0	30.0	25.6	5.8	7.3	6.6	7.1	8.4	7.9	392	1158	642	3.2	10.0	4.9	0.18	3.63	1.40	2	4	2	50	140	76
1210	GODAVARI AT NANDED	MAHARASHTRA	28.0	31.0	29.7	5.1	7.4	6.6	7.4	8.6	8.1	356	954	582	3.0	7.4	4.4	0.25	4.14	1.52	2	11	3	60	170	103
1209	GODAVARI AT RAHER	MAHARASHTRA	29.0	31.0	30.2	4.5	7.1	6.2	7.3	8.8	8.1	408	721	569	3.0	7.0	4.5	0.36	3.84	1.81	2	9	3	33	170	103
2157	GODAVARI AT LATUR WATER INTAKE NEAR PUMP HOUSE AT DHANEGON	MAHARASHTRA	21.0	36.0	27.3	6.1	7.4	6.8	7.0	8.4	7.8	348	517	432	2.3	7.4	4.2	0.29	3.05	1.05	2	6	3	50	140	82
2360	GODAVARI AT BASARA, ADILABAD	ANDHRA PRADESH	22.0	30.0	26.6	5.2	6.3	5.7	7.5	8.6	8.1	315	804	477	0.2	4.0	2.2	0.50	4.00	1.78	6	26	14	145	312	188
2361	GODAVARI AT MANCHERIAL, NEAR RLY BDG B/C OF RALLAVAGU	ANDHRA PRADESH	21.0	28.0	24.8	6.5	9.4	8.0	6.7	8.9	8.0	347	546	481	0.7	3.6	2.3	0.10	0.70	0.31	2	350	76	220	1600	854
2362	GODAVARI AT RAMANUGUNDAM D/S, NEAR FC INTAKE WELL, KARIMNAGAR	ANDHRA PRADESH	21.0	28.0	24.8	6.6	12.2	8.6	7.4	9.1	8.2	366	661	522	0.8	6.4	3.1	0.10	0.80	0.30	2	90	26	280	1600	1056
2363	GODAVARI AT GODAVARIKHANI NEAR BATHING GHAT, KARIMNAGAR	ANDHRA PRADESH	21.0	28.0	24.8	5.4	11.6	7.7	7.4	8.8	8.1	377	717	565	0.9	7.8	4.8	0.11	1.39	0.80	17	500	265	1600	1600	
2364	GODAVARI AT RAMANUGUNDAM U/S, KARIMNAGAR	ANDHRA PRADESH	21.0	28.0	24.6	6.5	8.8	8.0	7.4	9.1	8.2	348	544	480	0.7	3.5	2.2	0.10	0.70	0.28	2	350	127	210	1600	1182
2356	GODAVARI, D/S OF RAMANUGUNDAM	ANDHRA PRADESH	21.0	28.0	24.9	6.5	9.8	7.9	7.5	8.8	8.1	368	591	514	1.2	7.7	3.2	0.08	0.70	0.27	14	80	43	1600	1600	1600
2365	GODAVARI AT KAMALPUR U/S M/S AP RAYONS LTD. INTAKE WELL, WARANGAL	ANDHRA PRADESH	20.0	36.0	26.5	5.5	9.1	6.8	7.2	8.8	7.9	183	458	338	0.5	3.0	1.7	0.10	0.75	0.23	2	350	98	280	1600	1196
2366	GODAVARI AT KAMALPUR D/S AT M/S. AP RAYONS LTD. DISCHARGE POINT, WARANGAL	ANDHRA PRADESH	20.0	37.0	27.6	4.5	8.3	6.5	7.3	9.0	8.0	186	468	342	0.0	3.5	1.5	0.10	0.82	0.30	2	500	161	240	1600	1188
13	GODAVARI AT MANCHERIAL	ANDHRA PRADESH	21.0	28.0	25.0	6.5	9.9	8.1	7.4	9.1	8.2	347	544	481	0.7	3.6	2.3	0.10	0.60	0.26	12	280	89	500	1600	1380
2367	GODAVARI AT BHADRACHALAM U/S BATHING GHAT, KHAMMAM	ANDHRA PRADESH	20.0	20.0	20.0	4.1	7.5	5.5	7.5	8.2	7.7	205	489	331	0.4	1.0	0.6	0.15	0.34	0.26	4	6	4	1100	1400	1200
2368	GODAVARI AT BHADRACHALAM D/S BATHING GHAT, KHAMMAM	ANDHRA PRADESH	20.0	20.0	20.0	4.1	7.7	5.7	7.0	8.3	7.6	206	549	344	0.5	0.9	0.7	0.19	0.42	0.27	4	6	5	1100	1400	1308
2369	GODAVARI AT BURGAMPADAH, KHAMMAM	ANDHRA PRADESH	20.0	20.0	20.0	4.0	7.1	5.0	6.5	7.8	7.1	407	1119	671	0.5	0.8	0.7	0.22	0.52	0.32	4	6	5	1100	1700	1325

2370	GODAVARI AT RAJAMUNDRY U/S OF NALLA CHANNEL	ANDHRA PRADESH	24.8	29.0	26.9	5.8	7.2	6.4	7.2	8.0	7.5	160	371	255	1.0	1.4	1.1	0.23	3.40	1.74	3	3	3	14	1100	525
14	GODAVARI AT POLAVARAM	ANDHRA PRADESH	25.0	28.2	26.2	6.0	7.2	6.7	7.4	8.2	7.8	160	345	244	1.0	1.0	1.0	0.44	2.25	1.20	3	3	3	7	1100	330
1218	GODAVARI AT RAJAMUNDRY U/S OF NALLA CHANNEL	ANDHRA PRADESH	24.0	28.0	25.6	5.8	7.0	6.4	7.2	8.5	7.7	168	314	248	1.0	1.4	1.1	0.37	2.50	1.49	3	4	3	21	1100	428
2371	GODAVARI AT RAJAMUNDRY D/S OF NALLA CHANNEL	ANDHRA PRADESH	25.0	29.4	26.4	6.0	7.0	6.2	6.8	7.8	7.4	196	391	268	1.0	1.5	1.2	1.04	3.52	1.96	3	4	3	39	2400	964
1219	GODAVARI AT RAJAMUNDRY D/S OF NALLA CHANNEL	ANDHRA PRADESH	20.0	27.1	25.6	5.8	6.8	6.3	7.2	8.2	7.6	168	813	307	1.0	1.8	1.3	0.58	3.79	1.90	3	4	3	21	1100	793

TABLE 14.2 - WATER QUALITY OF TRIBUTARY STREAMS INDRAVATI, SHANKINI, MANJEERA, MANER, WARDHA, WAINGANGA, KOLAR, KANHAN, PURNA, NIRA, KINNERSANI, SABARI, BINDUSARA, DARNA, PENGANGA & WENA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
			> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml											
1854	INDRAVATI A/C DANTEWADA RIVER, NELSONNAR, DANTEWADA	CHHATTISGARH	19.0	30.0	25.8	7.6	7.8	7.7	7.5	7.8	7.6				0.8	1.5	1.2							4	8	7
1856	SHANKINI A/C DANKANI RIVER	CHHATTISGARH	19.0	30.0	25.8	7.6	7.8	7.7	7.6	7.8	7.7				0.9	1.6	1.2							4	12	10
2673	MANJIRA AT D/S OF LATUR, NEAR LATUR- NANDED BRIDGE	MAHARASHTRA	22.0	34.0	27.4	2.7	7.0	6.0	7.2	8.5	8.0	368	878	540	3.8	7.6	4.7	0.37	4.97	1.88	2	6	3	70	140	100
2374	MANJEERA AT GOWDICHARLA B/C WITH NAKKAVAGU	ANDHRA PRADESH	21.0	29.0	26.3	4.6	7.0	6.2	7.6	8.7	8.2	312	630	394	0.9	3.2	1.9	0.30	1.30	0.79	2	36	10	25	240	106
2375	MANJEERA AT GOWDICHARLA A/C WITH NAKKAVAGU	ANDHRA PRADESH	21.0	31.0	26.5	4.6	6.1	5.6	6.9	8.6	7.7	358	1019	652	0.9	5.6	3.2	1.00	7.00	3.44	11	80	25	49	340	149
1781	MANJEERA NR GANAPATHI SUGARS	ANDHRA PRADESH	23.0	30.0	26.8	5.0	6.8	5.8	7.2	8.8	8.1	332	626	421	0.6	4.8	2.2	0.30	2.00	0.72	6	45	26	95	260	186
1157	MANJERA AT RAIPALLU	ANDHRA PRADESH	23.0	31.0	28.8	4.8	6.1	5.3	7.4	8.9	8.1	257	604	393	0.8	4.0	2.2	0.30	2.00	0.92	4	26	15	65	360	148
1891	MANJIRA AT D/S IN INTAKE POINT TO BILAS CHATRY	KARNATAKA	22.0	31.0	27.0	7.5	8.3	7.9	6.8	8.3	7.9				1.0	3.5	2.1	0.10	1.63	0.66	130	1000	489	350	3200	1396
1215	MANER AT WARANGAL U/S	ANDHRA PRADESH	27.0	36.0	30.5	2.1	9.5	7.0	7.2	8.4	7.9	214	642	492	0.8	9.5	4.2	0.20	9.82	3.00	12	1600	543	280	1600	1160
1158	MANER AT SOMNAPALLI	ANDHRA PRADESH	21.0	28.0	24.5	6.4	14.2	8.9	7.2	9.2	8.1	321	512	430	0.8	4.0	2.6	0.08	2.10	0.30	2	350	96	350	1600	1130
2719	WARDHA AT D/S OF ERAI RIVER, HADASTI, CHANDRAPUR	MAHARASHTRA	18.0	26.0	20.2	3.7	6.9	5.5	7.1	8.8	7.8	410	2400	791	4.0	11.0	14.9	0.14	26.0	3.75	22	1600	173	70	1600	238
2720	WARDHA AT U/S OF ERAI RIVER, HADASTI, CHANDRAPUR	MAHARASHTRA	18.0	26.0	20.2	3.6	7.4	6.0	7.0	8.7	8.0	456	1560	697	3.6	13.3	6.0	0.15	14.0	2.20	14	500	64	30	900	139
2721	WARDHA AT U/S OF ACC GHUGGUS, CHANDRAPUR	MAHARASHTRA	18.0	26.0	19.0	4.0	7.3	5.9	7.0	8.9	7.8	352	918	621	3.0	7.2	5.3	0.42	2.84	1.31	8	170	49	17	250	121
2174	WARDHA D/S OF ACC GHUGGUS.	MAHARASHTRA	18.0	28.0	19.5	3.8	6.7	5.3	7.3	9.0	7.8	396	992	654	3.6	8.6	6.2	0.15	2.96	1.29	13	170	62	30	350	163
2156	WARDHA AT CONFLUENCE POINT OF PENGANGA & WARDHA AT JIJAD.	MAHARASHTRA	20.0	20.0	20.0	4.6	6.6	5.5	6.7	8.8	7.9	376	1810	893	4.0	12.0	6.6	0.14	8.62	2.43	17	170	51	50	300	117
1212	WARDHA AT RAJURA BRIDGE	MAHARASHTRA	18.0	20.0	18.2	4.6	7.3	5.8	7.4	8.6	8.0	367	770	554	3.2	8.4	5.4	0.14	2.72	1.30	11	220	69	26	350	155
1213	WAINGANGA AT BALAGHAT	MADHYA PRADESH	17.0	30.0	21.5	7.2	8.2	7.8	7.2	7.9	7.6	399	781	505	1.0	2.8	1.7	0.06	1.90	0.98				11	460	81
1214	WAINGANGA AT CHINDWARA	MADHYA PRADESH	18.0	26.0	22.5	7.4	8.2	7.8	7.3	7.9	7.5	229	1224	495	1.2	2.8	1.9	0.04	3.20	0.99				21	460	100
1910	WAINGANGA A/C WITH KANHAN	MAHARASHTRA	18.0	22.0	21.6	5.1	7.6	6.1	7.3	8.8	8.0	436	918	562	3.0	8.7	5.3	0.14	9.72	1.92	11	240	66	70	500	194
2173	WAINGANGA U/S OF ELLORA PAPER MILL	MAHARASHTRA	20.0	26.0	22.5	4.5	7.4	5.9	7.3	8.6	8.0	323	690	495	3.3	6.8	5.0	0.18	3.69	1.24	13	110	69	80	350	186
2172	WAINGANGA D/S OF ELLORA PAPER MILL	MAHARASHTRA	20.0	26.0	23.0	3.9	6.2	5.3	7.3	8.7	7.9	369	964	541	4.0	11.0	6.2	0.19	3.26	1.40	17	170	85	110	500	235
2175	WAINGANGA U/S OF GAURAV PAPER MILLS, NEAR JACKWELL	MAHARASHTRA	18.0	20.0	19.0	4.6	7.1	5.9	7.0	8.6	7.9	316	928	573	3.4	8.6	5.3	0.43	2.82	1.46	11	130	64	33	280	152
2176	WAINGANGA D/S OF GAURAV PAPER MILLS, NEAR JACKWELL.	MAHARASHTRA	17.0	20.0	18.3	4.1	6.4	5.4	7.4	8.4	7.9	318	990	622	4.0	12.0	6.7	0.14	2.88	1.47	17	240	99	50	500	248
11	WAINGANGA AT ASHTI	MAHARASHTRA	17.0	24.0	19.0	4.7	7.2	6.0	6.7	8.8	7.8	405	1021	644	3.6	7.2	5.0	0.12	3.98	1.34	7	280	84	21	350	200
1908	KOLAR B/C TO KANHAN AT KAMPTEE	MAHARASHTRA	18.0	27.0	22.2	4.5	6.4	5.5	6.5	8.4	7.9	507	1140	740	4.0	8.0	5.4	0.13	3.48	1.66	14	170	89	50	350	184
1909	KANHAN D/S OF NAGPUR	MAHARASHTRA	18.0	25.0	21.7	3.1	7.4	5.3	7.1	8.4	7.8	392	1224	688	3.2	11.0	7.2	0.12	3.20	1.27	14	170	51	50	350	178
2170	KANHAN U/S OF MS VIDHARBA PAPER MILL, SINORA	MAHARASHTRA	18.0	27.0	20.8	4.4	6.4	5.6	6.8	8.9	7.9	394	892	561	3.8	8.0	5.6	0.12	4.64	1.48	8	110	55	34	350	145
2171	KANHAN D/S OF MS VIDHARBA PAPER MILL, SINORA.	MAHARASHTRA	18.0	27.0	21.9	4.1	5.9	5.0	6.3	9.0	7.9	410	918	591	4.0	9.4	6.6	0.17	4.72	1.68	14	170	82	80	500	245
1913	PURNA AT DHUPESHWAR	MAHARASHTRA	20.0	25.0	20.8	3.9	6.3	5.4	7.1	8.8	8.1	552	1872	895	3.8	14.0	6.9	0.08	4.34	2.14	21	280	91	70	900	284
2700	PURNA NR ACHALPUR-AMRAVATI RD BDG, ASEGAON, CHANDUR BAZAR, AMRAVATI.	MAHARASHTRA	18.0	20.0	19.6	5.3	6.8	6.2	7.6	8.9	8.4	490	1143	780	4.0	7.7	4.9	0.94	3.19	2.05	50	130	94	170	300	224
1315	NIRA AT PULGAON COTTON MILL	MAHARASHTRA	18.0	22.0	21.2	4.9	7.0	5.8	7.1	8.8	8.0	380	886	524	4.0	8.6	5.9	0.13	3.62	1.39	22	140	63	50	500	207
2372	KINNERSANI A/C OF KTPS ASH POND EFFLUENTS, KHAMMAM	ANDHRA PRADESH	20.0	24.0	20.0	4.6	7.8	5.9	7.3	8.0	7.7	359	510	431	0.5	1.0	0.6	0.28	0.41	0.33	4	6	5	1100	1400	1250
2373	SABARI AT KUNAVARAM, KHAMMAM	ANDHRA PRADESH	20.0	24.0	20.3	4.7	8.0	6.1	6.8	8.0	7.3	67	232	119	0.4	0.5	0.5	0.02	0.18	0.10	2	2	2	200	200	200
2657	BINDUSARA AT BEED, NR INTAKE WATER PUMP HOUSE DAM	MAHARASHTRA	22.0	30.0	26.2	5.6	7.4	6.6	6.8	8.8	7.9	179	2156	861	3.0	7.4	4.4	0.29	6.36	2.42	2	11	4	33	240	113
2660	DARNA AT CHEHEDI PUMPING ST.	MAHARASHTRA	25.0	26.0	25.0	5.7	7.1	6.2	7.1	8.1	7.7	195	659	330	2.4	7.0	5.0	0.36	4.80	1.13	8	22	15	22	60	38
2661	DARNA ASWALI (DARNA DAM), LGATPURI, NASHIK	MAHARASHTRA	20.0	29.0	25.1	4.3	7.0	6.2	7.2	8.4	7.6	170	704	267	2.2	6.0	4.6	0.03	4.26	1.06	7	22	11	11	60	30
2662	DARNA AT MES SITE PUMPING STATION, BHAGUR, NASHIK	MAHARASHTRA	24.0	26.0	25.0	5.1	7.2	6.3	7.2	8.8	7.8	156	283	197	2.0	10.0	4.2	0.07	3.81	1.27	8	50	18	21	110	44
2663	DARNA RIVER AT BHAGUR PUMPING STATION NR PANDHURLI BDG, BHAGUR, NASHIK	MAHARASHTRA	24.0	27.0	25.2	5.8	6.7	6.4	7.2	8.1	7.7	164	512	261	2.2	6.0	3.9	0.41	4.10	1.44	9	17	13	26	50	36
2664	DARNA AT SANSARI, NASHIK	MAHARASHTRA	24.0	28.0	25.4	3.0	7.3	6.1	7.2	7.9	7.6	156	401	287	2.0	12.0	5.0	0.63	5.41	1.87	7	26	16	26	60	40
2697	PENGANGA NEAR WATER SUPPLY SCHEME OF UMARKEHD MC BELKHEHD, UMARKEHD, YAVATMAL	MA																								

2723	WENA AT D/S MOHATA MILLS, NR RD BRG ON HINGANGHAT-WADNER RD	MAHARASHTRA	19.0	26.0	20.8	3.2	6.2	5.1	6.5	8.7	8.0	360	918	639	4.2	12.0	6.8	0.10	4.82	1.65	30	110	62	60	350	182
------	---	-------------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	-----	------	------	------	----	-----	----	----	-----	-----

TABLE 15.1 :- WATER QUALITY OF RIVER KRISHNA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1194	KRISHNA AT MAHABALESHWAR DHOM DAM NEAR KOINA DAM	MAHARASHTRA	20.2	27.5	22.5	5.4	6.3	6.0	7.1	8.3	7.8	99	385	154	1.8	4.5	2.8	0.02	0.70	0.21	11	260	102	50	1800	873
1153	KRISHNA AT RAJAPUR WEIR	MAHARASHTRA	20.0	31.0	23.8	1.7	7.8	5.9	7.0	8.6	7.7	125	839	433	1.8	9.6	3.8	0.43	2.86	1.25	2	17	5	60	500	148
36	KRISHNA AT KRISHNA BRIDGE, KARAD	MAHARASHTRA	20.1	29.0	23.4	4.3	6.4	5.1	7.2	8.2	7.8	190	459	297	1.8	10.5	5.8	0.14	1.20	0.43	17	425	211	425	1800	1335
1906	KRISHNA D/S OF ISLAMPUR	MAHARASHTRA	20.0	29.0	24.3	4.4	7.3	6.5	7.2	8.7	8.0	271	879	459	2.0	6.5	2.9	0.09	2.16	1.10	2	140	16	4	170	129
37	KRISHNA AT SANGLI	MAHARASHTRA	20.0	28.0	23.7	4.6	7.5	6.5	7.3	8.7	8.0	260	899	573	1.8	7.5	3.2	0.00	3.05	0.98	4	4	4	110	140	121
1310	KRISHNA AT KURUNDWAD IN KOLHAPUR MAHARASHTRA	MAHARASHTRA	20.0	30.0	23.7	2.8	7.4	5.9	6.9	8.6	7.9	220	764	477	2.0	6.5	3.2	0.14	2.78	1.46	2	6	4	90	170	119
2187	KRISHNA RIVER AT KSHETRA MAHULL	MAHARASHTRA	19.5	21.9	20.7	4.6	5.8	5.3	7.5	8.5	8.0	274	680	457	3.0	8.0	5.3	0.14	3.10	0.61	30	360	205	425	1800	1394
2188	KRISHNA RIVER AT KRISHNA-VENNA SANGAM AT MAHULL	MAHARASHTRA	19.2	22.1	20.7	4.6	6.0	5.2	7.0	8.5	7.8	281	572	430	3.0	8.4	5.6	0.12	3.70	0.64	50	350	217	350	1800	1354
2190	KRISHNA RIVER AT WAL	MAHARASHTRA	20.0	27.0	22.6	4.4	6.0	5.2	7.1	8.2	7.8	207	500	304	2.6	8.0	5.5	0.11	2.00	0.44	75	275	140	425	1800	1257
1182	KRISHNA AT US OF USARKHURD BARRAGE KARNATAKA	KARNATAKA	23.0	30.0	27.1	5.8	9.0	7.4	7.7	8.3	8.1	190	980	666	0.4	3.2	1.4	3.55	12.8	7.28	80	900	470	170	1600	956
1889	KRISHNA - ANKALI BRIDGE ALONG CHIKKODI KAGWAD ROAD	KARNATAKA	24.0	29.0	26.0	6.3	9.0	7.3	7.7	8.5	8.1	190	1090	595	0.5	3.2	1.5	3.80	11.1	7.45	80	900	671	140	1600	1303
1181	KRISHNA AT D/S OF NARAYANPURA DAM KARNATAKA	KARNATAKA	25.0	34.0	29.2	5.7	7.0	6.6	7.7	8.7	8.1	1.0	1.7	1.2	0.08	0.40	0.21	40	900	192	70	1600	1600	458		
1028	KRISHNA AT TINTINI BRIDGE	KARNATAKA	26.0	31.0	28.0	7.0	7.8	7.3	7.6	8.5	8.2	1.0	2.8	1.4	0.09	0.47	0.30	17	600	222	50	9000	1273			
1170	KRISHNA AT D/S DEVASAGAR BDG	KARNATAKA	28.0	31.0	28.9	7.0	7.6	7.3	7.7	8.4	8.2				1.0	16.0	3.0	0.10	0.89	0.38	120	9000	1586	440	16000	4753
2781	KRISHNA AT D/S OF ALAMATTI DAM	KARNATAKA	28.0	34.0	29.3	5.8	7.6	6.7	7.5	8.7	8.0				1.0	1.8	1.2	0.10	0.36	0.24	50	500	205	170	1600	586
1784	KRISHNA AT THANGADI, MAHABOBNAGAR DIST., A.P.	ANDHRA PRADESH	26.0	37.0	31.5	6.9	13.8	9.1	7.3	8.5	8.0	332	996	755	0.9	7.3	3.1	0.07	0.90	0.41	11	90	42	1600	1600	1600
39	KRISHNA AT GADWAL BRIDGE, A.P.	ANDHRA PRADESH	25.0	37.0	30.8	6.2	15.8	9.1	7.4	8.7	8.1	340	1038	795	0.7	7.9	3.2	0.10	0.74	0.43	2	22	12	240	1600	948
1175	KRISHNA A/C WITH TUNGABHADRA, SANGAMESHWARAM A.P.	ANDHRA PRADESH	24.0	32.0	26.0	5.8	7.1	6.6	7.5	8.2	7.9	269	780	466	2.4	3.2	2.7	0.60	1.40	1.11	80	210	130	920	1250	1074
1465	KRISHNA AT WADAPALLY AFTER CONFL. WITH R. MUSI, A.P. (SHIFTED FROM 1220)	ANDHRA PRADESH	26.0	31.0	27.8	4.5	5.9	5.1	7.9	8.7	8.4	377	1154	687	1.2	4.8	2.9	0.50	2.00	1.07	14	36	24	105	580	341
1786	KRISHNA AT VEDADRI, GUNTUR	ANDHRA PRADESH	25.0	38.0	28.9	4.4	8.0	6.1	7.2	8.5	7.9	526	1398	732	0.5	1.2	0.7	0.18	0.42	0.27	4	6	6	2100	3400	2558
1787	KRISHNA AT AMARAVATI, GUNTUR	ANDHRA PRADESH	27.0	29.0	27.0	5.0	7.5	6.4	7.2	8.0	7.6	534	796	680	0.5	0.8	0.6	0.18	0.36	0.24	4	6	5	1100	3400	1658
25	KRISHNA AT VIJAYWADA, A.P.	ANDHRA PRADESH	25.0	32.0	28.4	4.1	6.1	6.1	7.2	8.1	7.9	534	890	655	0.5	0.6	0.5	0.12	0.26	0.16	4	6	5	1400	2700	2182
ESTUARINE ZONE																										
1782	KRISHNA AT HAMSALA DEEVI, GUNTUR DIST, A.P.	ANDHRA PRADESH	25.0	32.0	28.4	3.9	8.2	6.0	7.4	8.3	7.8	565	8570	2453	0.4	0.8	0.6	0.15	0.38	0.28	4	6	5	1100	1700	1367

TABLE 15.2 :- WATER QUALITY OF TRIBUTARY STREAMS PANCHANGA AND BHIMA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1311	PANCHANGA AT ICHALKARANJLI	MAHARASHTRA	22.0	35.0	26.4	4.9	7.5	6.4	6.7	8.4	7.5	132	533	298	2.0	4.0	2.6	0.12	2.85	1.27	2	6	4	90	170	120
2163	PANCHANGA RIVER AT SHIROL NEAR SHIROL INTAKE WELL	MAHARASHTRA	21.0	34.0	25.0	4.1	7.6	6.5	7.3	8.4	7.9	170	796	419	2.0	5.5	2.7	0.28	3.31	1.63	4	12	6	110	220	158
1904	PANCHANGA US OF KOLHAPUR TOWN	MAHARASHTRA	20.0	34.0	24.6	4.9	7.8	6.4	7.0	8.8	8.0	141	565	302	1.8	4.0	2.5	0.17	15.3	2.54	2	9	4	110	140	126
1905	PANCHANGA D/S OF KOLHAPUR TOWN	MAHARASHTRA	21.0	35.0	24.8	1.3	7.4	5.8	6.5	8.3	7.5	184	510	339	2.4	67.5	8.5	0.13	4.14	1.72	4	22	7	120	900	221
1189	BHIMA AT PUNE US VITHALWADI	MAHARASHTRA	20.0	30.0	27.0	1.9	4.9	3.4	7.2	8.1	7.7	270	464	358	5.8	13.5	9.8	0.30	3.70	0.73	130	350	225	900	1800	1550
2655	BHIMA AT KOREGAON NEAR KOREGAON BRIDGE, SHIRUR, PUNE	MAHARASHTRA	25.0	29.0	26.8	3.6	5.5	4.8	7.2	9.3	7.9	258	1134	602	0.4	11.0	6.4	0.18	0.85	0.41	90	550	241	550	1800	1258
2656	BHIMA RIVER-BACKWATER OF UJANI DAM NEAR RAW WATER PUMP HOUSE, KUMBARGAON, INDAPUR	MAHARASHTRA	26.0	30.0	27.7	4.8	6.3	5.5	7.1	8.3	7.7	172	996	571	2.0	7.8	4.0	0.04	0.80	0.53	10	350	127	225	1800	865
1190	BHIMA AT PUNE, D/S OF BUNDGARDEN	MAHARASHTRA	18.0	29.0	26.0	1.1	5.0	2.4	7.1	8.8	7.8	240	604	449	7.0	22.0	13.1	0.09	2.70	0.79	130	350	293	1600	1700	
1191	BHIMA AT PARGAON (AFTER CONFL. WITH MULE MARTHA)	MAHARASHTRA	20.0	30.0	26.7	2.2	6.0	3.9	7.1	8.3	7.8	243	1289	644	2.8	15.0	8.5	0.20	2.82	0.41	120	375	254	900	1800	1610
1192	BHIMA AFTER CONFL. WITH DALUNT	MAHARASHTRA	22.0	30.0	27.5	3.3	6.0	4.3	7.1	8.9	7.9	225	1267	601	3.0	12.5	7.8	0.26	1.30	0.53	110	250	208	900	1800	1540
1188	BHIMA AT NARSINGHPUR, (D/S AF. CONFL. WITH R. NIRA)	MAHARASHTRA	21.0	38.0	28.6	4.2	6.0	5.3	7.3	8.7	8.0	333	1737	968	2.0	9.6	5.3	0.22	2.90	0.53	43	425	214	425	1800	1485
28	BHIMA AT TAKLI	MAHARASHTRA	20.0	27.0	25.0	4.4	6.4	5.1	7.0	8.6	8.1	673	2184	1412	1.6	10.5	6.3	0.18	2.50	0.71	40	425	216	350	1800	1225
1183	BHIMA AT D/S OF ROAD BRIDGE AT GANGAPUR VILLAGE	KARNATAKA	24.0	30.0	27.3	6.3	6.8	6.5	7.9	8.5	8.1	710	1300	1066	2.6	3.8	3.3	0.20	1.18	0.62	900	9000	4345	1600	16000	9300
1184	BHIMA AT FERIZABAD VILLAGE (D/S)	KARNATAKA	25.0	31.0	27.8	6.2	6.9	6.6	7.8	8.6	8.2	710	1210	1019	2.0	3.7	2.8	0.17	1.15	0.63	500	9000	2891	1600	16000	6664
1888	BHIMA AT CONFLUENCE OF JEWARGI TOWN SEWAGE DISPOSAL POINT	KARNATAKA	27.0	31.0	28.6	6.4	6.8	6.6	7.9	8.6	8.2	700	1200	997	0.3	3.4	2.2	0.18	1.24	0.71	300	16000	3841	900	16000	6182
1167	BHIMA AT D/S OF BDG. NEAR YADGIR	KARNATAKA	26.0	40.0	31.8	6.0	8.5	7.4	8.0	8.3	8.1				2.0	3.5	2.7	0.08	0.52	0.32	800	9000	4583	1600	16000	9225

TABLE 15.3 :- WATER QUALITY OF TRIBUTARY STREAMS GHATPRABHA, MALPRABHA, TUNGHBHADRA, TUNGA, BHADRA, MUSI, PALLERU, MUNERU, KAGINA, NAKKAVAGU, HUNDRI, KUNDU & ASANGI NALLA IN ANDHRA PRADESH AND KARNATAKA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5			< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml						
1185	GHATPRABHA AT D/S OF MIDHOL RD. CROSS BGD, KARNATAKA	KARNATAKA	25.0	34.0	28.8	4.6	6.3	5.4	7.6	8.4	7.9	260	2280	885	0.2	2.8	1.3	2.22	31.4	12.4	8	13	900	324	30	1600	565
1163	GHATPRABHA AT W.A. POINT TO GOKAK TOWN, KARNATAKA	KARNATAKA	24.0	31.0	27.4	4.6	8.2	6.7	7.6	8.2	7.9	140	1000	331	0.4	3.5	1.2	2.22	14.8	7.11	8	8	900	334	13	1600	641
1187	MALPRABHA AT D/S OF KHANAPUR VILLAGE, KARNATAKA	KARNATAKA	22.0	31.0	26.0	5.0	10.5	6.8	7.1	8.4	7.7	90	400	203	0.4	2.6	1.4	1.40	7.73	3.68	30	30	900	530	50	1600	1208
1164	MALPRABHA AT WATER ABSTR. PT. TO HUBLI DHARWAR, KARNATAKA	KARNATAKA	21.0	30.0	26.1	5.2	8.0	6.9	7.2	8.6	8.0	90	380	246	0.2	1.8	0.8	1.02	6.13	3.27	4	4	900	330	23	1600	739
1186	MALPRABHA AT D/S OF AIHOLE TOWN, KARNATAKA	KARNATAKA	23.0	33.0	28.9	4.9	5.6	5.2	7.9	8.2	8.1	590	2200	1095	0.3	2.0	0.8	3.50	13.8	8.27	2	2	1600	376	4	1600	551
2764	MALPRABHA AT BADAMI BRIDGE, KARNATAKA	KARNATAKA	23.0	32.0	28.2	4.5	5.9	5.3	7.9	8.2	8.0	570	2200	1193	0.4	1.9	1.1	5.20	15.1	9.36	4	4	900	294	23	1600	612
38	TUNGHABHADRA AT HONNALI BRIDGE, KARNATAKA	KARNATAKA	24.0	27.0	24.9	6.8	8.0	7.2	7.0	8.1	7.7	130	430	251	1.8	3.0	2.1	0.15	2.30	1.01	30	60	47	140	280	218	
1029	TUNGHABHADRA AT HARALHALLI BRIDGE, KARNATAKA	KARNATAKA	24.0	31.0	26.3	6.8	7.8	7.3	6.9	8.5	7.9	150	572	343	2.0	3.6	2.2	0.15	2.80	1.35	30	50	40	140	240	190	
29	TUNGHABHADRA AT ULLANUR, KARNATAKA	KARNATAKA	26.0	32.0	28.8	6.8	7.6	7.2	7.6	8.3	8.0	470	470	470	2.0	3.5	2.6	0.15	1.50	0.44	40	40	9000	3320	220	16000	6585
1785	TUNGHABHADRA AT MANTHRALAYAM, KURNOOL DIST, ANDHRA PRADESH	ANDHRA PRADESH	26.0	30.0	27.1	6.0	6.9	6.4	7.0	8.3	7.7	202	1158	777	2.0	2.9	2.5	1.40	5.40	4.04	90	200	133	960	1200	1105	
1174	TUNGHABHADRA AT KURNOOL U/S, BAVAPURAM, A.P., ANDHRA PRADESH	ANDHRA PRADESH	26.0	29.0	26.8	6.0	6.9	6.3	6.5	7.8	7.5	214	1140	726	2.6	3.4	3.0	0.90	1.80	1.44	110	260	184	1100	1800	1440	
2766	TUNGHABHADRA AT NEW BRIDGE, KARNATAKA	KARNATAKA	24.0	29.0	26.0	6.7	8.2	7.2	6.9	8.4	7.7	130	380	258	1.0	2.9	2.0	0.21	2.20	0.99	20	3000	283	130	9000	924	
2767	TUNGHABHADRA AT U/S OF HFF, KARNATAKA	KARNATAKA	24.0	28.0	26.0	6.8	8.0	7.2	6.3	8.3	7.4	130	380	266	1.0	2.4	1.9	0.22	2.50	1.14	30	50	40	130	280	195	
2768	TUNGHABHADRA AT D/S OF HFF, KARNATAKA	KARNATAKA	25.0	31.0	27.2	5.2	7.2	6.3	6.0	8.2	7.2	300	920	595	3.0	8.2	4.2	0.35	3.40	1.77	50	80	63	280	500	324	
2769	TUNGHABHADRA AT JACKWELL POINT, KARNATAKA	KARNATAKA	25.0	31.0	27.3	6.1	7.5	6.6	6.4	8.4	7.6	160	580	356	2.0	4.0	3.1	0.30	2.50	1.46	40	70	53	170	350	232	
2770	TUNGHABHADRA AT HARIHAR WATER SUPPLY INTAKE, KARNATAKA	KARNATAKA	24.0	29.0	26.2	6.0	7.9	6.7	6.2	8.3	7.5	270	570	360	2.0	4.0	2.9	0.25	2.60	1.64	50	80	60	220	300	265	
2776	TUNGHABHADRA AT D/S OF GANAGATHI, KARNATAKA	KARNATAKA	26.0	31.0	28.0	6.8	7.6	7.2	7.7	8.3	8.0				1.6	3.0	2.3	0.17	0.42	0.26	700	9000	3530	2800	16000	7400	
1168	TUNGA AT D/S OF SHIMOGA TOWN, KARNATAKA	KARNATAKA	25.0	28.0	26.2	6.5	7.6	6.9	6.7	8.2	7.3	120	340	196	1.4	2.4	2.0	0.15	4.10	1.49	50	140	60	140	350	228	
1896	CONFLUENCE POINT OF TUNGA AND BHADRA AT KUDLI, KARNATAKA	KARNATAKA	26.0	29.0	27.0	7.1	7.5	7.2	7.1	7.8	7.5	180	350	255	2.0	2.5	2.2	1.00	1.50	1.23	40	50	48	170	240	218	
1091	BHADRA AT MALLESWARAM D/S OF KIOCL, KARNATAKA	KARNATAKA	20.0	29.0	25.8	6.3	7.4	6.8	6.7	7.5	7.2	120	230	171	1.0	1.0	1.0	0.02	0.17	0.09	430	920	762	1600	1600		
1387	BHADRA AT D/S OF BHADRAVATHI, KARNATAKA	KARNATAKA	25.0	27.0	25.0	6.2	7.5	6.9	6.5	7.9	7.2	190	550	337	3.0	4.5	3.8	0.25	5.10	1.94	140	300	218	500	1600	842	
1169	BHADRA AT D/S OF KIOCL ROAD BRIDGE, NEAR HOLESHNUR, KARNATAKA	KARNATAKA	26.0	28.0	26.8	6.8	7.4	7.0	6.9	7.9	7.4	180	410	289	2.0	3.0	2.5	0.20	4.20	1.62	40	110	60	170	350	239	
2765	BHADRA AT U/S OF MPM, KARNATAKA	KARNATAKA	24.0	26.0	25.3	6.9	7.7	7.2	6.5	8.1	7.4	140	310	203	1.0	2.3	1.6	0.09	4.20	1.46	23	50	36	100	240	161	
2771	BHADRA AT U/S OF KIOCL, KARNATAKA	KARNATAKA	21.0	27.0	24.4	6.5	7.8	6.9	6.6	7.8	7.3	100	220	157	1.0	1.0	1.0	0.01	0.12	0.07	280	540	460	1600	1600		
1172	MUSI U/S AT HYDERABAD, A.P., ANDHRA PRADESH	ANDHRA PRADESH	22.0	29.0	25.7	4.1	13.8	6.9	7.2	9.0	7.9	368	492	423	0.5	7.5	2.8	0.05	2.30	0.54	6	1600	379	350	1600	1350	
1173	MUSI D/S AT HYDERABAD, A.P., ANDHRA PRADESH	ANDHRA PRADESH	22.0	29.0	26.5	0.6	2.8	1.3	6.9	8.3	7.6	1140	1372	1294	36.3	76.0	49.9	0.10	36.0	21.8	11	1600	702	1600	1600	1600	
2339	RIVER MUSI AT NAGOLE RANGAREDDY, ANDHRA PRADESH	ANDHRA PRADESH	24.0	29.0	26.8				6.9	8.3	7.7	1254	1440	1355	45.0	145.0	109.7	1.76	29.0	16.5	900	1600	1180	1600	1600		
1178	PALLERU BEFORE CONFL. WITH KRISHNA, JAGGAYAPET, A.P., ANDHRA PRADESH	ANDHRA PRADESH	26.0	40.0	29.8	4.5	8.1	6.1	7.4	8.4	7.8	516	882	732	0.5	0.9	0.7	0.17	0.38	0.29	4	6	5	2100	2600	2350	
1177	MUNERU BEFORE CONFL. WITH KRISHNA, NANDIGAMA, A.P., ANDHRA PRADESH	ANDHRA PRADESH	23.0	39.0	28.8	1.7	6.8	5.4	7.2	8.5	7.7	443	1297	769	0.5	0.9	0.7	0.16	0.46	0.25	4	6	6	1200	2700	2233	
1895	KAGINA D/S OF SEWAGE DISPOSAL POINT, KARNATAKA	KARNATAKA	25.0	27.0	26.3	6.4	6.6	6.5	7.9	8.2	8.1	550	840	667	1.3	1.5	1.4	0.95	1.79	1.30	2800	5000	3600	9000	16000	11333	
2777	KAGINA AT SHAHABAD BRIDGE, KARNATAKA	KARNATAKA	25.0	30.0	26.8	6.3	6.8	6.6	7.7	8.3	8.1	560	950	681	1.1	3.2	2.3	1.00	2.43	1.50	300	9000	2100	300	16000	4600	
2349	River NAKKAVAGU, Bachugudem, Medak, ANDHRA PRADESH	ANDHRA PRADESH	21.0	30.0	27.1	4.1	6.4	4.9	7.2	7.6	7.5	1420	2404	1774	5.8	18.0	10.5	2.00	47.0	11.6	6	73	40	165	560	367	
2350	RIVER HUNDRI, JOHARPURVY, NEAR TEMPLE, KURNOOL, ANDHRA PRADESH	ANDHRA PRADESH	25.0	29.0	26.7	5.4	6.4	6.0	6.5	8.4	7.7	530	1640	973	1.6	3.6	2.5	1.20	4.40	2.37	90	120	103	950	1200	1033	
2351	RIVER KUNDU, NANDAL, NEAR OVER BGD, KURNOOL, ANDHRA PRADESH	ANDHRA PRADESH	26.0	27.0	26.5	5.9	6.8	6.4	7.4	8.0	7.7	620	1042	751	2.4	3.2	2.8	1.20	8.50	2.73	110	980	620	800	1300	1119	
2763	ASANGI NALLA AT ASANGI VILLAGE, KARNATAKA	KARNATAKA	26.0	33.0	29.0	4.9	6.2	5.3	7.5	8.6	8.0	260	1420	779	0.2	2.1	1.2	1.50	14.2	6.92	22	900	322	30	1600	564	

TABLE 15.4 :- WATER QUALITY OF TRIBUTARY STREAMS NIRA, VENNA, KOYNA, MULA, MULA-MUTHA, MUTHA, PAWANA, INDRAYANI, CHANDRABHAGA, GHOD, SINA, URMUDI & VEL IN MAHARASHTRA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5			< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
2195	NIRA AT D/S OF JUBILANT ORGANOSIS, PUNE, MAHARASHTRA	MAHARASHTRA	20.0	30.0	27.3	1.4	5.2	4.4	6.9	9.3	8.1	250	1326	767	4.5	13.0	7.8	0.24	1.32	0.83	95	290	208	550	1800	1613
2882	NIRA AT U/S OF JUBILANT ORGANOSIS (DATTAGHAT), BARAMATI, PUNE, MAHARASHTRA	MAHARASHTRA	20.0	29.0	27.2	5.1	5.8	5.5	7.1	9.1	8.1	78	898	545	3.0	6.0	4.5	0.20	1.20	0.63	80	250	192	425	1800	1452
1463	NIRA AT SAROLE BGD ON PUNE-BANGLORE HIGHWAY, MAHARASHTRA	MAHARASHTRA	21.0	29.0	26.8	4.6	6.4	5.5	6.9	8.6	7.9	89	910	455	1.8	8.5	5.1	0.18	1.50	0.49	60	275	130	550	1800	1050
2681	NIRA AT SANGAVI, PHALTAN, SATARA, MAHARASHTRA	MAHARASHTRA	20.0	28.0	23.8	3.1	5.0	4.1	7.4	8.9	8.3	294	2980	1588	5.5	12.0	8.7	0.26	1.50	0.51	35	425	198	225	1800	1383
2683	NIRA AT SHINDEWADI, SHIRVAL, KHANDALA, SATARA, MAHARASHTRA	MAHARASHTRA	21.0	29.0	23.9	4.0	5.5	5.0	7.3	8.3	8.0	96	555	251	4.0	11.0	6.1	0.18	1.30	0.38	17	275	154	200	1800	1233
2186																										

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
2194	MULA AT HARRISON BRIDGE NEAR MULA-PAWANA SANGAM.	MAHARASHTRA	20.0	29.0	25.8	1.0	4.1	2.0	6.9	8.4	7.8	142	581	445	7.5	19.5	13.5	0.28	1.40	0.69	200	350	264	1600	1800	1750
2193	MULA AT AUNDH BRIDGE, AUNDHGAON.	MAHARASHTRA	20.0	30.0	26.4	1.4	4.9	3.4	7.1	8.2	7.8	253	843	529	5.5	15.0	10.5	0.22	1.40	0.50	140	350	240	1600	1800	1691
2192	MULA-MUTHA AT MUNDHAWA BRIDGE.	MAHARASHTRA	20.0	29.0	26.3	1.5	4.8	2.7	6.9	8.2	7.7	245	593	452	6.5	21.5	14.1	0.18	2.50	0.84	175	350	292	1600	1800	1750
2677	MUTHA-MUTHA AT D/S OF THEUR, HAWELI PUNE.	MAHARASHTRA	24.0	29.0	27.0	1.3	4.0	2.6	7.1	8.9	7.7	382	1086	548	7.5	16.0	11.0	0.13	3.40	0.65	140	550	299	550	1800	1596
2191	MUTHA AT SANGAM BRIDGE NEAR GANAPATHY GHAT.	MAHARASHTRA	20.0	29.0	26.3	0.8	3.8	1.8	6.9	8.2	7.7	223	602	429	9.5	21.0	16.9	0.22	3.70	0.96	200	350	290	1600	1800	1733
2678	MUTHA NEAR VEER SAVARKAR BHAVAN, PUNE.	MAHARASHTRA	20.0	29.0	26.4	0.9	8.5	2.9	7.1	8.2	7.6	205	512	417	9.0	23.5	16.3	0.28	1.80	0.82	225	425	313	1600	1800	1733
2679	MUTHA AT DECCAN BRIDGE, DECCAN, PUNE.	MAHARASHTRA	20.0	30.0	26.2	0.9	4.0	2.0	7.2	8.6	7.9	260	6317	915	8.5	22.5	16.6	0.32	1.60	0.69	170	550	345	1800	1800	1800
2680	MUTHA AT KHADAKVASLA DAM, KHADAKVASLA, HAWELI, PUNE.	MAHARASHTRA	23.0	30.0	26.4	5.7	6.7	6.1	7.2	8.2	7.7	75	486	152	1.4	4.0	2.3	0.02	1.10	0.23	10	80	37	140	550	341
2196	PAWANA AT SANGAVIGAON, PUNE.	MAHARASHTRA	23.0	28.0	26.0	1.3	4.0	2.3	6.9	9.0	7.6	300	658	529	8.0	19.0	13.4	0.18	3.30	0.80	170	430	316	1600	1800	1764
2690	PAWANA AT KASARWADI, HAWELI, PUNE.	MAHARASHTRA	19.0	29.0	25.0	1.1	3.6	2.0	7.0	8.8	7.6	268	728	537	8.5	16.4	12.9	0.22	3.40	0.84	195	425	289	1600	1800	1717
2691	PAWANA AT DAPODI BRIDGE AT PAWANA-MULA SANGAM, DAPODI, HAWELI, PUNE.	MAHARASHTRA	20.0	28.0	25.0	1.4	3.9	2.1	7.1	8.6	7.7	301	836	605	9.0	16.0	13.4	0.22	2.80	0.71	225	550	308	1600	1800	1783
2692	PAWANA AT RAVET WEIR, RAVET, HAWELI, PUNE.	MAHARASHTRA	20.0	29.0	25.8	5.3	6.4	6.0	7.2	8.3	7.7	106	411	202	1.4	4.5	2.7	0.09	1.40	0.30	20	275	111	140	1800	751
2693	PAWANA AT CHINCHWADGAON, HAWELI, PUNE.	MAHARASHTRA	20.0	29.0	26.3	1.8	5.8	3.6	6.8	8.3	7.6	216	660	345	5.0	13.0	9.3	0.16	1.50	0.64	95	550	238	900	1800	1442
2694	PAWANA AT PIMPRIGAON, HAWELI, PUNE.	MAHARASHTRA	19.0	29.0	25.0	1.0	3.2	1.8	7.1	8.9	7.6	304	746	520	9.5	19.5	14.8	0.18	3.40	0.85	275	425	346	900	1800	1725
2197	INDRAYANI AT D/S OF ALANDIGAON, PUNE.	MAHARASHTRA	23.0	30.0	27.3	3.8	5.3	4.7	7.0	8.2	7.7	200	554	426	3.5	10.5	7.2	0.18	1.50	0.44	95	550	263	900	1800	1600
2668	INDRAYANI AT D/S OF MOSHIGAON, HAWELI, PUNE.	MAHARASHTRA	23.0	30.0	26.5	1.5	5.2	4.0	6.9	9.0	7.6	227	699	464	4.0	13.0	8.9	0.22	1.60	0.53	120	350	263	350	1800	1604
2669	INDRAYANI AT U/S OF MOSHIGAON, HAWELI, PUNE.	MAHARASHTRA	24.0	30.0	26.7	2.6	5.9	4.7	6.9	8.9	7.6	202	652	456	3.0	10.5	7.0	0.04	1.50	0.43	85	380	201	275	1800	1498
1911	CHANDRABHAGA U/S OF PANDHARPUR TOWN.	MAHARASHTRA	22.0	38.0	32.0	5.2	6.0	5.5	7.6	8.7	8.1	288	1916	1129	2.8	6.5	4.7	0.33	2.40	0.63	65	290	167	350	1600	915
1912	CHANDRABHAGA D/S OF PANDHARPUR TOWN.	MAHARASHTRA	21.0	38.0	30.8	4.7	5.8	5.0	7.4	8.8	8.1	393	2861	1336	3.5	10.5	6.3	0.26	2.10	0.71	85	350	212	900	1600	1520
2665	GHOD AT SHIRUR, PUNE.	MAHARASHTRA	25.0	30.0	27.1	2.7	5.9	4.7	7.4	8.8	8.0	394	1450	959	3.8	10.5	6.7	0.04	1.40	0.39	25	425	252	275	1800	1377
2705	SINA NEAR LABOTI TOLL, NAKA, LABOTI, MOHAL, SOLAPUR.	MAHARASHTRA	18.0	37.0	27.0	3.9	6.1	5.0	7.4	8.5	8.0	654	1478	1078	2.8	12.2	6.6	0.30	2.70	0.93	45	275	167	350	1800	1210
2711	URMODI , NAGTHANE, SATARA.	MAHARASHTRA	20.3	24.0	22.1	4.7	6.0	5.2	7.1	8.3	7.8	134	549	271	2.0	7.5	5.8	0.10	1.50	0.39	20	350	135	550	1800	1113
2715	VEL AT SHIKRAPUR, SHIRUR, PUNE.	MAHARASHTRA	24.0	30.0	27.3	2.3	5.4	4.5	6.9	9.2	7.9	186	1050	448	4.0	14.0	7.8	0.20	0.42	0.30	25	350	218	550	1800	1485

TABLE 16.1 :- WATER QUALITY OF RIVER PENNAR – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1255	PENNR BEFORE CONF. WITH CHITRAVATHI TADPATRI, UNGANQOOR	ANDHRA PRADESH	26.0	28.0	26.7	6.2	6.9	6.6	7.3	8.4	8.0	610	934	736	2.6	3.7	3.3	0.30	0.90	0.65	95	140	114	200	1200	1002
1256	PENNR AFTER CONF. WITH PAPAGNI, PUSPAGNI	ANDHRA PRADESH	18.2	28.3	25.5	6.1	7.1	6.7	7.6	8.2	8.0	620	943	783	2.3	3.0	2.7	0.30	0.32	0.69	100	180	126	700	1200	1008
1257	PENNR AFTER CONF. WITH CHEYYURU, SOMASE	ANDHRA PRADESH	28.0	30.0	29.0	3.9	8.2	5.9	7.2	8.6	8.0	523	1728	794	0.5	6.0	1.1	0.19	3.20	0.26	4	6	6	2600	3400	3158
30	PENNR AT SIDDVATA, NELLORE	ANDHRA PRADESH	22.8	28.0	26.1	5.9	7.0	6.8	7.6	8.2	7.9	540	990	768	2.4	3.1	2.7	0.80	1.80	1.30	90	160	118	900	1200	1040

TABLE 17.1 :- WATER QUALITY OF RIVER CAUVERY – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1198	CAUVERY AT NAPONKULU BDG (D/S)	KARNATAKA	20.0	28.0	24.5	5.8	7.9	6.9	6.2	8.5	7.5	34	90	59	1.0	1.0	1.0	0.07	0.24	0.14	1600	1600	1600	1600	1600	1600
1195	CAUVERY AT KUSHAL NAGAR U/S (NEAR BAICHANAHALLI)	KARNATAKA	20.0	28.0	25.0	5.9	8.0	7.0	6.9	8.8	7.8	46	132	93	1.0	1.0	1.0	0.00	0.32	0.13	1600	1600	1600	1600	1600	1600
33	CAUVERY AT KRS DAM, BALAMURKISHETRA	KARNATAKA	24.0	28.0	26.6	6.0	7.8	7.0	8.1	8.9	8.5	122	322	235	1.0	1.0	1.0	0.12	0.80	0.31	1600	1600	1600	1600	1600	
1386	CAUVERY AT D/S OF KAREKURARA VILLAGE	KARNATAKA	24.0	29.0	26.8	5.8	8.4	6.9	7.6	8.8	8.5	157	324	243	1.0	1.0	1.0	0.15	0.55	0.33	1600	1600	1600	1600	1600	
1171	CAUVERY AT SRI RANGAPATTANNA D/S OF ROAD BDG.	KARNATAKA	24.0	29.0	26.4	4.7	7.7	6.1	7.6	8.6	8.1	140	384	280	1.0	2.0	1.6	0.13	0.65	0.38	1600	1600	1600	1600	1600	
34	CAUVERY AT SATHYAGALAM BRIDGE	KARNATAKA	25.0	27.0	26.0	6.4	8.5	7.6	7.5	8.7	8.1	190	518	336	1.0	1.0	1.0	0.22	0.92	0.46	1600	1600	1600	1600	1600	
2773	CAUVERY AT BANNUUR BRIDGE	KARNATAKA	25.0	29.0	26.7	5.2	8.5	7.0	7.5	8.7	8.1	207	428	331	1.0	2.0	1.3	0.24	0.54	0.39	1600	1600	1600	1600	1600	
2774	CAUVERY AT RANGANATHITTU	KARNATAKA	24.0	28.0	25.8	5.9	7.7	6.7	6.9	8.4	8.1	161	396	277	1.0	2.0	1.1	0.15	0.69	0.35	1600	1600	1600	1600	1600	
50	CAUVERY AT METTUR	TAMILNADU	24.0	29.0	27.0	3.2	8.8	6.5	7.6	8.7	8.1	291	602	417	0.7	5.0	1.5	0.05	0.67	0.20	80	220	166	170	400	334
1322	CAUVERY AT 1KM. D/S OF BHAYANI RIVER CONFL.	TAMILNADU	27.0	31.0	28.4	4.7	9.6	6.2	7.7	8.4	8.0	293	812	475	0.3	3.7	1.1	0.03	1.36	0.25	90	220	163	200	400	324
51	CAUVERY AT PALLIPPALAYAM	TAMILNADU	25.0	28.0	26.0	5.5	8.2	6.7	7.3	8.4	7.9	280	613	425	0.5	2.3	1.2	0.04	0.39	0.20	110	1300	307	210	2200	543
1320	CAUVERY AT ERODE NEAR CHIRAPALAYAM	TAMILNADU	27.0	31.0	28.5	1.7	8.7	5.6	7.3	8.2	7.7	262	920	475	0.4	5.1	1.7	0.08	0.70	0.25	110	2200	388	240	3500	673
1323	CAUVERY AT VELORE NEAR KATTIPALAYAM	TAMILNADU	25.0	28.0	26.2	5.5	9.6	6.9	7.1	8.3	7.9	289	719	442												

31	CAUVERY AT MUSIRI	TAMILNADU	24.0	30.0	28.0	6.7	10.5	8.0	7.4	8.5	8.1	316	892	598	0.4	1.5	0.9	0.06	0.42	0.18	60	320	144	170	520	303
3016	CAUVERY AT PETTAIWAITHALAI, TRICHY	TAMILNADU	24.0	30.0	27.8	5.5	10.6	7.6	4.3	8.4	7.8	437	903	670	0.2	1.6	0.9	0.04	0.48	0.23	110	220	151	220	390	305
1202	CAUVERY AT TIRUCHIRAPPALLI UIS	TAMILNADU	23.0	29.0	27.0	6.5	9.1	7.6	7.6	8.6	8.2	326	814	576	0.3	1.4	0.8	0.01	0.34	0.20	110	170	144	220	390	287
1325	CAUVERY AT TIRUCHIRAPPALLI D/S	TAMILNADU	23.0	29.0	26.6	3.7	8.3	6.1	7.5	8.5	8.0	418	1026	739	0.7	4.2	1.9	0.03	0.42	0.16	140	790	255	320	1100	460
1203	CAUVERY AT TRICHY, GRAND ANAICUT	TAMILNADU	22.0	28.0	26.0	4.8	8.0	6.4	7.6	8.4	8.1	409	1061	752	0.6	5.3	1.9	0.03	0.42	0.20	110	940	300	220	1400	503
1206	CAUVERY AT THANJAVUR	TAMILNADU	25.0	32.0	28.0	3.6	8.2	6.5	7.4	8.6	8.0	358	1099	657	0.3	3.9	1.3	0.04	0.37	0.21	90	330	154	220	460	317
3018	CAUVERY AT MAYLADUTHURAI, NAGAPATTINAM	TAMILNADU	24.0	27.0	24.3	6.0	7.8	6.8	7.7	8.6	8.1	288	915	576	0.7	3.9	1.9	0.01	0.45	0.22	110	260	165	200	460	319
3012	CAUVERY AT KOMARAPALAYAM, NAMAKAL	TAMILNADU	25.0	28.0	26.9	4.0	10.4	6.4	7.4	8.2	7.8	297	700	431	0.4	3.4	1.3	0.01	0.45	0.25	90	270	178	200	470	348
3013	CAUVERY AT URRACHIKOITTAI, ERODE	TAMILNADU	26.0	28.0	27.0	3.3	7.9	5.8	7.3	8.4	7.9	97	549	290	0.5	2.5	1.2	0.05	0.75	0.19	20	220	134	90	390	288
3014	CAUVERY AT VAIRAPALAYAM, NAMAKAL	TAMILNADU	25.0	28.0	26.9	3.0	10.9	6.9	7.2	8.3	7.8	252	606	399	0.2	4.7	1.9	0.05	0.48	0.21	110	490	169	210	940	352
3017	CAUVERY AT KUMBAKONAM, THANJAVUR	TAMILNADU	23.0	33.0	27.5	4.6	8.3	7.0	7.5	8.7	8.1	316	816	513	0.7	4.6	1.7	0.04	0.34	0.22	110	340	182	210	6200	864
ESTUARINE ZONE																										
1326	CAUVERY AT COLEROON	TAMILNADU	26.0	33.0	31.5	7.2	10.2	8.1	7.4	8.6	8.0	270	3640	1133	0.2	2.4	0.8	0.06	0.42	0.20	70	220	148	140	400	303
1327	CAUVERY AT PITCHAVARAM	TAMILNADU	25.0	34.0	31.8	5.8	8.9	7.8	7.6	8.8	8.1	283	3520	1073	0.1	7.2	1.6	0.03	0.31	0.16	70	220	148	110	400	288

TABLE 17.2 :- WATER QUALITY OF TRIBUTARY STREAMS YAGACHI, HEMAVATI, SHIMSA, AKRAVATI, LAKSHMANTIRTHA, KABBANI, BHAVANI, AMRAVATI, KALINGANARAYAN CANAL, SARABANGA & THIRUMANIMUTHAR - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
			> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml											
1893	YAGACHI NEAR PUMPING STATION, HASSAN CITY	KARNATAKA	20.0	28.0	25.0	6.9	8.0	7.3	7.1	8.2	7.8	280	410	345	1.0	2.0	1.3	0.10	0.16	0.12	430	920	798	1600	1600	1600
1199	HEMAVATI AT DIS OF HOLENARASIPURA TOWN AT RAMADEVALA WEIR	KARNATAKA	21.0	29.0	24.5	6.8	7.8	7.1	6.9	8.2	7.6	300	350	325	1.0	2.0	1.3	0.10	0.24	0.15	500	920	815	1600	1600	1600
1200	SHIMSHA AT DIS OF HIGHWAY BRIDGE, YEDIYAR	KARNATAKA	26.0	31.0	28.3	5.2	7.8	6.7	6.6	8.1	7.5	470	690	571	2.0	3.5	2.5	0.45	2.30	1.38	13	23	19	26	50	39
1166	SHIMSHA AT DIS OF BRIDGE, HALAGUR	KARNATAKA	25.0	29.0	27.0	6.0	8.3	7.1	7.8	8.8	8.3	496	604	556	1.0	1.0	1.0	0.50	1.00	0.71	1600	1600	1600	1600	1600	1600
1165	ARKAVATHI AT DIS OF KANAKAPURA TOWN	KARNATAKA	26.0	28.0	27.0	3.3	4.0	3.7	7.4	8.0	7.7	870	1130	1000	2.0	2.3	2.1	6.67	36.0	21.3	30	30	30	30	110	70
2778	ARKAVATHI AT T. G. HALLI RESERVOIR	KARNATAKA	25.0	31.0	26.5	3.1	11.5	6.1	7.0	9.0	8.2	800	1102	934	2.0	9.0	3.6	1.00	8.00	3.37	2	30	17	7	170	54
2779	ARKAVATHI AT HESARAGHATTA RESERVOIR	KARNATAKA	25.0	28.0	25.5	7.8	12.0	9.9	8.7	10.5	9.6	110	980	545	2.0	3.0	2.5	5.52	5.99	5.76	4	13	9	14	21	18
1196	LAKSHMANTIRTHA AT DIS OF HUNSUR TOWN	KARNATAKA	23.0	28.0	26.5	3.2	6.5	4.5	7.2	8.1	7.6	135	956	502	2.0	5.0	3.0	0.13	1.10	0.74	1600	1600	1600	1600	1600	1600
2772	LAKSHMANTIRTHA AT DIS OF KATTEMALAVADI	KARNATAKA	27.0	28.0	27.0	3.2	6.2	4.3	7.5	8.0	7.8	430	742	557	2.0	3.0	2.7	0.87	1.09	0.96	1600	1600	1600	1600	1600	1600
1207	KABBANI AT MUTHANKARA	KERALA	24.0	25.0	24.6	6.3	7.0	6.7	6.8	7.2	7.0	63	90	76	0.5	0.8	0.7	0.20	0.48	0.32	140	600	283	340	700	435
1197	KABBANI AT SARAGUR VILLAGE DIS	KARNATAKA	23.0	26.0	24.8	6.0	8.0	6.8	7.1	8.9	8.1	81	270	146	1.0	1.0	1.0	0.09	0.34	0.17	1600	1600	1600	1600	1600	1600
41	KABBANI AT CAUSE WAY SATTUR	KARNATAKA	25.0	28.0	26.5	6.1	8.2	6.9	7.5	8.7	8.0	125	470	282	1.0	1.0	1.0	0.11	0.58	0.35	1600	1600	1600	1600	1600	1600
1445	KABBANI AT WATER INTAKE OF KIADB AT NANJANAGUD	KARNATAKA	26.0	27.0	26.0	6.3	8.2	7.4	7.6	8.3	8.0	101	460	295	1.0	1.0	1.0	0.10	0.54	0.36	1600	1600	1600	1600	1600	1600
2775	KABINI AT BATHING GHAT, NANJANAGUD	KARNATAKA	24.0	29.0	26.7	4.2	8.1	5.8	5.0	8.7	7.6	149	479	277	1.0	2.0	1.9	0.15	0.69	0.43	1600	1600	1600	1600	1600	1600
1208	BHAVANI AT ELACHIVAZHY	KERALA	23.5	26.0	24.6	6.8	7.5	7.1	6.8	8.0	7.3	43	206	110	0.2	0.6	0.4	0.24	0.39	0.31	70	270	195	160	400	315
1201	BHAVANI AT PATHIRAKALIAMMAN KOIL	TAMILNADU	18.0	30.0	26.2	6.8	8.9	8.1	7.3	8.5	8.1	59	1043	278	0.1	2.0	0.8	0.01	1.59	0.29	20	220	107	70	340	220
1204	BHAVANI AT SIRUMUGAI	TAMILNADU	18.0	31.0	26.3	7.0	8.5	8.0	7.3	8.5	8.0	83	464	193	0.0	3.8	0.9	0.03	0.37	0.18	20	170	102	80	330	219
1321	BHAVANI AT BHAVANI SAGAR	TAMILNADU	27.0	28.0	27.6	5.3	8.4	6.7	7.4	8.4	8.0	150	451	255	0.4	1.8	1.0	0.02	0.37	0.18	70	170	129	170	390	285
1205	BHAVANI AT BHAVANI	TAMILNADU	27.0	28.0	27.6	3.6	8.7	5.9	7.4	9.0	8.0	158	470	343	0.4	2.6	1.3	0.01	0.34	0.17	80	330	168	210	700	348
3019	BHAVANI AT DIS OF BHAVANISAGAR, SATHYANGALAM, ERODE	TAMILNADU	26.0	28.0	27.0	5.5	8.2	6.7	7.3	8.6	7.9	132	392	237	0.0	2.0	0.9	0.02	0.31	0.16	70	220	141	140	340	278
1319	AMRAVATI AT 1KM D/S FROM EFF. DIS. PT. AT MADHUTHUKKULAM	TAMILNADU	20.0	28.0	25.2	6.3	8.6	7.6	7.3	8.8	7.9	57	341	186	0.3	2.7	1.0	0.06	0.33	0.15	1	210	101	20	330	211
3020	US OF KALINGARAYAN CANAL (B5), ERODE	TAMILNADU	27.0	30.0	28.1	4.0	6.7	5.8	7.7	8.3	8.0	276	592	423	0.2	3.8	1.3	0.06	1.06	0.26	70	270	145	170	340	289
3021	D/S OF KALINGARAYAN CANAL (B10), ERODE	TAMILNADU	27.0	31.0	28.2	0.3	7.4	5.1	7.6	8.1	7.9	342	1102	501	0.6	6.2	1.8	0.06	0.65	0.21	80	260	177	210	470	369
3024	SARABANGA AT SALEM, DIS OF TEXTILE DYEING INDUSTRIES EFFLUENT	TAMILNADU	25.0	29.0	27.9	0.6	8.7	2.9	7.1	8.3	7.6	1281	5280	3413	7.4	85.0	35.0	0.02	0.95	0.43	11000	540000	180667	22000	920000	306750
3022	THIRUMANIMUTHAR AT SALEM, DIS OF SAGO & TEXTILE DYING INDUSTRIES	TAMILNADU	25.0	29.0	27.6	0.9	2.9	2.0	7.1	7.8	7.5	855	3120	2306	0.1	83.7	40.3	0.03	1.12	0.51	2400	920000	209617	5400	1600000	351617

TABLE 18.1 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN GUJARAT & DAMAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
			> 4 mg/l			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml											
1393	DAMANGANGA AT DIS OF MADHUBAN	DAMAN & DIU	27.2	31.0	29.1	6.1	7.3	6.7	7.3	8.4	7.7	130	334	218	5.0	5.0	5.0	0.01	5.00	1.31						
2459	DAMANGANGA AT ZUARI CAUSE WAY BRIDGE	DAMAN, DIU, DADRANAGAR HAVELI	27.0	27.0	27.0	3.8	4.6	4.2	7.8	7.9	7.9	45	9772	4909	9.0	27.0	18.0	7.00	7.00	7.00						
2460	DAMANGANGA AT DISCHARGE POINT OF DISTILLERY	DAMAN, DIU, DADRANAGAR HAVELI	27.2	30.0	28.1	1.8	6.8	4.6	7.6	8.3	8.0	32	50300	23576	76.0	354.0	156.8	1.50	9.80	6.88	35	35	35			

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C	D.O. (mg/l)	pH	CONDUCTIVITY (µmhos/cm)	B.O.D. (mg/l)	NITRATE-N+ NITRITE-N (mg/l)	FECAL COLIFORM (MPN/100ml)	TOTAL COLIFORM (MPN/100ml)																
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean						
2676	MUCHKUNDI RIVER AT WAKED NEAR MS ASHAI INDIA GLASS LTD, WAKED, LANJA, RATNAGIRI	MAHARASHTRA	26.0	30.0	27.9	5.3	7.5	6.8	6.9	8.5	7.8	120	986	350	1.8	5.5	2.6	0.05	15.3	1.99	2	4	2	50	90	72
1151	PATLARGANGA AT SHILPHATA, MAHARASHTRA	MAHARASHTRA	20.0	29.0	26.9	6.0	7.3	6.9	6.7	8.1	7.5	93	185	133	2.0	4.0	3.2	0.05	1.36	0.55	13	1600	252	20	1800	409
1462	PATLARGANGA NEAR INTAKE OF MIDC W/W MAHARASHTRA	MAHARASHTRA	20.0	29.0	27.2	6.2	7.2	6.9	7.0	7.9	7.5	93	170	143	2.4	5.0	3.4	0.04	0.82	0.54	20	900	149	70	1600	307
2685	PATLARGANGA RIVER AT DIS OF KHARPADA BRIDGE, KHARPADA, KHALAPUR, RAIGAD	MAHARASHTRA	20.0	29.0	26.8	3.8	7.0	6.1	5.2	7.7	6.9	114	1755	609	2.6	6.0	4.2	0.23	12.6	3.10	17	250	65	20	550	135
2686	PATLARGANGA RIVER AT WYAL PUMP HOUSE, WYAL, KHALAPUR, RAIGAD	MAHARASHTRA	20.0	29.0	26.9	5.8	8.0	6.8	6.8	8.0	7.4	96	172	129	2.0	4.4	3.2	0.04	2.50	0.86	13	250	51	25	550	133
2687	PATLARGANGA RIVER AT KHALAPUR PUMPING STATION, KHALAPUR, RAIGAD	MAHARASHTRA	20.0	29.0	26.8	6.0	7.4	6.7	6.9	8.0	7.4	96	160	130	2.0	4.0	3.2	0.07	1.72	0.75	13	250	45	25	550	124
2686	PATLARGANGA RIVER AT SAVROLI BRIDGE, KHALAPUR, RAIGAD	MAHARASHTRA	20.0	29.0	26.9	4.8	7.4	6.6	6.9	8.0	7.4	96	169	130	2.4	16.0	5.0	0.05	1.84	0.74	20	250	67	45	550	158
2689	PATLARGANGA RIVER AT GARGANGIRI MAHARAJ TEMPLE, KHOPOLI, KHALAPUR, RAIGAD	MAHARASHTRA	20.0	29.0	26.9	5.8	7.3	6.7	7.0	8.0	7.5	62	159	120	2.6	4.5	3.6	0.06	1.83	0.73	13	130	85	20	350	226

TABLE 18.2 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN GOA & MAHARASHTRA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml		
2696	PEHLAR DAM ON PEHLAR R. INLET OF WATER WORKS, VASAI, THANE	MAHARASHTRA	25.0	28.0	26.0	6.6	7.3	7.1	7.4	8.2	7.9	97	169	139	2.8	4.0	3.2	0.14	0.66	0.45	13	130	74	70	225	147
2199	SAVITRI RIVER AT DVALE VILLAGE, NANGALWADI, MAHAD, RAIGAD	MAHARASHTRA	24.0	32.0	27.4	2.5	7.4	6.0	6.5	8.5	7.4	211	33220	1392	2.0	525.0	59.1	0.13	15.3	3.08	2	4	4	80	140	116
2701	SAVITRI JACKWELL AT UPSA KENDRE, NANGALWADI, MAHAD, RAIGAD	MAHARASHTRA	20.0	33.0	26.4	5.2	7.6	6.7	6.7	8.8	7.7	111	413	274	1.8	3.0	2.3	0.06	15.3	2.04	2	20	5	40	130	88
2702	SAVITRI AT SHEDAD DOH, RAIGAD	MAHARASHTRA	24.0	32.0	26.7	4.5	7.3	6.3	7.1	8.6	7.9	110	598	326	1.8	4.0	2.5	0.07	15.3	2.32	2	4	2	50	90	71
2703	SAVITRI RIVER AT DADLI BRIDGE, MAHARASHTRA	MAHARASHTRA	24.0	32.0	27.3	5.0	7.4	6.3	7.2	8.8	7.9	157	28380	7392	2.0	2.8	2.4	0.07	16.3	6.41	2	20	4	50	90	71
2704	SAVITRI RIVER AT MUTHAVALI VILLAGE, MAHAD, RAIGAD	MAHARASHTRA	24.0	34.0	27.4	4.1	7.5	6.3	7.1	8.5	7.7	189	36850	1205	2.0	27.5	4.4	0.05	15.3	5.37	2	7	4	80	120	102
2706	SURYA RIVER, US OF SURYA DAM, DHAMMI, VIKRAMGAD, THANE	MAHARASHTRA	27.0	29.0	27.6	5.8	7.6	7.0	7.5	8.8	8.3	116	218	162	2.6	7.0	3.8	0.02	1.21	0.48	17	80	44	35	140	90
2707	SURYA RIVER AT MIDC PUMPING STN, GARVASHETI, PALGHAR, THANE	MAHARASHTRA	27.0	29.0	27.5	6.5	7.3	7.0	8.0	8.8	8.3	113	770	212	2.8	5.0	3.6	0.04	0.95	0.44	13	80	47	45	175	90
2708	SURYA AT INTAKE OF VASAI-VIRAR WS SCHEME, MASVAN, PALGHAR	MAHARASHTRA	27.0	29.0	27.5	6.0	7.5	7.1	7.8	8.7	8.3	117	760	227	2.6	3.8	3.2	0.08	1.13	0.48	20	110	67	20	225	124
2709	TANSA RIVER NEAR ROAD BRIDGE, VILLAGE DAKEWALI, WADA, THANE	MAHARASHTRA	23.0	30.0	26.9	5.1	7.7	6.8	7.5	9.2	8.2	78	953	314	3.0	11.0	4.3	0.10	1.00	0.45	17	35	28	50	110	69
1093	ULHAS AT US OF NRC BUND AT MOHANE, MAHARASHTRA	MAHARASHTRA	22.0	30.0	25.9	5.8	7.3	6.8	7.2	8.4	7.8	128	202	151	2.0	4.8	3.4	0.26	0.78	0.50	35	1800	601	110	1800	740
1094	ULHAS AT US OF BADLAPUR, MAHARASHTRA	MAHARASHTRA	22.0	30.0	25.9	6.0	7.4	7.0	7.5	8.5	7.8	77	175	123	2.8	4.6	3.4	0.19	0.82	0.44	17	70	42	50	170	100
2162	ULHAS AT JAMBHUL WATER WORKS, MAHARASHTRA	MAHARASHTRA	22.0	30.0	26.0	6.5	7.6	6.9	7.4	8.4	7.8	87	181	139	2.6	4.0	3.3	0.19	2.01	0.76	25	200	85	0	350	169
2712	VAITARNA NEAR ROAD BRIDGE, GANDHARE VILLAGE, WADA, THANE	MAHARASHTRA	22.0	30.0	26.9	5.7	7.6	6.8	7.3	9.4	8.2	77	930	313	3.0	10.0	4.0	0.08	1.15	0.49	11	140	49	40	250	99
2164	VASHISTI AT US OF THREE M PAPER MILLS NEAR MS MULTIFILMS PLASTIC PVT. LTD. AT KHERDI, MAHARASHTRA	MAHARASHTRA	19.0	33.0	24.8	4.2	7.6	6.7	7.0	8.7	7.8	68	385	215	1.8	4.8	2.5	0.05	2.90	0.83	2	2	2	30	70	51
2713	VASHISTI AT DIS OF THREE M PAPER MILLS NEAR CHINLI WATER INTAKE JACKWELL AT KHERDI, RATNAGIRI, MAHARASHTRA	MAHARASHTRA	18.0	33.0	26.2	5.3	7.6	6.7	7.0	8.9	7.8	51	370	204	1.8	3.2	2.5	0.07	2.71	0.77	2	4	2	40	90	68
2714	VASHISTI AT US OF POPHAL NR KONPHANSAWANE BRIDGE, MAHARASHTRA	MAHARASHTRA	19.0	33.0	25.3	6.0	7.5	6.9	7.3	8.3	7.7	85	315	205	1.8	2.6	2.2	0.07	4.89	0.93	2	4	2	30	80	55

TABLE 18.3 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN KERALA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml		
1342	ACHENKOIL AT THUMPAMON	KERALA	25.6	27.5	26.6	5.9	7.6	7.1	6.6	7.4	6.9	41	133	72	0.2	0.9	0.5	0.05	0.72	0.25	80	550	278	240	1100	641
1443	ACHENKOIL AT CHENNITHULA	KERALA	26.0	27.4	26.8	5.7	6.9	6.6	6.4	7.2	6.9	59	98	70	0.6	1.4	0.9	0.16	0.90	0.49	110	500	223	280	900	495
2297	R ANCHARAKANDY AT MERUVAMBA	KERALA	23.0	31.0	26.6	6.3	7.6	6.9	6.7	7.4	7.1	37	64	52	0.6	1.2	0.8	0.08	0.27	0.18	2	170	46	21	1600	520
2319	R ANCHARAKANDY AT MERUVAMBA	KERALA	23.5	31.0	26.8	6.7	8.0	7.6	7.2	7.0	7.0	37	3170	830	0.3	1.2	0.8	0.06	0.33	0.16	2	350	94	4	2100	654
2286	R AYROOR AT AYROOR BRIDGE	KERALA	26.0	30.5	28.3	5.3	7.5	6.3	6.5	7.2	6.9	79	111	95	0.4	2.0	1.3	0.12	1.50	0.99	300	900	750	500	1600	1325
2331	R BHARATHAPUZHA AT KUTIPPURAM	KERALA	24.5	27.0	25.5	7.0	7.4	7.2	7.1	8.0	7.4	116	220	164	0.4	1.6	0.9	0.30	0.62	0.46	900	1700	1325	1400	3500	2225
2332	R BHARATHAPUZHA AT PATTAMBI	KERALA	25.0	27.0	25.5	6.3	7.4	6.9	7.1	8.0	7.5	155	320	231	0.5	1.2	0.8	0.42	0.70	0.55	900	1300	1000	1300	2400	1725
1154	CHALAKUDY AT PULICKALKA-DAVU	KERALA	24.0	29.0	26.6	5.6	7.3	6.5	6.6	7.3	6.9	43	208	101	0.4	3.0	1.3	0.16	1.00	0.47	50	1100	468	110	2400	1127
20	CHALIYAR AT KOOLIMADU, KERALA	KERALA	22.0	26.0	24.7	6.8	7.9	7.1	6.8	7.6	7.1	28	100	64	0.2	0.9	0.6	0.05	1.30	0.40	110	700	283	220	2200	646
21	CHALIYAR AT CHUNGAPALLY	KERALA	22.0	26.0	24.8	6.5	8.0	7.1	6.7	7.4	7.1	34	30000	4600	0.2	1.0	0.6	0.20	1.00	0.35	40	500	229	80	1300	538
1572	CHANDRAGIRI AT PADIYATHAKKA	KERALA	26.0	30.0	28.0	7.1	7.8	7.5	6.8	7.4	7.2	42	64	52	0.4	1.2	0.6	0.09	0.24	0.15	30	500	285	80	1700	900
1573	CHITTHRAPUZHA AT IRUPANAM	KERALA	25.5	29.0	27.4	0.6	3.1	2.0	6.6	7.1	6.8	188	390	265	0.9	3.6	2.4	0.90	3.30	2.30	300	3500	1525	500	16000	5425
2295	R CORAPUZHA AT KANAYANKODE	KERALA	25.0	27.0	26.0	5.2	6.0	5.6	6.5	7.3	7.0	649	34000	1276	0.8	1.6	1.2	0.20	0.58	0.41	300	1300	725	500	3500	1650
1564	R ITHIKKARA AT AYUR, KERALA	KERALA	26.7	28.0	27.4	6.6	7.6	7.1	6.8	7.1	7.0	68	102	90	0.2	0.9	0.6	0.06	1.40	0.64	170	600	338	500	900	625
2287	R ITHIKKARA AT ITHIKKARA	KERALA	26.0	27.0	26.5	5.6	6.8	6.1	6.8	7.1	7.0	182	328	248	0.4	1.5	0.8	0.00	2.20	0.66						

2293	R KADALLUNDI AT HAJIRAPPALLY	KERALA	27.5	29.5	28.9	4.9	7.1	6.5	6.7	7.9	7.5	49	92	76	0.3	1.6	0.8	0.07	0.08	0.08	110	600	275	220	1400	585
2337	R KADAMBAYAR AT BRAHMAPPURAM	KERALA	23.5	29.0	26.7	0.3	7.2	1.5	5.0	7.3	6.6	62	1020	192	0.9	9.4	3.6	0.20	3.60	0.92	100	1600	881	240	9000	2978
2338	R KADAMBAYAR AT MANCKAKADAVU	KERALA	23.5	29.0	26.5	0.5	7.1	2.0	6.5	7.1	6.8	49	117	79	0.7	4.4	2.4	0.10	3.30	0.20	130	1300	456	500	5000	1275
42	KALLADA AT PERUMTHOTAM KADAVU, PUNALLOOR, KERALA	KERALA	25.0	27.6	26.5	6.3	7.9	7.2	6.6	7.4	7.1	34	90	52	0.3	0.8	0.6	0.00	0.54	0.15	110	500	298	220	1100	687
2294	R KALLAI AT KALLAI BRIDGE	KERALA	25.0	26.5	25.5	2.9	4.8	4.0	6.7	8.0	7.5	957	44000	2596.4	0.6	1.2	1.1	0.26	1.90	0.76	280	2200	945	350	4000	1588
1571	KARINGODE AT KAKKADAVU	KERALA	26.0	31.0	28.0	6.3	8.0	7.2	6.8	7.6	7.3	40	68	54	0.2	1.3	0.9	0.10	0.40	0.25	80	700	330	140	900	610

TABLE 18.3 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN KERALA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5			< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
1155	KARAMANA AT MOONNATTUMUKKU	KERALA	27.0	29.5	28.0	0.0	6.8	6.8	6.5	7.8	7.1	580	2500	1239	6.2	18.0	11.9	1.60	2.13	1.87	300	11000	4250	1600	22000	11000
2289	R KARUVANNURR AT KARUVANNUR BRIDGE	KERALA	27.0	29.0	27.9	6.0	7.0	6.4	6.2	6.9	6.5	48	64	58	0.6	2.4	1.3	0.26	0.50	0.34	50	500	255	240	2800	960
2301	R KAVVAI AT KUTTIYOL PALAM	KERALA	25.0	31.0	28.1	4.7	8.0	6.3	5.8	7.3	6.8	29	136	77	0.6	2.0	1.2	0.11	0.20	0.16	60	80	73	110	500	208
2291	R KEECHER AT VADAKKANCHERY BRIDGE	KERALA	26.5	31.0	28.8	4.5	6.4	5.4	6.4	6.7	6.6	61	94	80	0.6	2.3	1.6	0.05	0.54	0.27	60	700	335	600	1100	775
2326	R KORAYAR AT KANJIKODE	KERALA	25.0	26.5	25.3	4.4	6.6	5.8	7.7	7.9	7.8	606	727	666	0.4	1.2	1.0	0.05	0.60	0.24	300	1770	993	500	2800	1650
1569	R KUPPAM AT THALIPARAMBA	KERALA	23.5	32.0	28.5	4.6	8.0	6.6	6.4	7.5	7.2	89	39360	1276.8	0.6	2.0	1.1	0.06	0.18	0.13	2	240	88	9	5000	1412
2298	R KUPPAM AT RAYAROM	KERALA	21.5	31.0	26.1	7.3	8.0	7.7	6.4	7.8	7.2	29	56	44	0.6	1.6	1.0	0.23	0.32	0.28	2	80	29	22	240	148
1567	R KUTTIYADY AT KUTTIYADY ESTATE	KERALA	24.0	25.0	24.5	6.9	7.5	7.1	6.5	7.6	7.0	25	29	27	0.4	0.5	0.4	0.05	0.20	0.11	60	80	73	110	400	218
1568	R MAHE AT VALAYAM, KERALA	KERALA	25.0	28.0	26.0	7.0	8.0	7.3	6.7	7.9	7.2	39	71	59	0.3	0.8	0.6	0.08	0.31	0.19	60	220	160	120	800	465
2285	R MAMOM AT MAMOM BRIDGE	KERALA	27.5	29.5	28.5	7.4	8.0	7.8	6.7	7.7	7.1	86	168	119	0.2	1.2	0.7	0.20	1.21	0.87	500	1600	875	1300	2400	1725
1340	MANIMALA AT KALLOPARA	KERALA	26.5	27.0	26.8	6.5	7.8	7.3	6.4	7.4	7.1	33	85	54	0.3	2.6	1.3	0.20	0.53	0.41	140	800	415	350	1300	913
1384	MANIMALA AT THONDRA, KERALA	KERALA	26.5	27.0	26.8	6.7	7.6	7.0	6.4	6.8	6.6	36	260	104	1.0	2.7	1.5	0.29	0.78	0.49	400	700	500	800	1200	1000
2307	R MANJESWAR AT BAKRANKARA BR.	KERALA	26.0	30.0	28.0	2.8	8.1	6.0	6.9	7.4	7.2	58	160	92	0.2	1.2	0.7	0.10	0.69	0.38	80	1600	765	220	3500	1390
1339	MEENACHIL AT KIDANGOOR, KERALA	KERALA	25.5	27.0	26.2	6.2	7.8	6.8	6.3	6.9	6.6	37	64	48	0.4	0.6	0.5	0.28	0.70	0.44	800	1600	1225	1100	3200	2025
2304	R MOGRAL AT MOGRAL BR.	KERALA	26.0	30.0	28.5	4.8	6.1	5.6	6.1	7.7	7.1	118	49200	2045.8	0.3	1.0	0.6	0.24	1.13	0.58	11	1600	433	110	2200	675
43	MUVATTAPUZHA AT VETTIKATTUMUKKU, KERALA	KERALA	24.0	29.0	26.5	6.2	7.8	7.0	6.6	7.3	7.0	45	97	56	0.5	2.0	1.1	0.04	0.70	0.43	170	2200	768	500	3500	1725
2302	R NEELASWARAM AT MAMBURKAL DAM	KERALA	26.0	33.0	29.3	5.7	7.5	6.7	6.4	7.4	6.9	38	8100	2531	0.2	0.9	0.5	0.15	0.38	0.22	21	700	308	60	900	465
1570	R NEELASWARAM AT HOSDURG	KERALA	28.0	31.0	29.0	5.9	6.3	6.2	6.5	8.0	7.2	61	46000	1536.2	0.2	1.6	0.8	0.18	0.75	0.39	80	2200	830	110	3000	1303
1563	R NEYYAR AT AMARAVILA, KERALA	KERALA	26.0	28.5	27.0	6.8	7.8	7.3	6.6	7.6	7.2	46	82	62	0.7	1.0	0.8	0.50	1.60	0.95	80	900	525	240	1600	985
2284	R NEYYAR AT ARUVIPURAM	KERALA	26.0	28.5	27.3	7.0	7.9	7.6	7.0	7.6	7.2	44	85	59	0.2	0.9	0.6	0.17	0.89	0.65	50	900	463	350	2400	1163
2288	R PALLICKAL AT NELLIMUKAL	KERALA	27.0	30.0	27.9	6.2	6.9	6.4	6.5	7.1	6.8	60	109	83	0.4	0.6	0.5	0.20	0.80	0.42	110	280	175	500	700	575
1156	PAMBA AT CHENGANNUR, KERALA	KERALA	26.0	31.0	27.8	5.9	7.5	7.0	6.1	7.3	6.6	28	80	50	0.4	0.8	0.6	0.10	1.40	0.75	30	500	295	110	900	578
1341	PAMBA AT THAKAZHY, KERALA	KERALA	27.0	30.0	27.8	6.2	7.5	6.7	6.3	7.5	6.8	41	160	76	0.7	2.0	1.2	0.60	1.72	1.21	220	500	310	500	700	625
1565	PAMBA DOWN, KERALA	KERALA	27.0	30.0	28.3	6.3	7.0	6.7	6.2	7.4	6.6	35	110	64	0.7	1.3	0.9	1.00	1.70	1.35	110	900	428	350	1600	838
17	PERIYAR NEAR ALWAYE-ELOOR	KERALA	24.0	31.0	27.5	4.1	7.0	5.6	6.5	7.3	6.9	61	6600	943	0.4	2.4	1.5	0.20	0.92	0.40	170	1600	655	500	3500	1925
18	PERIYAR AT KALADY, KERALA	KERALA	24.0	28.5	26.3	6.7	8.0	7.4	6.8	7.3	7.0	27	53	38	0.2	1.6	0.9	0.10	0.49	0.26	170	800	386	350	3000	1196
1338	PERIYAR AT SEWAGE DISCHARGE POINT, KERALA	KERALA	24.0	30.0	27.0	5.8	7.4	6.7	6.5	7.0	6.9	32	53	43	0.4	1.7	1.0	0.14	0.47	0.30	220	3000	1043	600	5000	2750
2333	RIVER PERIYAR AT MUPPETHADAM	KERALA	26.5	29.0	27.4	6.4	7.8	7.1	7.1	7.4	7.3	40	59	48	0.5	2.1	1.5	0.30	0.52	0.36	80	1100	595	500	2800	1775
2334	RIVER PERIYAR AT PATHALAM	KERALA	23.5	31.0	27.0	4.8	7.2	6.2	6.5	7.0	6.8	49	2200	309	0.5	2.9	1.6	0.20	0.76	0.39	110	3500	1129	350	5000	2725
2335	R PERIYAR AT KALAMASSERY	KERALA	24.0	32.0	27.4	2.4	7.2	5.2	6.5	7.1	6.8	39	88	61	0.6	3.0	1.8	0.12	0.56	0.33	240	3000	1123	900	5000	2650
2336	R PERIYAR AT PURAPPALLIKAVU	KERALA	23.0	31.0	27.3	5.4	7.6	6.8	6.7	7.2	6.9	36	3600	995	0.3	2.0	1.1	0.09	0.45	0.24	22	1400	349	50	5000	1258
2300	R PERUVAMBA AT CHANDAPPURA	KERALA	24.0	31.0	27.0	4.8	8.0	6.8	6.5	7.1	6.9	27	92	52	0.6	1.2	0.9	0.45	0.45	0.45	2	110	39	11	500	198
2303	R PULLUR AT PULLUR BR.	KERALA	27.0	28.0	27.8	4.3	7.5	6.2	6.3	6.9	6.6	38	57	44	0.3	1.4	0.7	0.12	0.36	0.21	80	1600	715	170	3000	1630
2290	R PUZHACKAL AT PUZHACKAL BRIDGE	KERALA	27.0	30.0	28.4	2.9	6.2	4.5	6.0	6.8	6.5	60	97	77	0.8	1.2	1.1	0.10	0.54	0.34	30	900	400	300	9000	2675
2299	R RAMAPURAM AT RAMAPURAM BRIDGE	KERALA	25.0	32.0	28.8	3.3	5.5	4.0	6.0	7.7	7.0	45	50000	1927.9	0.2	1.2	0.9	0.01	0.04	0.03	2	280	98	11	400	233
2305	R SHRIYA AT ANGADIMOORU	KERALA	27.0	30.0	28.8	4.8	8.0	7.0	7.0	8.0	7.4	47	123	69	0.3	1.8	1.0	0.06	0.18	0.12	70	500	230	220	1600	660
2296	R THALASSERY AT PATHIPPALAM	KERALA	24.0	28.0	25.9	5.3	7.0	6.5	6.5	7.0	6.8	46	72	58	0.1	1.0	0.5	0.04	0.44	0.24	2	700	303	4	2100	1026
2292	R THIRUR AT THALAKKADATHUR BRIDGE	KERALA	27.0	28.0	28.0	3.6	5.0	4.6	6.3	7.6	6.9	61	153	98	0.1	1.5	0.6	0.10	0.12	0.11	60	400	168	110	800	348
2306	R UPPALA AT UPPALA BR.	KERALA	26.0	30.0	28.5	4.8	7.5	6.6	6.8	8.1	7.3	73	49000</													

TABLE 18.4 - WATER QUALITY OF MEDIUM & MINOR RIVERS IN ANDHRA PRADESH, KARNATAKA, ORISSA, PONDICHERY & TAMILNADU - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml						
1448	NAGAVALLI AT THOTAPALLI REGULATOR, A.P.	ANDHRA PRADESH	24.2	36.0	27.6	6.0	6.8	6.2	7.1	8.0	7.5	262	450	371	1.0	1.4	1.1	1.00	2.50	1.62	3	4	3	14	1100	528	
2352	RIVER VAMSHADHARA KALINGAPATNAM VIZIANAGARAM	ANDHRA PRADESH	24.0	37.0	27.6	5.8	6.8	6.2	7.2	7.9	7.7	207	410	316	1.0	2.0	1.3	0.21	4.80	2.41	7	3	4	3	23	1100	312
1444	KALI AT D/S WEST COAST PAPER MILL, KARNATAKA	KARNATAKA	27.0	30.0	28.3	7.2	7.5	7.3	7.0	7.2	7.1	96	348	241	2.0	4.3	2.9	0.37	2.10	1.17	6	140	100	50	350	165	
2780	KALI AT US OF WCPM, DANDELI, KARNATAKA	KARNATAKA	25.0	30.0	27.5	7.5	8.1	7.7	7.1	7.7	7.4	88	157	121	0.9	1.9	1.4	0.23	1.30	0.64	11	900	378	20	1800	1255	
1894	KUMARADHARA - US OF UPPINAGADY TOWN BEFORE CONFLUENCE WITH RIVER NETRAVATHI	KARNATAKA	30.0	31.0	30.5	6.0	7.0	6.5	7.0	7.7	7.3	37	110	64	1.0	1.0	1.0	0.20	5.00	2.60	2	920	236	9	1600	420	
1892	NETRAVATHI US OF DHARMASTALA AT WATER SUPPLY INTAKE POINT	KARNATAKA	27.0	33.0	29.5	6.5	7.0	6.9	7.2	7.5	7.4	32	90	57	1.0	1.0	1.0	0.00	5.00	1.28	2	170	46	2	1600	409	
2423	BUDHABALANGA, D/S OF BARIPADA TOWN	ORISSA	16.0	28.0	22.3	7.2	8.0	7.5	7.5	8.4	8.0	117	332	211	1.1	2.8	1.9	0.09	0.88	0.39	580	17000	3005	1300	35000	6858	
2424	BUDHABALANGA, D/S OF BARIPADA TOWN	ORISSA	17.0	29.0	22.3	7.0	8.0	7.2	7.4	8.4	8.0	153	504	263	1.6	22.0	3.7	0.01	2.86	0.63	1100	35000	6625	2100	92000	14725	
2425	RIVER KERANDI INTAKE WEL OF NALCO REFINARY, HAL, SUNABEDA)	ORISSA	19.0	30.0	25.0	6.5	7.8	7.0	7.2	8.3	7.6	66	153	111	0.9	2.5	1.6	0.03	3.89	0.67	170	4300	1081	400	15000	2743	
2422	NAGAVALLI AT PENTA US, JAYKAPUR TOWN	ORISSA	16.0	31.0	25.0	6.8	8.0	7.5	7.1	8.3	7.9	153	259	205	0.7	2.2	1.5	0.04	6.84	1.00	700	4600	1615	1100	14000	3542	
1642	NAGAVALLI AT JAYKAPUR D/S, ORISSA	ORISSA	17.0	30.0	25.9	6.6	8.1	7.1	6.8	8.3	7.7	164	461	283	0.8	3.7	2.3	0.22	7.53	1.73	780	11000	2882	1700	28000	6692	
1643	NAGAVALLI AT RAYGADA D/S, ORISSA	ORISSA	16.0	30.0	24.6	6.4	8.2	7.4	7.2	8.4	8.0	183	321	263	0.8	2.7	1.7	0.05	2.44	0.65	630	14000	3113	1200	35000	6617	
1455	RUSHKULYA AT GANJAM U/S, ORISSA	ORISSA	20.0	33.0	27.5	5.5	10.8	8.1	7.5	8.4	8.0	221	394	300	1.0	3.0	2.3	0.03	2.19	0.45	78	13000	2272	130	24000	4569	
1456	RUSHKULYA AT GANJAM D/S, ORISSA	ORISSA	22.0	32.0	28.0	6.3	8.9	7.8	7.4	8.3	8.0	280	25280	13103	1.0	3.3	2.1	0.13	1.12	0.59	70	1100	277	120	2200	739	
2426	VANSADHARA AT MUNGUUDA (D/S OF MS. SEDIMENTATION PROJECT)	ORISSA	17.0	29.0	25.8	6.0	8.1	7.4	7.5	8.3	8.0	162	326	207	0.8	2.4	1.5	0.02	3.00	0.53	170	4900	1356	700	9400	2872	
2427	VANSADHARA AT GUNUPUR (INTERSTATE BOUNDARY)	ORISSA	15.0	33.0	25.8	6.2	7.6	7.2	7.6	8.3	8.0	160	239	198	0.6	2.8	1.4	0.02	3.73	0.57	110	2300	677	400	7900	1850	
1685	ARASALAR RIVER KARAIKAL REGION, PONDICHERY	PONDICHERY	23.0	30.0	26.5	6.5	6.5	6.5	7.8	8.3	8.1	380	1078	729	1.0	1.0	1.0	0.30	1.00	0.65							
2444	CORINGA RIVER	PONDICHERY	31.0	31.0	31.0	3.0	3.0	3.0	8.1	8.1	8.1	1086	1086	1086				0.10	0.10	0.10							
2442	GAUTAMI-GODAVARI RIVER	PONDICHERY	32.0	32.0	32.0	6.9	6.9	6.9	8.2	8.2	8.2	1091	1091	1091				0.02	0.02	0.02							
2443	GAUTAMI-GODAVARI RIVER	PONDICHERY	31.0	31.0	31.0	6.0	6.0	6.0	8.0	8.0	8.0	1799	1799	1799				0.07	0.07	0.07							
2445	MAHE RIVER	PONDICHERY	28.0	28.0	28.0	4.8	4.8	4.8	7.7	7.7	7.7	4850	4850	4850				0.34	0.34	0.34							
1450	PALAR AT VANIAMBADEI WATER SUPPLY HEAD WORK, TAMILNADU	TAMIL NADU	25.0	36.0	28.0	5.7	6.9	6.3	7.2	8.0	7.6	493	1071	830	1.0	2.0	1.8	0.04	0.90	0.24	20	1700	738	40	9200	2020	
1159	TAMBIRAPARANI AT BDG NR. MADURA COATS LTD PAPANIVASAM, TAMILNADU	TAMIL NADU	22.0	27.0	24.0	6.8	7.8	7.4	7.5	7.8	7.6	50	172	104	0.8	2.4	1.2	0.01	0.26	0.09	22	60	37	70	140	94	
1160	TAMBIRAPARANI AT CHEERANMADEVI CAUSEWAY, TAMILNADU	TAMIL NADU	23.0	28.0	25.6	6.6	7.9	7.1	7.5	7.9	7.7	60	236	103	0.8	1.9	1.2	0.03	1.10	0.21	40	80	63	110	170	131	
1161	TAMBIRAPARANI AT TIRUNELVELI, COLLECTORATE, TAMILNADU	TAMIL NADU	24.0	29.0	26.0	5.1	7.8	6.4	7.3	7.9	7.7	72	274	140	0.9	4.1	2.0	0.06	0.27	0.16	130	300	192	220	500	368	
1162	TAMBIRAPARANI AT MURAPPANADU, TAMILNADU	TAMIL NADU	29.0	31.0	29.4	5.2	7.4	6.6	6.3	7.9	7.0	108	834	342	0.8	3.0	1.3	0.03	0.25	0.11	22	70	52	90	110	103	
1328	TAMBIRAPARANI AT PAPPANKULAM, TAMILNADU	TAMIL NADU	23.0	28.0	25.2	6.7	8.3	7.2	7.0	8.0	7.7	47	186	87	0.4	1.7	1.1	0.01	0.52	0.14	23	90	49	80	170	113	
1329	TAMBIRAPARANI AT RAIL BDG. NR. AMBASAMUDAM, TAMILNADU	TAMIL NADU	22.0	27.0	24.1	6.1	8.0	7.2	7.3	7.7	7.5	54	179	88	0.5	1.5	1.1	0.02	0.36	0.12	26	60	41	80	130	96	
1330	TAMBIRAPARANI AT ARUMUGANERI, TAMILNADU	TAMIL NADU	29.0	29.0	29.0	6.0	7.7	6.9	7.1	8.3	7.6	193	1428	787	1.4	8.0	3.2	0.01	0.28	0.14	30	110	82	110	280	178	
3025	TAMBIRAPARANI AT ERAL, THOTHUKUDI, TAMILNADU	TAMIL NADU	29.0	31.0	29.3	6.0	8.0	6.9	6.9	7.5	7.2	174	688	338	1.0	2.2	1.3	0.02	0.48	0.13	40	90	70	80	170	135	
3026	TAMBIRAPARANI AT KALI DAI KURICHI, TIRUNELVELI, TAMILNADU	TAMIL NADU	22.0	27.0	24.3	7.2	8.1	7.6	7.3	7.9	7.6	56	180	86	0.6	8.0	1.7	0.04	0.19	0.10	27	80	45	80	140	103	
3027	TAMBIRAPARANI AT SRIVAIKUNTAM, D/S OF SK ANAICUT, TIRUNELVELI, TAMILNADU	TAMIL NADU	29.0	31.0	29.3	4.6	7.7	6.4	6.4	7.6	7.0	98	821	264	1.0	2.1	1.3	0.04	0.24	0.13	50	170	82	90	458	160	
3028	TAMBIRAPARANI AT VELLAKOIL, TIRUNELVELI, TAMILNADU	TAMIL NADU	24.0	30.0	26.8	5.2	7.2	6.2	7.4	7.8	7.6	86	276	170	0.8	3.5	1.8	0.06	0.41	0.23	80	220	133	170	350	277	
3029	TAMBIRAPARANI AT SIVALAPERI, CONFLUENCE POINT OF KUTTRALAM FALLS, D/S OF PALAYAMKOTTAI, TIRUNELVELI, TAMILNADU	TAMIL NADU	24.0	30.0	27.0	4.9	7.3	6.3	7.4	7.7	7.6	109	276	200	0.8	3.9	2.0	0.03	15.0	1.42	80	280	143	170	500	298	
3023	VASISTA AT SALEM, D/S OF SAGO INDUSRIES EFFLUENT, TAMILNADU	TAMIL NADU	27.0	35.0	30.0	0.5	6.4	2.5	6.7	7.8	7.3	845	2840	1761	12.0	340.0	139.8	0.04	1.45	0.40	14000	920000	278417	22000	1600000	472250	

TABLE 18.5 - WATER QUALITY OF MEDIUM & MINOR RIVERS IN HARYANA, HIMACHAL PRADESH, PUNJAB & RAJASTHAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml						
1885	RIVER GHAGGAR AT D/S OF SURAJPUR	HARYANA				6.8	7.1	6.9	7.7	8.0	7.8	406	479	440	3.2	3.6	3.4	0.95	1.58	1.21							
1023	GHAGGAR AT MUBARAKPUR REST HOUSE (PATIALA), PUNJAB	PUNJAB	14.0	35.0	24.8	5.0	6.4	5.8	7.2	7.2	7.2	666	810	732	2.5	16.0	8.5	3.30	4.20	3.83	55	2100	1089	350	9000	4838	
1024	GHAGGAR AT 100M D/S CONF. WITH R. SARASWATI (PATIALA), PUNJAB	PUNJAB	16.0	36.0	24.0	4.2	6.2	5.6	7.1	7.6	7.4	991	1620	1322	13.0	18.0	15.3	6.60	22	15	9000	35000	16750	21000	70000	41500	
1295	GHAGGAR NEAR BANKARPUR, DERA BASSI, PUNJAB	PUNJAB	14.0	36.0	25.0	4.6	6.2	5.4	7.1	7.4	7.3	665	920	809	3.0	20.0	10.0	2.80	5	4.20	110	9000	4278	900	15000	8975	
1473	GHAGGAR AT RATANHERI, D/S OF PATIALA NADI (AFTER CONFL.), PUNJAB	PUNJAB	15.0	36.0	23.3	4.0	6.4	5.7	7.2	7.5	7.3	926	1510	1103	12.0	16.0	14.3	4.20	18	13.7	9000	50000	20250	20000	90000	52500	
1688	GHAGGAR AT D/S CHHATBIR	PUNJAB	14.0	35.0	25.0	4.8	6.4	5.7	7.3	7.7	7.5	664	1209	906	5.0	68.0	24.0	3.50	36	14.1	350	25000	7863	500	50000	17625	

1699	GHAGGAR AT U/S DHAKANSU NALLAH, PUNJAB	PUNJAB	14.0	35.0	25.8	2.1	5.8	3.5	6.9	7.7	7.4	840	1490	1064	13.0	24.0	20.0	5.20	22	13.2	8	5000	11000	8000	11000	21000	14500
1700	GHAGGAR AT D/S DHAKANSU NALLAH, PUNJAB	PUNJAB	14.0	35.0	25.8	1.8	5.8	3.2	7.2	7.9	7.6	860	1560	1197	14.0	36.0	27.3	7.60	28	19.2	8	11000	30000	20250	21000	50000	40250
1701	GHAGGAR AT D/S JHARMAL NADI	PUNJAB	14.0	36.0	26.0	4.2	5.2	4.7	6.8	7.7	7.3	1040	1630	1383	15.0	60.0	32.8	6.00	25.2	16.4	0	550	35000	14388	1500	70000	42875
1702	GHAGGAR AT U/S JHARMAL NADI	PUNJAB	14.0	36.0	26.0	4.2	5.6	4.8	6.9	7.6	7.4	973	1260	1063	10.0	24.0	16.0	3.80	5.80	5.03	0	350	5000	3138	1100	11000	8025
1703	GHAGGAR AT MOONAK, PUNJAB	PUNJAB	15.0	36.5	24.4	4.4	6.2	5.3	7.3	7.6	7.5	987	2140	1532	15.0	20.0	18.3	7.00	28.0	15.8	0	11000	40000	27000	24000	110000	63500
1704	GHAGGAR AT D/S SARDULGARH	PUNJAB	14.0	37.5	23.4	4.6	7.4	5.6	7.3	7.7	7.5	994	1800	1269	14.0	50.0	34.5	6.40	22.0	12.1	5	11000	40000	22000	50000	90000	60000
1705	GHAGGAR AT U/S SARDULGARH	PUNJAB	16.0	37.0	24.3	4.6	7.2	5.4	7.2	7.6	7.4	810	1840	1194	12.0	34.0	22.0	4.80	10.0	8.30	0	9000	11000	10000	25000	50000	35000
1025	GHAGGAR GH-1 AT ROAD BRDG SIRSA, DEBWALI ROAD, HARYANA	HARYANA	15.0	22.0	17.7	5.7	6.7	6.1	6.7	6.9	6.8	780	780	780	12.0	16.0	14.7										
1026	GHAGGAR GH-2 AT CHANDARPUR SYPHON, HARYANA	HARYANA	15.0	21.0	17.0	5.9	6.2	6.1	6.7	6.8	6.8	640	940	773	12.0	18.0	14.7										
1887	GHAGGAR BEFORE OTTU WEIR (BEFORE MIXING OF SATLUJ CANAL WATER) (HARYANA)	HARYANA	15.0	22.0	17.3	5.6	6.3	6.0	6.9	7.1	7.0	820	820	820	10.0	22.0	15.3										
1718	GHAGGAR RIVER WHEN ENTERING IN RAJASTHAN FROM HARYANA NEAR RD NO. 629, RAJASTHAN	RAJASTHAN	22.0	33.0	28.0	3.5	5.5	4.8	7.6	8.1	7.9	370	1330	650	2.7	4.6	3.2	0.30	1.02	0.68	0	3	11	6	9	210	62
1719	GHAGGAR RIVER D/S HANUMANGARH NEAR 2 KNI NAL ABADI, MAKKASR	RAJASTHAN	32.0	32.0	32.0	5.0	5.0	5.0	7.3	7.3	7.3	390	390	390	2.8	2.8	2.8	0.14	0.14	0.14	0	4	4	4	20	20	20
1871	RIVER MARKANDA AT PAONTA, DISTT. SIRMOUR, H.P.	HIMACHAL PRADESH	15.0	26.0	21.4	6.2	10.1	8.3	7.3	8.0	7.6	167	461	334	0.4	1.6	1.0	0.03	0.13	0.49	0	4	12	9	8	26	16
2624	MARKANDA U/S KALA AMB	HIMACHAL PRADESH	12.0	28.0	22.3	6.1	9.9	8.2	6.8	8.1	7.7	163	398	316	0.8	1.6	1.2	0.04	1.00	0.48	0	6	17	11	12	43	20
1884	KALA AMB D/S MARKANDA RIVER	HARYANA	17.0	20.0	18.0	0.8	5.2	3.1	6.9	8.3	7.8	378	2650	1261	4.5	535.0	195.4	1.10	8.46	4.78	0						
2625	MARKANDA D/S KALA AMB BOUNDARY OF HARYANA	HIMACHAL PRADESH	14.0	28.0	22.8	6.0	9.8	8.3	6.8	8.2	7.6	169	377	304	0.8	1.8	1.2	0.04	1.70	0.51	0	5	21	12	10	43	20
1870	RIVER SUKHANA AT PARWANOO, DISTT. SOLAN	HIMACHAL PRADESH	8.0	31.0	21.1	1.2	9.0	5.5	6.8	8.3	7.6	302	1589	743	0.2	26.0	7.6	0.00	3.58	1.02	0	26	136	81	80	250	166
2946	RIVER BANDI AT HEMAWAS DAM, PALLI RAJASTHAN	RAJASTHAN	21.0	32.0	26.9	1.7	7.1	5.1	7.0	8.3	7.8	420	830	657	0.8	2.3	1.7	0.02	0.42	0.26	0	4	20	6	9	75	23
2947	RIVER JAWAI AT JAWAI DAM, SIROHI, RAJASTHAN	RAJASTHAN	10.0	41.0	27.3	3.2	7.6	5.3	7.2	8.3	7.8	380	1340	623	0.6	3.4	1.7	0.02	0.58	0.37	0	3	7	4	7	76	18
1717	KODRA DAM, MOUNT ABU, RAJASTHAN	RAJASTHAN	10.0	29.0	20.4	1.6	7.0	5.5	6.8	8.2	7.5	170	800	278	0.2	2.8	1.4	0.02	0.38	0.20	0	3	7	5	7	1100	105
2949	RIVER LUNI AT RANAKPUR DAM, RANAKPUR, PALLI, RAJASTHAN	RAJASTHAN	19.0	40.0	27.7	4.8	7.1	5.8	7.0	8.4	7.8	500	2100	1162	0.6	2.6	1.5	0.02	1.84	0.59	0	3	4	4	4	20	12

TABLE 18.6 - WATER QUALITY OF MEDIUM & MINOR RIVERS IN MANIPUR, MEGHALAYA, MIZORAM & TRIPURA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			
2869	BARAK RIVER AT SENAPATI	MANIPUR	19.0	19.0	19.0	8.7	8.7	8.7	7.1	7.1	7.1	252	252	252	4.9	4.9	4.9								10	10	10
2875	BARAK RIVER AT N.H. 53, TAMENGLONG DISTT., MANIPUR	MANIPUR	26.0	26.0	26.0	5.1	5.1	5.1	7.2	7.2	7.2	17	17	17	1.0	1.0	1.0								10	10	10
2868	CHAKPI AT CHAKPI KARONG	MANIPUR	19.0	19.0	19.0	10.0	10.0	10.0	7.4	7.4	7.4	157	157	157	0.6	0.6	0.6								5	5	5
1424	IMPHAL AT MAHABALI, MANIPUR	MANIPUR	15.0	26.0	21.8	4.1	8.3	5.9	6.9	7.2	7.0	28	375	164	1.2	2.5	1.6								15	150	74
1457	IMPHAL AT KORENGEL, MANIPUR	MANIPUR	14.0	27.0	22.3	4.8	7.5	6.1	7.0	7.6	7.3	112	198	141	0.6	2.0	1.4								5	115	63
1627	IMPHAL AT KIYAMGI, MANIPUR	MANIPUR	15.0	26.0	22.3	5.2	6.2	5.6	6.9	7.2	7.1	128	807	427	1.0	2.0	1.4								5	450	175
1626	IMPHAL AT MINUTHONG	MANIPUR	15.0	26.0	22.3	4.1	5.4	4.7	6.8	7.1	7.0	250	803	527	1.7	2.0	1.9								0	120	42
2861	IMPHAL AT KANGLA MOAT, IMPHAL	MANIPUR	19.0	27.0	23.0	2.9	8.0	5.5	7.3	9.8	8.6	29	202	116	2.1	6.9	4.5								25	200	113
2862	IMPHAL AT SAMUROU, IMPHAL WEST	MANIPUR	19.0	27.0	23.0	4.5	9.0	6.8	6.7	6.9	6.8	149	171	160	1.3	1.6	1.5								15	30	23
2864	IMPHAL AT SEKMAL, IMPHAL EAST	MANIPUR	20.0	26.0	23.0	5.6	8.3	7.0	7.2	7.6	7.4	0	93	47	1.0	1.0	1.0								5	5	5
2874	IRANG RIVER AT TAMENGLONG	MANIPUR	20.0	26.0	23.0	4.7	9.8	7.3	7.3	8.2	7.8	106	125	116	1.2	1.2	1.2								5	15	10
1458	IRIL AT PORAMPET, MANIPUR	MANIPUR	14.0	26.0	22.0	4.4	6.9	5.5	7.1	7.7	7.3	40	286	179	0.8	1.5	1.2								5	200	75
1624	IRIL AT LILONG, MANIPUR	MANIPUR	14.0	27.0	22.3	3.1	5.7	4.7	7.2	7.6	7.4	171	299	220	1.2	2.1	1.6								10	320	140
2863	IRIL RIVER AT KANGLA SIPHAL, IMPHAL EAST, MANIPUR	MANIPUR	27.0	27.0	27.0	4.9	4.9	4.9	7.0	7.0	7.0	180	180	180	1.2	1.2	1.2								10	10	10
2873	IRIL RIVER AT LILONG (THOUBAL)	MANIPUR	30.0	30.0	30.0	5.8	5.8	5.8	7.8	7.8	7.8	367	367	367	6.2	6.2	6.2								95	95	95
1925	KHUGA RIVER (CHURACHANDPUR)	MANIPUR	15.0	28.0	23.0	4.3	6.8	5.8	7.2	7.7	7.4	195	354	249	0.9	1.2	1.0								5	100	37
2877	KHUGA DAM ON KHUGA RIVER, CHURACHANDPUR, MANIPUR	MANIPUR	20.0	26.0	23.0	4.1	8.3	6.2	6.7	7.0	6.9	174	190	182	1.9	2.3	2.1								5	10	8
1926	KHUJAIROK, MOREH (CHANDEL DIST.)	MANIPUR	14.0	27.0	22.3	4.7	6.0	5.5	7.5	8.0	7.7	229	504	356	1.1	1.3	1.2								35	500	202
2878	LOKCHAO RIVER AT BISHNUPUR, MANIPUR	MANIPUR	20.0	26.0	23.0	3.7	6.4	5.1	6.8	6.9	6.9	175	206	190	2.1	2.4	2.3								5	60	33
2867	MAHA RIVER AT CHANDEL, MANIPUR	MANIPUR	21.0	26.0	23.0	4.7	5.7	5.2	7.0	7.1	7.1	157	171	164	1.2	4.4	2.8								5	35	20
2852	MANIPUR RIVER AT SEKMALIAN, DISTT. THOUBAL, MANIPUR	MANIPUR	20.0	26.0	23.0	4.0	5.1	4.6	6.7	7.2	7.0	164	212	188	1.3	4.2	2.8								10	25	18
2879	MANIPUR RIVER AT ETIAI BARRAGE ON MANIPUR RIVER AT BISHNUPUR	MANIPUR	20.0	27.0	23.0	4.6	6.5	5.6	6.4	6.8	6.6	158	171	165	1.8	1.9	1.9								20	25	23
1625	NAMBUL RIVER AT HUMP BRIDGE	MANIPUR	16.0	27.0	23.0	0.2	5.1	1.9	6.5	7.0	6.8	259	712	484	4.9	21.0	15.3								120	2200	1075
1626	NAMBUL RIVER AT HEIRANGTHONG, MANIPUR	MANIPUR	16.0	27.0	23.0	0.3	5.9	2.5	7.0	7.4	7.1	225	592	424	4.6	30.5	16.7								95	1000	682
2858	NAMBUL RIVER AT SAMUSANG (U.K.	MANIPUR	19.0	26.0	22.0	4.1	6.8	5.5	6.8	6.9	6.9																

STATION		YAMUNA		TEMPERATURE °C		D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
NO.	NAME	STATE	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1502	CIVIL MILL DRAIN, DELHI	DELHI							7.1	7.5	7.3				12.0	156.0	78.4									
1503	POWER HOUSE DRAIN, DELHI	DELHI							7.0	7.5	7.3				36.0	139.0	88.4									
1504	SEN NURSING HOME DRAIN, DELHI	DELHI							7.1	7.5	7.3				30.0	166.0	95.3									
1505	BARAPULA DRAIN, DELHI	DELHI							7.2	7.6	7.3				39.0	87.0	63.8									
1506	SHAHADARA DRAIN, DELHI	DELHI				0.0	2.4	0.2	6.8	8.0	7.6				12.0	59.0	29.8				1500000	16000000	21183000			
1657	MAHARANI BAGH DRAIN	DELHI							7.1	7.5	7.2				57.0	253.0	132.4									
1858	SARITA VIHAR, DELHI	DELHI							7.1	7.6	7.4				31.0	623.0	235.6									
2178	CHIKHALI NALLAH MEETS GODAVARI	MAHARASHTRA	25.0	26.0	25.2	1.1	6.2	3.8	5.9	7.6	7.0	355	1915	1190	4.8	30.0	15.5	0.17	4.98	2.51	22	170	59	60	900	316
2782	RABODI NALLAH, RABODI, THANE	MAHARASHTRA	28.0	34.0	30.5	1.2	4.7	2.6	6.9	7.4	7.2	386	9630	1342	13.0	200.0	89.0	0.19	4.12	1.55	250	1800	1442	550	1800	1529
2783	COLOUR CHEMICAL NALLAH, THANE	MAHARASHTRA	28.0	34.0	30.6	0.6	5.2	2.5	7.1	7.5	7.3	1237	3982	2297	7.0	85.0	35.5	0.09	4.18	1.58	250	1800	1308	550	1800	1571
2784	SANDOZ NALLAH, SANDOZBAUG	MAHARASHTRA	29.0	32.0	30.5	1.4	6.0	3.2	7.3	7.7	7.5	557	2868	1718	9.0	160.0	65.2	0.49	6.36	2.66	350	1800	1209	900	1800	1445
2785	BPT NAVAPUR DISCHARGE FROM MIDC, TARAPUR, PALGHAR, THANE	MAHARASHTRA	27.0	30.0	27.5				5.6	8.3	7.3	4343	7412	5955	110.0	800.0	336.7	0.99	27.3	5.18	140	1800	1095	250	1800	1263
2786	TARAPUR MIDC NALLA (NR SUMP 1)	MAHARASHTRA	27.0	30.0	27.3				4.3	7.4	6.5	1536	9769	4039	44.0	600.0	235.3	0.47	4.35	2.04	110	1800	1112	225	1800	1185
2787	TARAPUR MIDC NALLA (NR SUMP 2)	MAHARASHTRA	27.0	30.0	27.3	1.0	6.5	4.3	6.3	9.2	7.5	124	7203	2197	6.0	875.0	180.4	0.26	6.57	2.20	80	1800	889	250	1800	1038
2788	TARAPUR MIDC NALLA (NR SUMP 3)	MAHARASHTRA	27.0	30.0	27.5	2.8	2.8	2.8	3.8	9.4	5.9	1789	20570	6545	110.0	675.0	312.5	2.30	7.98	3.80	130	1800	797	350	1800	1050
2789	NALLA AT DIS OF AKLAI MANDIR, AKLAI, MALSHIRAS, SOLAPUR	MAHARASHTRA	20.0	38.0	27.7	1.2	5.1	3.5	7.6	9.0	8.2	4	2193	1406	7.4	12.0	9.4	0.22	2.10	0.79	95	350	248	350	1800	1348
2790	PIMPAL-PANERI NALLA NR FINOLEX INDST., YASGANGAON, RATNAGIRI	MAHARASHTRA	27.0	29.0	27.8	4.9	7.6	6.3	5.7	8.0	7.2	168	1674	1199	2.0	4.2	2.7	0.45	15.3	2.56	2	9	5	70	220	128

TABLE 19.1-1: WATER QUALITY OF LAKE, POND & TANK IN ANDHRA PRADESH, KARNATAKA, KERALA, PONDICHERY & TAMILNADU- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			> 4 mg/l			6.5-8.5			< 4 mg/l			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml								
1391	HUSSAIN SAGAR LAKE, BUDAMERU	ANDHRA PRADESH	25.0	40.0	31.0	0.9	7.1	3.8	6.9	8.5	7.8	1064	1629	1403	23.5	58.0	39.8	0.40	26.0	13.0	7	1600	489	900	1600	1460
1447	DHARMA SAGAR TANK NEAR WARANGAL	ANDHRA PRADESH	25.0	40.0	28.1	5.8	7.8	6.8	7.2	8.9	7.9	249	429	296	1.5	6.2	3.1	2.40	15.0	6.06	7	1600	582	1600	1600	1600
1464	BIBINGAN TANK	ANDHRA PRADESH	26.0	36.0	29.3	3.8	6.5	5.4	7.3	9.0	8.4	498	680	570	0.8	4.6	2.7	0.16	28.3	14.0	5	38	23	85	480	210
1780	GANDIGUDEM, MEDAK DISTRICT	ANDHRA PRADESH	26.0	31.0	27.9	3.2	7.5	5.3	7.3	8.2	7.7	1248	3260	2285	4.0	12.0	6.4	0.08	1.90	0.63	15	78	32	180	540	318
1783	KISTAREDDYPET TANK, MEDAK DIST.	ANDHRA PRADESH	26.0	30.0	28.0	2.0	6.1	4.0	6.6	7.6	7.1	2820	5360	4123	4.0	24.0	8.6	0.18	0.56	0.38	16	100	49	175	530	333
1788	SARONAGAR, RANGA REDDY DIST	ANDHRA PRADESH	24.0	29.0	26.3	3.3	5.3	4.4	7.0	8.6	7.9	1332	1764	1542	29.0	136.0	64.6	0.73	27.1	9.43	280	1600	1196	1600	1600	1600
1789	HIMAYAT SAGAR LAKE, R.R.DIST.	ANDHRA PRADESH	23.0	29.0	25.9	4.3	14.0	7.1	7.1	8.8	7.8	369	471	413	0.1	7.0	3.7	0.10	6.00	2.84	4	900	468	500	1600	1380
1790	PULICATE LAKE, NELLORE DIST.	ANDHRA PRADESH	29.0	30.0	29.3	3.5	5.9	5.0	6.6	7.9	7.5	1870	53400	3846	0.5	1.6	0.9	2.30	18.0	10.4	4	6	5	1300	2600	1767
2340	LAXMINARAYANA CHEVURU AT EDULABAD, RANGAREDDY	ANDHRA PRADESH	24.0	29.0	26.7	0.8	11.2	5.5	7.4	8.6	8.2	1046	1670	1292	7.5	37.0	22.8	0.80	5.86	2.02	220	900	560	1600	1600	1600
2341	MIRALAM LAKE NEAR ZOO PARK, RANGAREDDY	ANDHRA PRADESH	23.0	40.0	32.3	0.8	5.3	3.1	5.1	9.0	7.8	981	1579	1385	5.5	26.0	11.5	1.90	33.4	11.3	60	900	434	1600	1600	1600
2342	NOOR MD. KUNTA, KATTEDAN, RANGAREDDY	ANDHRA PRADESH	22.0	29.0	26.1	2.1	3.4	2.8	6.9	9.1	8.0	2126	2801	2465	16.5	43.0	28.2	0.78	12.2	5.85	280	1600	806	1600	1600	1600
2343	PREMAJIPET TANK, KATTEDAN, RANGAREDDY	ANDHRA PRADESH	24.0	27.0	25.9	4.0	14.3	7.5	3.1	8.3	5.6	1271	7444	4861	4.5	39.0	17.4	0.10	0.98	0.42	280	500	390	1600	1600	1600
2344	NALLA CHEVURU, RANGAREDDY	ANDHRA PRADESH	24.0	27.0	25.6	0.4	8.1	2.8	6.9	8.4	8.0	1383	1992	1582	28.0	66.0	43.3	13.0	82.0	35.0	240	500	370	1600	1600	1600
2345	SAI CHEVURU, NEAR TANNERY INDUSTRIES, DESAIPET, WARANGAL	ANDHRA PRADESH	21.0	35.0	28.4	1.5	12.0	6.3	7.3	9.0	8.1	8450	19550	1194	5.0	25.0	11.5	1.61	18.0	8.30	27	500	156	900	1600	1460
2346	BHADRAKALI CHEVURU, BHADRAKALI TEMPLE, WARANGAL	ANDHRA PRADESH	26.0	35.0	29.7	5.4	9.0	7.4	7.3	8.4	8.0	323	443	381	1.5	7.2	4.8	0.00	27.6	12.6	90	1600	620	1600	1600	1600
2347	ASANI KUNTA, KAJIPALLY, MEDAK	ANDHRA PRADESH	26.0	29.0	27.0				5.6	7.7	6.8	6030	18150	1113	39.0	320.0	173.3	0.05	1.54	0.42	10	140	67	50	900	540
2348	KAJIPALLY TANK, KAJIPALLY, MEDAK	ANDHRA PRADESH	26.0	28.0	27.5				6.5	7.6	6.9	110	11180	7059	75.0	115.0	94.5	1.00	2.60	1.92	72	215	117	120	675	384
2353	KONDACHARLA-AAVA LAKE, PARAWADA PHARMA CITY, VISHAKHAPATNAM	ANDHRA PRADESH	25.0	30.0	26.5	5.6	6.4	6.0	6.9	7.9	7.5	454	728	610	1.0	1.4	1.1	3.00	56.0	23.6	3	3	3	21	460	218
2357	DURGAM CHEVURU	ANDHRA PRADESH	20.0	28.0	24.6	0.6	10.0	3.6	6.8	8.9	7.8	1135	1427	1275	2.3	80.0	41.3	0.10	10.0	2.66	80	1600	716	1600	1600	1600
2358	MALLAPUR TANK	ANDHRA PRADESH	22.0	28.0	25.9	0.5	2.0	1.2	7.0	8.1	7.6	1703	2195	1844	13.5	70.0	42.9	0.77	41.0	21.5	280	900	616	1600	1600	1600
2359	PEDDA CHEVURU	ANDHRA PRADESH	24.0	28.0	26.0	0.8	10.7	5.2	7.1	8.5	7.9	2124	3800	2484	7.9	85.0	45.3	0.00	27.6	11.6	130	1600	806	900	1600	1460
1388	ULSOOR LAKE TRAINING CENTRE OF FISH BREEDING	KARNATAKA	23.0	28.0	25.3	8.0	9.1	8.4	5.5	10.0	8.1	399	884	604	4.0	43.0	20.5	0.52	5.00	2.17	220	500	407	140	1600	697
1446	HEBALA VALLEY LAKE AT DIS ROAD BRIDGE NR. MANDYA	KARNATAKA	25.0	30.0	26.0	4.0	6.0	4.7	7.2	7.7	7.5	373	548	480	2.0	8.0	4.5	0.32	11.0	0.86	1600	1600	1600	1600	1600	1600
1383	ORUVATHILKOTTA LAKE	KERALA	28.0	29.0	28.5	2.8	8.0	6.5	6.3	7.8	7.0	440	2500	1588	1.6	4.4	2.4	1.00	1.95	1.48	300	900	700	1300	1600	1525
1385	SASTHAMCOTTA LAKE	KERALA	26.0	28.0	27.1	6.1	7.6	6.6	6.7	7.0	6.9	52	63	56	0.3	0.7	0.5	0.20	0.80	0.40	110	400	190	350	900	550
1441	ASHTHAMUDI LAKE AT QUILON	KERALA	26.0	28.0	27.7	4.2	6.1	5.3	7.2	7.7	7.5	1212	42250	2043	0.9	5.9	2.5	0.20	3.19	1.22	80	300	170	170	900	468
1574	PARAVUR	KERALA	27.0	28.0	27.4	5.8	6.8	6.2	7.1	7.5																

1579	ALAPPUZHA	KERALA	25.5	26.5	26.1	5.6	6.2	5.9	6.3	7.1	6.7	111	1260	477	1.2	3.3	2.0	0.12	0.47	0.25	300	1400	725	500	7000	2425
1580	POOKOTE	KERALA	23.0	24.5	23.9	5.8	7.3	6.7	6.3	6.8	6.5	24	26	25	0.3	1.5	0.8	0.08	0.08	0.08	2	11	6	21	60	40
2312	VEMBANADU AT PATHIRAMANAL (ALAPPUZHA)	KERALA	26.0	27.0	26.0	5.7	7.4	6.8	6.4	7.2	6.8	78	2400	740	1.2	2.2	1.6	0.05	0.50	0.20	2	400	193	4	700	381
2318	PAZHASSI RESERVOIR (KANNUUR)	KERALA	23.5	33.5	29.0	6.6	8.0	7.5	6.9	7.7	7.4	40	56	51	0.6	1.3	1.0	0.02	0.23	0.15	2	220	76	40	500	263
2325	POND AT (PADMANABHA) SREE PADMANABHA SWAMY TEMPLE (TPVM)	KERALA	26.5	30.0	27.8	5.5	8.0	7.5	6.7	8.2	7.6	182	284	244	1.6	4.8	3.3	0.10	0.18	0.13	170	900	503	500	3500	1525
2328	RSVR AT MALAMPUZHA	KERALA	24.5	27.0	25.5	6.9	7.4	7.1	7.4	7.6	7.5	70	144	96	0.4	0.7	0.6	0.05	0.20	0.15	2	900	406	40	1600	885
2329	RSVR AT BHOOTHATHANKETU	KERALA	24.0	30.0	26.2	7.9	8.0	7.9	7.0	7.2	7.1	26	28	27	0.6	1.4	1.0	0.03	0.20	0.09	22	110	57	50	350	170
2330	RSVR AT EDAMALAYAR	KERALA	25.0	31.0	27.8	7.8	8.0	8.0	6.9	7.3	7.1	24	26	25	0.7	1.2	1.0	0.07	1.20	0.79	2	300	101	50	500	183
1396	OSTERI LAKE	PONDICHERY	27.0	32.0	29.5	6.5	77.0	30.4	6.3	9.2	8.0	51	321	231	0.9	2.0	1.5	0.05	0.15	0.10	7	7	7	170	170	
1686	BAHOUR LAKE	PONDICHERY	27.0	31.0	29.0	4.3	6.0	5.2	7.6	8.6	8.1	301	524	413	1.7	1.7	1.7	0.05	0.05	0.05	7	7	7	170	170	
1420	KODAI KANAL LAKE	TAMILNADU	18.0	21.0	19.3	6.0	6.9	6.5	5.9	7.1	6.5	75	206	111	2.2	12.7	5.7	0.07	0.25	0.14	0	11	6	7	33	12
1421	UDHAGAMDALE LAKE (OOTY)	TAMILNADU	16.0	22.0	18.9	2.5	9.1	4.8	6.8	8.4	7.6	276	678	407	0.9	20.6	10.1	0.10	3.74	0.78	110	35000	6148	210	92000	13351
1452	YERCAUD LAKE, SALEM	TAMILNADU	23.0	25.0	24.5	6.3	8.7	7.7	7.2	8.6	8.0	212	277	249	0.2	2.4	1.5	0.05	1.37	0.40	110	460	186	260	940	371
3007	VEERANAM LAKE AT CUDDALORE	TAMILNADU	27.0	36.0	32.0	6.1	8.7	7.9	7.3	9.3	8.3	244	728	487	0.5	3.9	1.5	0.06	0.37	0.21	110	170	137	210	330	282
3008	POONDI LAKE AT THIRUVALLUR	TAMILNADU				4.4	6.9	6.0	7.7	8.6	8.2	455	830	562	2.0	3.0	2.2	0.06	0.30	0.15	230	8000	2086	300	13000	3974
3009	REDD HILLS AT THIRUVALLUR	TAMILNADU				4.7	6.9	6.2	7.2	8.9	7.9	442	570	494	1.0	2.0	1.9	0.10	1.30	0.25	230	9000	2068	500	16000	5422
3010	PORUR LAKE AT THIRUVALLUR	TAMILNADU	20.0	25.0	23.6	5.6	6.7	6.2	7.6	9.2	8.3	440	522	475	2.0	7.0	2.7	0.06	0.41	0.17	170	5400	1524	500	16000	3650
3011	PULICATE LAKE AT THIRUVALLUR	TAMILNADU				3.7	6.7	5.5	7.6	8.3	8.1	1888	5520	3848	2.0	8.0	3.3	0.08	3.90	0.64	8	330	176	8	1700	567

TABLE 19.2 :- WATER QUALITY OF LAKE, POND & TANK IN GOA, GUJARAT, MADHYA PRADESH & RAJASTHAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N- NITRITE- N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
	WATER QUALITY CRITERIA																										
1549	SALULIM LAKE AT SALULIM - SANGUEM	GOA	23.0	35.0	29.3	5.9	7.8	6.9	5.7	7.8	6.6	45	69	58	0.3	6.3	1.8	0.03	3.91	0.60	4	7	5	4	125	85	
2269	MAYEM LAKE, BICHOLIM	GOA	23.0	32.0	28.0	5.2	8.1	6.8	5.3	7.6	6.3	42	84	54	0.3	4.2	1.9	0.02	1.08	0.24	4	15	8	4	225	147	
1345	AJWAH LAKE AT SRI SAYAJI SABVAR BARODA	GUJARAT	26.0	31.0	27.8	6.0	9.0	7.9	8.1	8.7	8.5	230	366	285	1.8	5.0	3.2	0.06	0.21	0.13	2	4	3	4	11	7	
1346	SURSAGAR LAKE AT BARODA	GUJARAT	26.0	31.0	28.3	3.2	8.9	7.1	7.6	8.3	8.1	1894	3610	2434	5.0	12.0	7.8	0.24	0.72	0.39	4	14	8	14	60	32	
1972	NALSAROVAR LAKE (SANAND), DIST AHMEDABAD	GUJARAT	24.0	24.0	24.0	8.2	8.2	8.2	7.7	7.7	7.7	2806	2806	2806	4.0	4.0	4.0	0.86	0.86	0.86	43	43	43	240	240		
1976	NARSIMHTA TALAV- JUNAGADH	GUJARAT	27.0	27.0	27.0	5.1	5.1	5.1	7.5	7.5	7.5	1040	1040	1040	8.0	8.0	8.0	0.36	0.36	0.36	110	110	110	170	170		
1977	CITY LAKE OF NADIAD	GUJARAT	27.0	29.0	28.0	3.3	8.0	5.7	8.3	8.8	8.6	1669	2409	2039	5.0	10.0	7.5	0.26	0.36	0.31	3	6	5	11	34	23	
2077	MOTICHER LAKE NR KAKRAPAR ATOMIC POWER STATION, SURAT	GUJARAT	27.0	31.0	28.8	5.6	7.4	6.6	7.7	8.1	7.9	306	386	341	1.4	2.7	1.9	0.03	0.21	0.12	430	4300	1590	1500	24000	7500	
2079	DHUDHIA TALAV AT NAVSARI, DIST. NAVSARI	GUJARAT	27.0	30.0	28.5	6.8	7.2	7.0	7.8	8.2	8.0	418	871	562	1.8	2.2	2.0	0.17	0.22	0.20	400	900	608	900	1500	1208	
1373	UPPER LAKE AT BHOPAL (INTAKE POINT)	MADHYA PRADESH	32.0	32.0	32.0	6.5	8.1	7.3	7.6	8.2	7.9	264	308	286	4.1	4.1	4.1	3.60	3.60	3.60	2	2	2	11	70	41	
1374	LOWER LAKE AT BHOPAL OUTLET	MADHYA PRADESH	36.0	36.0	36.0	9.0	11.3	10.2	7.9	8.0	8.0	264	370	317	4.2	4.5	4.4	1.63	1.63	1.63	2	2	2	13	1600	807	
2128	KHANDARI RESERVOIR WATER OFF TAKE POINT	MADHYA PRADESH	12.7	32.0	22.3	6.8	8.3	7.7	7.3	7.9	7.6	239	791	465	0.8	2.1	1.4	0.30	1.80	1.11	4	4	4	4	460	103	
2129	PERIAT TANK, JABALPUR	MADHYA PRADESH	12.0	33.0	23.3	6.9	8.4	7.6	7.2	7.8	7.5	199	817	451	1.0	3.6	2.0	0.09	1.80	0.98				28	120	47	
2135	GOVINDGARH TANK	MADHYA PRADESH	23.5	23.5	23.5	8.0	8.0	8.0	7.3	7.3	7.3				4.3	4.3	4.3	4.41	4.41	4.41	80	80	80	350	350		
2136	SHAHUPURA LAKE AT WEIR NEAR AYUSHMAN HOSPITAL, BHOPAL	MADHYA PRADESH	35.0	35.0	35.0	9.0	9.0	9.0	7.5	7.9	7.7	593	880	737	4.8	8.5	6.7	1.42	1.42	1.42	26	26	26	140	1600	870	
2137	UPPER LAKE AT YATCH CLUB	MADHYA PRADESH	33.0	33.0	33.0	6.7	9.0	7.9	8.0	8.3	8.2	260	264	262	4.2	4.5	4.4	3.00	3.00	3.00	2	2	2	2	13	1600	807
2138	UPPER LAKE AT KARBALA CLUB	MADHYA PRADESH				10.1	10.1	10.1	8.4	8.4	8.4	270	270	270	5.5	5.5	5.5				4	4	4	4	14	14	
2139	UPPER LAKE AT BARRAGARH CLUB	MADHYA PRADESH				9.8	9.8	9.8	8.4	8.4	8.4	270	270	270	4.5	4.5	4.5				4	4	4	4	13	13	
2140	KERWA DAM NEAR REST HOUSE, BPL	MADHYA PRADESH				8.5	8.5	8.5	8.3	8.3	8.3	368	368	368	3.1	3.1	3.1				4	4	4	7	7	7	
2141	JANUNIA TALAB NEAR W/S	MADHYA PRADESH				8.8	8.8	8.8	8.4	8.4	8.4	321	321	321	4.3	4.3	4.3				2	2	2	2	13	13	
1285	PICHOLA LAKE AT UDAIPUR (WATER INTAKE POINT)	RAJASTHAN	17.0	24.0	22.0	5.2	6.4	5.9	7.2	8.7	8.2	460	740	633	0.3	2.0	1.0	0.02	0.58	0.27	3	14	5	4	2400	211	
1286	UDASAGAR LAKE AT UDAIPUR (INTAKE PT.)	RAJASTHAN	18.0	24.0	23.0	3.2	5.8	4.5	7.5	9.1	8.5	1020	1630	1552	0.5	7.8	3.7	0.08	1.24	0.57	3	20	6	7	1100	168	
1414	PUSHKAR LAKE	RAJASTHAN	19.0	25.5	22.0	1.2	7.4	4.8	7.3	8.7	7.9	320	580	435	0.4	9.5	4.4	0.02	0.54	0.24	1	7	5	4	210	44	
1481	FATEH SAGAR LAKE AT UDAIPUR INTAKE POINT OF PHED	RAJASTHAN	18.0	25.0	22.9	4.2	6.8	6.0	7.9	8.7	8.3	510	630	578	0.4	3.4	1.4	0.08	0.82	0.26	3	14	5	7	150	26	
1714	KAYALANA JHEEL, JODPUR	RAJASTHAN	15.0	30.0	22.8	4.7	8.8	6.1	7.2	8.9	8.0	250	600	358	0.3	1.7	1.2	0.14	3.00	0.62	3	4	4	4	75	17	
1716	NAKKI LAKE, MT. ABU	RAJASTHAN	9.0	30.0	21.2	2.3	6.5	5.0	7.1	8.8	7.8	290	1320	481	0.4	3.8	1.6	0.08	0.74	0.31	1	7	3	4	2400	220	
2935	LAKE JET SAGAR, BUNDI	RAJASTHAN	18.5	31.0	25.8	2.7	5.9	4.6	7.1	8.2	7.7	40	590	458	1.1	4.1	1.8	0.08	1.10	0.35	3	14	5	9	75	22	
2936	JAISAMAND LAKE, ALWAR	RAJASTHAN	21.7	34.0	28.0	1.8	5.6	4.3	7.2	9.2	7.8	270	510	405													

2225	BASKANDI POND INSIDE THE BASKANDI MADRASA, BASKANDI	ASSAM	8.0	15.0	12.0	7.1	7.4	7.2	6.4	7.5	6.7	68	184	123	3.4	4.2	3.7	0.10	0.16	0.14	0	360	120	1	910	404
2226	SIVASAGAR TANK (BORPUKHURI) NEAR SIVADOL	ASSAM	17.0	27.0	22.8	3.5	7.3	5.5	6.0	7.4	6.7	20	20	20	1.1	2.8	2.2	0.10	0.40	0.19	0	910	303	730	4300	1920
2227	HORDAI PUKHURI, CHARAIDEW	ASSAM	18.0	27.0	22.5	3.4	6.5	5.7	6.1	7.1	6.6	20	23	22	2.0	4.2	3.2	0.10	0.19	0.14	0	730	243	300	2100	1103
2228	GALA BEEL AT DERGAON	ASSAM	19.0	36.0	29.0	5.8	7.6	6.4	6.5	7.3	7.1	43	147	111	0.9	4.8	2.5	0.10	0.14	0.12	0	700	250	360	930	503
1425	LOKTA LAKE AT THANA	MANIPUR	14.0	27.0	21.5	4.7	6.3	5.5	6.4	7.7	7.2	97	737	342	0.9	1.9	1.5						5	100	30	
1426	LOKTA LAKE AT BISHNUPUR	MANIPUR	14.0	26.0	22.0	4.9	7.1	6.3	7.1	7.3	7.2	207	291	249	1.4	1.9	1.6							10	120	53
1629	SENDRA (LOKTA LAKE)	MANIPUR	14.0	26.0	22.0	4.9	4.9	4.9	7.2	7.5	7.3	149	561	342	0.9	2.0	1.6							10	180	70
1630	KARANG ISLAND(LOKTA LAKE)	MANIPUR	14.0	26.0	22.0	4.6	5.2	4.9	7.1	7.3	7.2	207	573	356	1.0	2.1	1.6							5	190	70

TABLE 19.4 :- WATER QUALITY OF LAKE, POND & TANK IN ASSAM, MANIPUR, MEGHALAYA & TRIPURA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA																											
						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			
2837	PUMLEN LAKE AT TOKPACHING, DISTT. THOUBAL	MANIPUR	21.0	27.0	24.0	4.1	7.8	6.0	5.3	7.3	6.3	115	115	115	2.2	4.3	3.3								5	45	25
2839	PUKHRI AT LANGMEIDONG, DISTT. THOUBAL	MANIPUR	19.0	27.0	23.0	3.7	9.8	6.8	6.7	6.9	6.8	279	326	302	2.0	4.2	3.1								20	45	33
2840	LAMJAO PUKHURI AT ACHOUBA, DISTT. THOUBAL	MANIPUR	21.0	27.0	24.0	3.9	9.4	6.7	7.0	7.6	7.3	159	290	225	1.9	4.3	3.1								10	60	35
2841	HIRANMEI PUKHURI AT THOUBAL	MANIPUR	20.0	27.0	23.5	3.7	9.6	6.7	6.8	6.9	6.9	224	572	398	1.8	2.1	2.0								20	25	23
2842	LANGMEIDONG PUKHURI AT THOUBAL	MANIPUR	20.0	20.0	20.0	6.2	6.2	6.2	6.9	6.9	6.9	186	186	186	4.1	4.1	4.1								5	5	5
2843	POND AT LALAMBUNG, IMPHAL WEST	MANIPUR	21.0	27.0	24.0	3.2	8.2	5.7	7.0	7.2	7.1	355	574	464	2.1	2.1	2.1								20	40	30
2844	LILONG PUKHURI AT IMPHAL WEST	MANIPUR	21.0	27.0	24.0	2.9	8.1	5.5	7.1	8.1	7.6	190	406	298	1.6	2.4	2.0								30	35	33
2845	POND AT NGAIRANGBAM, IMPHAL WEST	MANIPUR	20.0	27.0	23.5	4.1	8.4	6.3	7.1	7.2	7.2	60	162	111	2.1	4.0	3.1								10	15	13
2846	POND AT MOIDANGPOK, IMPHAL WEST	MANIPUR	21.0	27.0	24.0	3.6	9.0	6.3	6.9	6.9	6.9	71	122	96	2.3	2.4	2.4								25	40	33
2847	POND AT MAIBAM LOKPACHING, IMPHAL WEST	MANIPUR	20.0	27.0	23.5	3.8	8.2	6.0	6.7	7.1	6.9	73	115	94	1.6	2.4	2.0								15	75	45
2848	POND AT KAKWA BAZAR, IMPHAL WEST	MANIPUR	21.0	27.0	24.0	3.1	6.0	4.8	7.3	8.9	8.1	42	576	309	2.5	5.8	4.2								35	200	118
2849	CHANAM PUKHURI, IMPHAL WEST	MANIPUR	22.0	27.0	24.5	3.2	8.0	5.6	7.5	9.0	8.3	43	365	204	2.6	2.6	2.6								25	500	263
2850	NINGTHEM PUKHURI, IMPHAL EAST	MANIPUR	21.0	27.0	24.0	3.8	4.1	4.0	6.7	8.2	7.5	27	356	191	0.4	1.9	1.2								15	300	158
2851	POND AT KONGBA BAZAR, IMPHAL EAST	MANIPUR	21.0	27.0	24.0	3.0	9.0	6.0	7.8	8.4	8.1	374	559	466	2.5	29.8	16.1								25	30	28
1347	UMIAM LAKE AT BARAPANI	MEGHALAYA	13.0	27.0	21.5	4.0	9.2	7.1	6.9	7.3	7.1	200	290	256	2.5	12.0	7.9	0.52	2.49	0.90	1300	3800	2592	2400	5000	3583	
1348	WARD LAKE AT SHILONG EAST	MEGHALAYA	12.0	25.0	19.5	6.2	8.0	6.9	6.9	7.4	7.2	210	270	239	5.5	9.0	7.3	0.50	1.65	0.98	2100	3500	2692	2600	4500	3525	
1459	THADLASKEN LAKE	MEGHALAYA	14.0	25.0	21.0	6.0	8.4	7.5	6.6	7.2	7.0	55	92	76	0.8	2.2	1.5	0.16	0.90	0.49	23	79	40	31	110	64	
1727	LAXMI NARAYAN BARI PALACE COMPOUND	TRIPURA	27.5	30.0	28.8	6.4	6.9	6.6	7.5	8.2	7.8	210	256	232	2.1	3.8	2.8	0.62	1.31	0.88	29	360	278	420	510	458	
1728	RUDRASAGAR, SONUMJRA	TRIPURA	27.5	30.0	28.9	6.1	6.6	6.4	7.9	8.1	8.0	176	250	203	2.4	3.4	3.0	0.32	0.55	0.41	340	540	436	480	580	528	

TABLE 19.5 :- WATER QUALITY OF LAKE, POND & TANK IN BIHAR, JHARKHAND, ORISSA & WEST BENGAL - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)					
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean			
WATER QUALITY CRITERIA																													
						> 4 mg/l			6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml					
2557	KAWAR LAKE, BEGUSARAI	BIHAR	15.0	26.0	21.3	4.2	9.4	7.2	7.4	8.1	7.8	446	446	446	2.7	3.6	3.0							1100	2400	1725	3000	5000	3500
2571	MOTI JHEEL AT MOTIHARI	BIHAR	21.0	30.0	27.0	7.4	7.8	7.6	7.3	8.4	7.9	745	947	849	2.9	3.5	3.1							1700	9000	5233	3000	24000	17000
2573	TIGHI TALAB AT GAYA	BIHAR	22.0	24.0	23.0	6.0	6.8	6.4	6.6	8.6	7.6	516	1038	821	2.9	3.0	2.9							1300	9000	4000	3000	16000	7333
2574	SURAJ KUND AT GAYA	BIHAR	21.0	25.0	23.3	6.2	7.2	6.7	6.8	7.7	7.4	803	964	859	2.8	3.5	3.1							1100	3000	1833	2800	9000	6933
2394	TOP CHACHI LAKE	JHARKHAND	17.0	17.0	17.0	6.0	6.0	6.0	8.0	8.0	8.0				0.2	0.2	0.2												
2398	DIMNA LAKE, DIMNA	JHARKHAND	18.0	35.0	26.2	3.3	8.2	7.4	7.4	7.7	7.5	162	356	187	0.4	1.1	0.6	4.66	7.43	5.42									
2400	RANCHI LAKE, RANCHI	JHARKHAND	15.5	25.5	22.1	4.0	7.6	5.9	5.8	8.0	7.4				4.0	35.0	12.1							230	230	240	2400	2400	
2431	BINDUSAGAR (RELIGIOUS POND OF BHUBANESHWAR CITY)	ORISSA	23.0	34.0	28.0	6.9	15.3	11.0	6.7	8.9	7.8	300	549	433	6.2	31.0	11.7	0.08	3.99	1.98	90	160000	18333	200	160000	36200			
2432	NARENDRA POKHARI (RELIGIOUS POND OF PURI CITY)	ORISSA	23.0	35.0	28.0	3.5	20.6	12.0	7.8	8.4	8.2	723	1113	924	2.7	45.0	11.4	0.26	6.00	2.01	78	11000	2565	580	35000	6465			
2433	MARKANDA POKHARI (RELIGIOUS POND OF PURI CITY)	ORISSA	22.0	35.0	27.0	8.9	17.9	12.3	7.3	8.5	8.1	495	831	715	1.0	14.0	6.4	1.75	9.78	6.86	20	17000	4104	80	28000	9032			
2434	INDRADYUMINA TANK (RELIGIOUS POND OF PURI CITY)	ORISSA	23.0	36.0	27.9	6.4	15.0	10.0	7.5	8.4	8.1	523	742	634	3.5	13.0	7.3	0.17	2.27	1.45	170	22000	5310	490	54000	12865			
2435	SWETAGANGA (RELIGIOUS POND OF PURI CITY)	ORISSA	22.0	34.0	27.0	8.9	17.9	12.3	7.5	8.4	8.0	417	1460	1104	1.6	19.0	38.2	0.46	10.7	5.57	80	160000	15231	430	160000	20347			
2436	PARVATI SAGAR (RELIGIOUS POND OF PURI CITY)	ORISSA	22.0	33.0	27.5	2.9	9.5	6.9	7.8	8.2	7.9	573	731	643	1.5	11.0	5.7	0.20	6.11	1.48	170	92000	11038	320	160000	19868			
2437	CHILKA LAKE (RAMSAR SITE)	ORISSA	23.0	33.0	28.0	5.8	9.0	7.2	6.7	8.5	7.9	8978	48010	2949	0.3	3.7	2.0	0.12	2.92	0.88	2	790	151	2	1700	361			
2438	ANSHUPA	ORISSA	20.0	36.0	26.0	5.3	10.5	8.1	7.3	8.3	7.8	125	200	167	1.0	5.7	2.2	0.02	1.97	0.49	45	7000	1039	120	11000	2123			
1765	RABINDRASAROVAR NATIONAL LAKE, CALCUTTA	WEST BENGAL	20.0	33.0	27.0	3.6	12.1	8.4	7.6	8.4	7.9	292	358	326	0.9	7.6	3.9	0.00	0.14	0.06	4000	170000	29750	8000	280000	56583			
2503	HATISHALA GHAT ON DUDHPUKUR AT TARKESHWAR	WEST BENGAL	20.0	35.0	29																								

2504	MAINH GHAT ON DUDHPUR AT TARAKESHWAR	WEST BENGAL	20.0	35.0	29.6	4.6	17.5	11.3	7.5	8.7	8.2	675	789	746	4.8	15.0	9.7	0.09	1.22	0.52	7000	30000	81818	11000	50000	129455
2505	HANUMAN GHAT ON DUDHPUR AT TARAKESHWAR	WEST BENGAL	21.0	36.0	30.3	6.6	20.9	12.0	7.6	8.8	8.2	675	791	743	5.5	24.0	10.8	0.02	1.10	0.37	1400	13000	29582	2200	17000	42564
2519	KOCHBIHAR LAKE (SAGAR DIGHI)	WEST BENGAL	10.0	35.0	26.7	7.8	10.0	9.0	6.9	8.9	7.4				1.1	6.7	3.3	0.02	0.27	0.11	4000	14000	24291	8000	27000	59364
2520	MIRIKH LAKE	WEST BENGAL	8.0	24.0	16.3	6.0	9.5	7.8	6.5	7.5	6.8	103	137	112	1.6	8.0	4.0	0.10	0.59	0.28	2200	14000	45655	4900	35000	119536
2521	WATER RESERVIOR AT DELO	WEST BENGAL	12.0	25.0	19.2	7.5	10.2	8.5	6.8	7.8	7.3	91	91	91	0.5	6.8	2.5	0.03	0.34	0.17	900	26000	6810	1700	33000	10320
2522	SINCHAL LAKE FOR DARJEELING	WEST BENGAL	6.0	16.0	12.1	7.8	10.7	9.0	6.2	7.6	7.1				1.1	5.9	3.0	0.03	0.32	0.17	400	27000	8227	1100	11000	19055
2539	BELBONI LAKE NEAR BARJORA	WEST BENGAL	19.0	33.0	27.0	7.3	9.0	8.0	6.2	8.0	7.1	83	257	151	1.3	6.8	3.5	0.02	0.55	0.14	400	1400	800	230	8000	2443
2544	SAHEBBANDH AT PURULIA	WEST BENGAL	17.0	32.0	25.2	5.5	9.4	7.3	7.1	7.8	7.5	372	570	464	1.4	6.4	3.6	0.10	0.93	0.56	400	11000	3510	1700	50000	12800

TABLE 20.1 : -GROUND WATER QUALITY IN ANDHRA PRADESH - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l											
15	WELL AT KUYURA, A.P.	ANDHRA PRADESH	23	28	25.5	6.8	7.85	7.3	195	226	211	2.9	2.9	3	0.1	0.25	0.2	22	22	22	380	380	380	0.11	0.42	0.27
16	WELL AT TADAVAI A.P.	ANDHRA PRADESH	27	28	25.5	7.2	7.72	7.5	663	1121	892	0.2	1	1	21.4	24	22.7	17	17	17	1600	1600	1600	0.66	0.72	0.69
26	WELL AT VIJAYWADA, A.P.	ANDHRA PRADESH	26	32	30.9	7.1	7.39	7.3	1601	1661	1631	0.5	0.5	1	0.19	0.28	0.2	2	2	2	700	700	700	0.76	0.92	0.83
27	WELL AT PEDDAVOORA, A.P.	ANDHRA PRADESH	26	27	26.5	7.8	8.8	8.3	1420	1668	1544	3	3.5	3	14	22	18				10	35	23	0.1	1	0.55
1513	B.W. - KRISHNA MURTHY, D.NO. 48-16-43 AUTONAGAR VIJAYAWADA, KRISHNA DIST., A.P.	ANDHRA PRADESH	25	30	27	6.8	7.11	6.9	1454	1575	1519	0.5	0.5	1	0.18	0.26	0.2	2	2	2	800	800	800	0.62	0.82	0.73
1514	B.W. - VIJAY KUMAR AUTONAGAR VIJAYAWADA, KRISHNA DIST., A.P.	ANDHRA PRADESH	24	31	27	6.7	7.43	7.1	1559	1649	1611	0.3	0.4	0	0.13	0.22	0.2	2	2	2	800	800	800	0.58	0.74	0.66
1515	B.W. - NAGARAJU, PALVONCHA, KHAMMAM DIST., A.P.	ANDHRA PRADESH	22	24	23	6.9	7.2	7.1	1788	2160	2032	0.5	0.6	1	1.88	4.28	3.2	2	2	2	600	800	667	0.68	0.92	0.81
1516	B.W. OF NAVLOK GARDENS NELLORE	ANDHRA PRADESH	29	29	29	7.4	8.04	7.8	696	1082	889	0.5	0.5	1	0.48	0.87	0.7	2	2	2	800	800	800	0.56	0.68	0.62
1517	B.W. - TUNGBHADRA RIVER NEAR KURNOOL, A.P.	ANDHRA PRADESH	26	27	27	7.3	8	7.6	1240	1662	1397	1.4	2.4	2	2	2.6	2.3	3	12	6	16	28	23	1	2.4	1.64
1518	B.W. - NANDYAL, KURNOOL DIST., A.P.	ANDHRA PRADESH	26	28	27	7.1	8.2	7.8	1650	2850	2391	1.2	1.6	1	2.8	8.4	4	4	12	9	12	26	19	0.4	0.67	0.55
1519	B.W. - NAGIRI, CHITTOOR DIST., A.P.	ANDHRA PRADESH	18	28	22.5	7.0	7.8	7.4	1460	2130	1737	1.2	1.8	1	16.1	22	19	2	10	6	9	16	12	0.3	1.8	0.93
1520	B.W. - SWARNAMUKHI RIVER, SRIKALAHASTI, CHITTOOR DIST.	ANDHRA PRADESH	20	26	23	7.3	8.4	7.9	829	1428	1054	1.4	3	2	0.4	14	8.5	4	140	30	6	1200	213	0.3	4	2.15
1521	Q.W. - NEAR RAMA TEMPLE, WARD No.2, MINDI, VISAKHAPATNAM, A.P.	ANDHRA PRADESH	25	27	26	7.5	7.54	7.5	3120	4111	3616	1	1	1	8.08	13.9	11	3	3	3	4	7	5.5	0.37	1.14	0.76
1522	Q.W. - PEDDANUYYI - VIZIANAGARAM	ANDHRA PRADESH	25	36	27	7.0	7.8	7.3	671	1580	1151	1	1.5	1	1.34	24.1	8	3	3	3	23	210	78	0.43	1.4	0.87
1523	B.W. - NEAR M/S ANDHRA SUGARS LTD., KOVVUR, W.G.DIST.	ANDHRA PRADESH	24	25	24	7.6	7.71	7.7	234	370	302	0.8	1	1	0.32	1.68	1	3	3	3	15	9	0.12	0.12	0.12	
1524	Q.W. - NEAR PARTAP NAGAR BRIDGE - KAKINADA, E.G.DIST., A.P.	ANDHRA PRADESH	25	26	25	7.2	7.38	7.3	875	1345	1110	1	1.4	1	0.76	6	5	3	3	3	11	23	17	0.08	0.31	0.2
1525	B.W. - IDA, NEAR CHAITANYA CHLORIDES, PASHAMYLAM, MEDAK.	ANDHRA PRADESH	26	26	26	6.9	6.9	6.9	1925	1925	1925	2.5	2.5	3	6	6	6				12	12	12	0.8	0.8	0.8
1791	B.W. - EAST OF SAICHERUVU, PAIDIPALLY (V), WARANGAL DIST.	ANDHRA PRADESH	28	29	28.5	6.7	7.43	7.1	2610	4525	3568	0.7	0.7	1	0.01	9	0.0140	350	350	350	1600	1600	1600	1.6	2.08	1.84
1792	B.W. - NEAR CKM COLLEGE, ENUBATHULA (V), WARANGAL DIST.	ANDHRA PRADESH	26	28	27	6.8	7.38	7.1	2377	3120	2749	0.3	1.2	1	40.1	87	63.6	32	32	32	240	240	240	1.28	1.73	1.51
1793	Q.W. - BHOOMAJAH NEAR ASHPONDS OF NTPC, KUNDANPALLY (V), RAMAGUNDAM, KARIMNAGAR, A.P.	ANDHRA PRADESH	25	28	26.5	7.3	7.93	7.6	1664	1975	1820	1.5	2.3	2	22	25.4	23.7	22	22	22	1600	1600	1600	1.47	1.74	1.61
1794	B.W. - MANAKONDRU (V), KARIMNAGAR DIST., A.P.	ANDHRA PRADESH	24	29	26.5	7.6	7.75	7.7	910	944	927	0.4	1	1	5.6	14	9.8	21	21	21	1600	1600	1600	1.79	2.07	1.93
1795	B.W. - PANCHAYAT OFFICE - BOLLARAM (V), MEDAK DIST., A.P.	ANDHRA PRADESH	26	27	26.5	7	7.2	7.1	6870	7120	6995	12	13	13	5.4	16	10.7				120	265	193	0.64	0.72	0.68
1810	B.W. - SRI RAMNAGAR COLONY, SAKKAR NAGAR, BODHAN, NIZAMABAD DIST., A.P.	ANDHRA PRADESH	28	28	28	7.1	7.6	7.4	1014	2044	1529	2.5	3.8	3	38	41	39.5				46	62	54	1.2	1.4	1.3
1811	B.W. - PRIMARY SCHOOL - RUDRAVELLI (V), BIBINAGAR (M), NALGONDA DIST., A.P.	ANDHRA PRADESH	26	27	26.5	8.2	8.3	8.3	1050	1100	1075	3.2	3.4	3	0.6	1.2	0.9	0	15	8	10	20	15	0.8	0.9	0.85

TABLE 20.2 : - GROUND WATER QUALITY IN ASSAM- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			6.5-8.5			< 3 mg/l			< 5000 MPN/100ml			< 1.0 mg/l											
1533	*DIGBOI, TINSUKIA DISTT., ASSAM	ASSAM	23	24	23.5	5.9	6.9	6.4	234	518	376	0.3	0.8	0.55	0.1	0.35	0.2	1	1	1	0.56	0.56	0.56
1534	*KARBBI ANGLONG DISTT., ASSAM	ASSAM	32	35	33	4.7	5.8	5.3	714	847	781	1.9	3.2	2.55	0.1	0.14	0.1	1	1	1	0.57	0.57	0.57
1535	*SIBSAGAR, ASSAM	ASSAM	20	27	23	6.2	6.7	6.5	243	365	304	1.2	2.5	1.85	0.1	0.25	0.2	1	1	1	0.53	0.53	0.53
1536	*SIBSAGAR, ASSAM	ASSAM	19	24	21.5	6	7.1	6.6	140	175	158	0.9	2.2	1.55	0.1	0.17	0.1	1	1	1	0.68	0.68	0.68
1537	*JORHAT, ASSAM	ASSAM	22	30	26	6.1	7	6.6	115	430	273	1.4	3.1	2.25	0.12	0.28	0.2	1	1	1	0.29	0.29	0.29
1538	*SILCHAR, ASSAM	ASSAM	12	15	13.5	6.5	7.1	6.8	711	913	812	3.9	6.5	5.2	0.17	0.31	0.2	1	1	1	0.34	0.34	0.34
1539	*BARPETA, ASSAM	ASSAM	24	26	25	6.5	7.5	7.0	111	562	337	0.4	1.6	1	0.1	0.19	0.1	1	1	1	0.28	0.28	0.28
1540	*SONAGAN, ASSAM	ASSAM	23	25	24	6.6	6.9	6.8	264	630	447	0.6	1.2	1	0.16	0.4	0.3	1	1	1	0.53	0.53	0.53
1541	*GUWAHATI, ASSAM	ASSAM	25	25	25	6.4	6.9	6.7	387	476	432	1	1.5	1.25	0.12	0.26	0.2	910	910	910	0.35	0.35	0.35
1542	*GUWAHATI, ASSAM	ASSAM	25	29	27	7.1	8.1	7.6	412	561	487	1.9	3.4	2.65	0.1	0.1	0.1	300	300	300	1	1	1
2243	GROUND WATER FROM LEDO, MARGHERITA	ASSAM	24	25	24.5	5.1	6.1	5.6	324	532	428	0.5	2.1	1.3	3.61	10.5	7.1	1	1	1	0.53	0.53	0.53

2244	GROUND WATER FROM NAZIRA	ASSAM	20	25	22.5	6.4	6.8	6.6	283	286	285	2.7	3.4	3.05	0.1	0.2	0.2	1	5	3	0.67	0.67	0.67
2245	GROUND WATER FROM NUMALIGARH (NEAR NRL TE LABOR COLONY)	ASSAM	27	32	29	5.1	6.3	5.7	66	104	85	1.3	2.3	1.8	0.1	0.22	0.2	1	1	1	0.26	0.26	0.26
2246	GROUND WATER FROM SEMBACHARI	ASSAM	20	24	22	6.4	6.8	6.6	139	468	304	1.7	3.1	2.4	0.1	0.2	0.2	1	1	1	0.66	0.66	0.66
2247	GROUND WATER FROM SILAPATHAR	ASSAM	20	24	22	6.3	6.3	6.3	255	292	274	2.5	3.5	3	0.1	0.21	0.2	1	1	1	0.64	0.64	0.64
2248	GROUND WATER FROM LAKHIMPUR TOWN	ASSAM	21	24	22.5	5.6	6.3	6.0	70	483	277	1.5	3	2.25	0.1	0.13	0.1	1	1	1	0.56	0.56	0.56
2249	GROUND WATER FROM TEZPUR (MISSION CHARIAL)	ASSAM	20	24	22	6.6	6.8	6.7	127	142	135	0.4	1.4	0.9	0.1	0.17	0.1	1	1	1	0.33	0.33	0.33
2250	GROUND WATER FROM NAGAON (PANIGON)	ASSAM	28	29	28.5	6.4	6.8	6.6	519	839	679	0.8	0.8	0.8	0.1	0.15	0.1	1	1	1	0.6	0.6	0.6
2251	GROUND WATER FROM JAGIROAD NR HPC EFFLUENT DISCHARGE POINT	ASSAM	27	28	27.5	6.9	7.2	7.1	305	313	309	1.7	2.9	2.3	0.12	0.19	0.2	1	1	1	0.87	0.87	0.87
2252	GROUND WATER NR ISHW DUMPING SITE AT GARCHUK-GUWAHATI	ASSAM	25	28	26.5	5.6	7.4	7.0	262	266	264	2	2.4	2.2	0.1	0.14	0.1	1	1	1	0.54	0.54	0.54
2253	GROUND WATER FROM NALBARI	ASSAM	24	26	25	6.6	6.8	6.7	289	428	359	1.5	3.2	2.35	0.1	0.16	0.1	1	1	1	0.46	0.46	0.46
2254	GROUND WATER FROM BARPETA ROADBY STATION	ASSAM	23	25	24	5.8	7.1	6.5	101	910	506	0.3	2.7	1.5	0.1	0.15	0.1	1	1	1	0.56	0.56	0.56
2255	GROUND WATER NEAR BPRL-DHALIGON	ASSAM	24	27	25.5	6	7	6.5	357	448	403	0.7	2.5	1.6	0.1	0.1	0.1	1	1	1	0.53	0.53	0.53
2256	GROUND WATER FROM KOKRAJHAR DISTRICT (HS SCHOOL)	ASSAM	24	30	27	5.9	6.4	6.2	78	107	93	0.8	1.8	1.3	0.13	0.41	0.3	1	1	1	0.56	0.56	0.56
2257	GROUND WATER FROM DHUBRI DISTRICT (COLLEGE NAGAR)	ASSAM	23	31	27	6.5	6.8	6.7	345	422	384	0.3	0.8	0.55	0.1	0.22	0.2	1	1	1	0.78	0.78	0.78
2258	GROUND WATER FROM GOALPARA DIST. (GOALPARA COLLEGE)	ASSAM	28	28	28	6.1	6.1	6.1	362	362	362	0.6	0.6	0.6	0.1	0.1	0.1	1	1	1	0.57	0.57	0.57
2259	GROUND WATER FROM DIPHU (GOVT. COLLEGE)	ASSAM	32	36	34	6.7	7	6.9	191	935	563	1.5	1.5	1.5	0.13	0.13	0.1	1	1	1	0.69	0.69	0.69
2261	GROUND WATER FROM HAILONG	ASSAM	10	25	5	5.6	7.6	6.6	86	166	126	1.2	6.5	3.85	0.1	0.12	0.1	1	1	1	0.43	0.43	0.43
2262	GROUND WATER FROM KARIMGANJ (COLLEGE)	ASSAM	13	13	13	6.5	6.5	6.5	302	302	302	5.4	5.4	5.4	0.1	0.19	0.1	1	1	1	0.43	0.43	0.43
2263	GROUND WATER FROM HALAKANDI (NEAR ASTO BUS STAND)	ASSAM	15	15	15	6.3	6.3	6.3	142	142	142	3.4	3.4	3.4	0.22	0.22	0.2	1	1	1	0.63	0.63	0.63
2264	GROUND WATER IN PANCHGRAM MARKET NEAR CACHAR PAPER MILL	ASSAM	12	15	13.5	6.7	6.8	6.8	431	690	561	3.3	5.2	4.25	0.1	0.1	0.1	1	1	1	0.34	0.34	0.34

TABLE 20.3 : - GROUND WATER QUALITY IN MANIPUR, TRIPURA AND MEGHALAYA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l			
1920	KAKCHING (THOUBAL DIST.)	MANIPUR	17	17	17				59.4	59.4	59				0.87	2.96	1.9										
1406	WELL AROUND UDAIPUR (TUBEWELL), TRIPURA	TRIPURA	25	28	26	7.7			334	360	348	0	0.8	0.4	0	0.08	0										
1730	KUNJIBAN, AGARTALA, TRIPURA	TRIPURA	26	27	26.5	7.3	7.76	7.6	182	193	189				0.22	0.24	0.23										
1731	LANKAMURA, TRIPURA	TRIPURA	26	28	27	7.6	7.94	7.8	82	84	89																
1732	A D NAGAR, AGARTALA, TRIPURA	TRIPURA	26	27	27	7.5			108	120	114																
1733	SHIBNAGAR, AGARTALA, TRIPURA	TRIPURA	27	27	27	7.7	7.85	7.8	182	196	188																
1734	GANDHIGRAM, AGARTALA, TRIPURA	TRIPURA	26	27	26.5	7.4	7.62	7.5	162	178	170																
1634	POLICE BAZAR, SHILLONG, MEGHALAYA	MEGHALAYA	18	18	18	6	6	6.0	175	215	195	2.4	2.8	3.0	4.04	6.3	5.0	38	63	51	50	94	72	0.1	0.1	0.1	
1635	MAWLAI, SHILLONG, MEGHALAYA	MEGHALAYA	19	19	19	5	5	5.0	220	255	238	4	4.4	4.0	10.2	16.4	13.0	49	70	60	70	110	90	0.1	0.1	0.1	
1636	INDUSTRIAL ESTATE, BYRNINAT, MEGHALAYA	MEGHALAYA	24	25	24.5	6	6.5	6.3	175	260	218	1	1.4	1.0	1.1	4.5	3.0	23	36	30	4.3	35	20	0.02	0.1	0.06	
1637	SOHRA CHERRAPUNJEE, MEGHALAYA	MEGHALAYA	18	18	18	6.5	6.5	6.5	75	92	84	0.22	0.3	0.0	3.5	3.9	4.0	17	23	20	21	31	26	0.03	0.03	0.03	
1638	SHANGPUNG, MEGHALAYA	MEGHALAYA	17	19	18	5.1	6.5	5.8	115	125	120	0.8	1	1.0	5.6	7.2	6.0	11	14	13	20	23	22	0.1	0.1	0.1	

TABLE 20.4 : - GROUND WATER QUALITY IN CHHATTISSGARH AND MADHYA PRADESH – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE					
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean			
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 5000 MPN/100ml			< 1.0 mg/l					
1620	AT RAIPUR REGION, CHHATTISSGARH	CHHATTISSGARH	25	32	29	7.2	7.96	7.7	480	786	663				1.1	1.4	1.3	4	11	8	0.1	0.2	0.13			
1621	AT RAIPUR REGION, CHHATTISSGARH	CHHATTISSGARH	25	31	28	7.6	7.86	7.8	496	943	796				1.3	2.5	1.9	6	27	12.8	0.2	0.5	0.35			
1622	AT BILASPUR REGION	CHHATTISSGARH	31	31	31	7.5	7.5	7.5	789	1789	1289				1.96	3.88	2.9				0.09	0.51	0.3			
1617	OPEN WELL/TUBE WELL, INDL AREA MANDIDEEP, RAISEN	MADHYA PRADESH	38	38	38	8.2	8.2	8.2	340	340	340	1.7	1.7	1.7	1	1	1	33	33	33						
1618	GW SAMPLING AT TWO POINTS IN INDUSTRIAL AREA MALANPUR, MP	MADHYA PRADESH				7.4	7.6	7.5	821	821	821	3.6	3.6	3.6	0.9	0.9	0.9									
1619	GROUND WATER SAMPLING AT TWO POINTS IN INDL AREA MALANPUR	MADHYA PRADESH				7.2	7.3	7.3	818	818	818	3.4	3.4	3.4	0.93	0.93	0.93									
2143	KATHODA, JABALPUR	MADHYA PRADESH	28	28	28	7.3	7.3	7.3	475	475	475	1.2	1.2	1.2	0.2	0.2	0.2	4	4	4	0.05	0.05	0.05			
2144	MADAI GRAM, JABALPUR	MADHYA PRADESH	32	32	32	7.8	7.8	7.8	918	918	918	1	1	1				7	7	7	0.3	0.3	0.3			
2145	MEHATWAS, NAGDA	MADHYA PRADESH				6.6	7.8	7.8	1850	2514	2182	1	2.5	1.75	4.1	4.1	4.1									
2146	BHAGATPURI VILLAGE, NAGDA	MADHYA PRADESH	27	29	28	7.2	7.5	7.4	1300	1340	1320	0.8	3	2	7	9.98	8.5									
2148	DOSGAON, RATLAM	MADHYA PRADESH	26	26	26	7.4	7.8	7.6	1860	2210	2035	2	6	4	1.01	1.4	1.2									
2149	CULVERT ON A.B. ROAD, MAKSI	MADHYA PRADESH	25	25	25	7	8	7.5	941	1100	1021	1.2	1.2	1.2	1.67	10.8	7									
2153	IBRAHIMGANJ NEAR BUS STAND	MADHYA PRADESH	36	36	36	7.8	7.8	7.8	510	510	510	1.3	1.3	1.3	1.64	4	1.8	50	50	50						

TABLE 20.5 : - GROUND WATER QUALITY IN HIMACHAL PRADESH AND CHANDIGARH- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE- N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l		

1555	AT KALA AMB, H.P	HIMACHAL PRADESH	25	26	25.5	7.2	7.6	7.5	389	445	407	1	1.4	1.2	0.24	1.27	0.76	4	8	6	9	11	10	0.03	0.05	0.04	
1556	AT PAONTA SAHIB, H.P	HIMACHAL PRADESH	24	26	25	7.2	7.8	7.4	541	649	595	1.4	1.6	1.5	0.26	1.18	0.72	5	7	6	9	12	11	0.02	0.04	0.03	
1557	AT PARWANOO, H.P	HIMACHAL PRADESH	21	24	22.5	7.2	8.34	7.8	385	455	410	0.2	0.5	0.35	0.03	0.09	0.06	2	2	2	2	2	2	0.041	0.061	0.05	
1558	AT BADDI, H.P	HIMACHAL PRADESH	23	26	24.5	7.5	8.3	7.9	291	709	500	0.2	1	0.6	0.18	1.79	0.98					10	10	0.142	0.158	0.15	
1559	AT BAROTWALA, H.P	HIMACHAL PRADESH	22	27	24.5	7.8	7.96	7.8	329	408	369	0.2	4	2.1	0.14	2.33	1.24	8	8	8	32	32	32	0.136	0.142	0.14	
1560	AT NALAGARH, H.P	HIMACHAL PRADESH	23	27	25	7.5	8.27	7.9	908	1145	1026	0.3	0.5	0.4	0.19	0.26	0.22					2	2	0.164	0.182	0.17	
1561	AT DAMTAL, H.P	HIMACHAL PRADESH	18	25	21	7.5	7.59	7.6	680	701	691	0.6	1	0.8	5.22	5.22	5.22	7	7	7	33	33	33	0.18	0.18	0.18	
1562	AT UNA, H.P	HIMACHAL PRADESH	15	25	20	7.4	7.85	7.6	428	630	529	0.0	0.5	0.25	1.71	3.33	2.52	4	4	4	26	26	26	0.74	0.74	0.74	
1872	SHIMLA DIS OF MSW DUMPING SITE	HIMACHAL PRADESH	10	14	12	6.8	7.86	7.2	232	758	512	2.5	45	23.75				6	128	49	27	390	120	0.051	3.54	0.46	
1873	DHARAMSHALA KANGRA DIS OF MSW DUMPING SITE	HIMACHAL PRADESH	18	20	19	5.8	6.04	5.9	289	293	281	0.7	0.9	0.8	0.02	0.61	0.31	4	4	4	17	17	17	0.5	0.5	0.5	
1874	SOLAN DIS OF MSW DUMPING SITE	HIMACHAL PRADESH	12	24	20	7.2	8.5	8.0	369	580	510	0.1	2	1.05	4.46	4.79	4.63	2	108	25	12	340	69	0.016	2.16	0.28	
1875	MANDI DIS OF MSW DUMPING SITE	HIMACHAL PRADESH	18	18	18	7.6	7.65	7.7	257	257	257	4.8	4.8	4.8	0	2.33	1.17	920	920	920	2400	2400	2400	0.373	0.373	0.37	
1876	PARWANOO INDUSTRIAL AREA	HIMACHAL PRADESH	21	25	23	6.6	8.32	7.5	553	763	658	0.3	0.5	0.4	0.22	0.22	0.22					6	10	8	0.106	0.136	0.12
1877	BADDI INDUSTRIAL AREA	HIMACHAL PRADESH	23	26	24.5	7.3	8.23	7.7	345	398	372	0.2	1	0.6	0.08	1.96	1.02	2	2	2	28	28	28	0.186	0.196	0.19	
1878	BAROTWALA INDUSTRIAL AREA	HIMACHAL PRADESH	22	27	25	7.4	7.63	7.5	360	513	437	0.2	0.5	0.35	0.22	2.75	1.49	15	15	15	50	50	50	0.062	0.068	0.07	
1879	NALAGARH INDUSTRIAL AREA	HIMACHAL PRADESH	22	28	25	6.8	7.68	7.1	888	1314	1101	0.2	0.5	0.35	0.1	2.43	1.28					15	15	0.139	0.142	0.14	
1880	KALA AMB INDUSTRIAL AREA	HIMACHAL PRADESH	26	26	26	9	7.36	7.2	371	485	428	1	1.2	1.1	0.13	5.2	2.67	5	8	7	9	10	10	0.02	0.05	0.04	
1881	PAONTA SAHIB INDUSTRIAL AREA	HIMACHAL PRADESH	23	25	24	7.2	8.04	7.6	409	671	540	1.2	1.2	1.2	0.2	1.07	0.64	4	7	6	9	11	10	0.05	0.07	0.06	
1882	MEHATPUR INDUSTRIAL AREA	HIMACHAL PRADESH	15	24	19	7.6	7.71	7.7	573	870	722	0.5	0.5	0.5	0.28	1.41	0.85	5	11	8	18	21	20	0.52	0.52	0.52	
1883	UNA INDUSTRIAL AREA	HIMACHAL PRADESH	14	25	19	7.4	7.75	7.6	516	794	655	0.5	0.6	0.55	4.86	5.71	5.29	9	9	9	43	43	43	0.3	0.3	0.3	
2828	HAND PUMP AT SHAMSHI	HIMACHAL PRADESH	10	16	13	6.9	8.21	7.8	301	568	435														0.202	0.336	0.27
2629	HAND PUMP AT MANDI TOWN	HIMACHAL PRADESH	20	21	21	7.4	7.78	7.6	591	703	647				0.56	2.35	4	1.46							0.027	0.097	0.06
2630	HAND PUMP AT HAMIRPUR TOWN	HIMACHAL PRADESH	15	15	15	7	7.04	7.0	7.36	1300	654	0.4	0.5	0.45	0.2	3.13	5	1.67	4	5	5	17	22	20	0.48	0.48	0.48
2631	HAND PUMP AT NADAUN TOWN	HIMACHAL PRADESH	13	13	13	6.6	6.78	6.7	527	811	669	0.5	0.5	0.5	6.05	6.11	6.08	2	2	2	7	10	8.5	0.32	0.32	0.32	
2632	HAND PUMP AT BILASPUR TOWN	HIMACHAL PRADESH	22	23	22.5	7.4	7.79	7.6	714	987	851				2.55	6.18	4.37								0.241	0.268	0.25
2633	HAND PUMP AT RECONGPEO	HIMACHAL PRADESH	9	9	9	8.8	8.85	8.9	244	244	244	0	0	0	4.93	8.25	6.59								0.236	0.236	0.24
2634	HAND PUMP AT SHIMLA	HIMACHAL PRADESH	10	10	10	7.8	7.98	7.9	245	250	248	0.2	0.5	0.35	0.03	0.02	0.03	6	6	6	2	26	14	0.122	0.138	0.13	
2635	HAND PUMP AT RAMPUR	HIMACHAL PRADESH	10	10	10	7.8	8.46	8.2	248	502	375	0	0.2	0.1	0.07	0.18	0.13								0.082	0.146	0.11
2636	HAND PUMP AT KANGRA TEMPLE	HIMACHAL PRADESH	20	21	20.5	7.2	7.01	6.7	559	695	627	0.6	1.1	0.85	0	4	0.05	4	4	4	27	27	27	0.23	0.23	0.23	
2637	HAND PUMP AT JWALAJI TEMPLE	HIMACHAL PRADESH	21	24	22.5	7.2	8.6	7.9	133	1350	742	0.5	0.6	0.55	0.05	2.02	1.04	7	7	7	7	17	17	0.06	0.06	0.06	
2638	HAND PUMP AT CHINTPURNI TEMPLE/ TOWN	HIMACHAL PRADESH	20	22	21	7.6	8.02	7.8	416	552	484	0.2	0.5	0.35	1.4	5.64	3.52	8	8	8	21	21	21	0.09	0.09	0.09	
2639	HAND PUMP AT CHAMUNDA DEVI TEMPLE TOWN	HIMACHAL PRADESH	21	22	21	6.7	8.22	7.5	80	133	107	0.8	1	0.9	2.82	3.98	3.4	7	7	7	17	17	17	0.71	0.71	0.71	
2640	HAND PUMP AT SANSARPUR TERRACE IA	HIMACHAL PRADESH	24	26	25	7.2	7.84	7.6	353	424	389	0.3	1	0.65	0.32	0.85	0.59	9	9	9	21	21	21	0.21	0.21	0.21	
2641	HAND PUMP AT CHAMBA TOWN	HIMACHAL PRADESH	15	15	15	7.2	7.48	7.3	688	691	680	0.2	0.8	0.6	1.25	1.43	1.34	4	4	4	9	9	9				
2642	HAND PUMP AT DALHOUSIE TOWN	HIMACHAL PRADESH	14	16	15	6.4	6.85	6.6	222	229	226	0.4	0.9	0.65	0.06	0.25	0.16	4	4	4	9	9	9				
2643	HAND PUMP AT SOLAN	HIMACHAL PRADESH	21	24	22.5	7.0	7.83	7.5	393	438	416	0.1	1	0.55	2.71	3.18	2.95	11	84	48	27	210	119	0.073	0.081	0.077	
2644	HAND PUMP AT PARWANOO IA	HIMACHAL PRADESH	24	24	24	7.2	7.21	7.2	507	507	507	0.2	0.2	0.2	0.05	0.18	0.12					2	2	2	0.11	0.11	0.11
2645	HAND PUMP AT NAHAN	HIMACHAL PRADESH	22	25	23	7.1	7.18	7.1	686	1050	868	1	1.2	1.1	0.03	9	0.03	6	9	8	10	13	12	0.03	0.06	0.045	
2646	HAND PUMP AT KALA AMB	HIMACHAL PRADESH	26	26	26	6.7	7.31	7.0	957	1880	1409	1	1.2	1.1	0.3	3.27	1.79	5	7	6	10	12	11	0.03	0.04	0.035	
2647	HAND PUMP AT TAHLI WAL IA	HIMACHAL PRADESH	14	26	20	6.8	7.22	7.0	696	1080	888	0.5	0.6	0.55	0.29	1.75	1.02	7	7	7	2	18	10	0.21	0.21	0.21	
2039	SECTOR 15	CHANDIGARH	26	26	26	7	7	7	869	869	869	0.4	0.4	0	0.22	1.02	0.62										
2042	SECTOR 47	CHANDIGARH	26	26	26	7.4	7.4	7.4	741	741	741	0.6	0.6	1	7.77	7.77	7.77										
2043	PALSORA VILLAGE	CHANDIGARH	26	26	26	7.2	7.2	7.2	870	870	870	1	1	1	0.38	0.38	0.38										
2044	DHANAS VILLAGE	CHANDIGARH	26	26	26	6.9	6.9	6.9	987	987	987	0.6	0.6	1	2.83	2.83	2.83										
2045	DADU MAJRA	CHANDIGARH	26	26	26	7.3	7.3	7.3	673	673	673																

TABLE 20.6 : - GROUND WATER QUALITY IN JAMMU & KASHMIR - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA																	
2759	DUGWELL AT GAGHWAL(KATHUA DIST) J&K	JAMMU & KASHMIR	27	27	27	6.2	6.24	6.2	458	458	458	2.3	2.3	2	0.33	1.49	0.91
2760	MALADHAR TALAB(POND)HATLI (KATHUA)J&K	JAMMU & KASHMIR	26	26	26	6.6	6.64	6.6	236	236	236	158	158	158			
2761	TUBE WELL KATHUA SICOP INDUSTRIAL AREA KATHUA J&K	JAMMU & KASHMIR	26	26	26	6.1	6.1	6.1	106	106	106				0.05	7	0.057
2762	R.S. PURA TEHSIL, JAMMU J&K	JAMMU & KASHMIR	16	16	16	9.4	9.4	9.4	2000	2000	2000	68	68	68			

TABLE 20.7 : - GROUND WATER QUALITY IN KERALA - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA																										
			6.5-8.5						< 3 mg/l																	

19	WELL AT ELOOR, KERALA	KERALA	24	26	5.7	7.5	6.3	120	245	174	0.2	1.4	0.8	0.3	4.5	2.40	2	1100	226	22	3500	779	0.06	0.06	0.06		
22	WELL AT CHUNGAPALLY, KERALA	KERALA	25	25	6.5	6.7	6.6	100	110	105	0.3	0.5	0.4	0.16	1.88	1.02	2	2	2	4	40	22	0.18	0.18	0.18		
35	WELL AT PUNALUR, KERALA	KERALA	26	26	5	5.8	5.4	329	344	337	0.4	0.6	0.5	4.5	6.1	5.30	170	400	285	300	700	500					
1581	PAPPANMOKODE, THIRUVANANTHAPURAM	KERALA	26	26	5	4.5	5.6	5.1	52	260	156	0.5	0.8	0.65	1.64	1.82	1.73	80	80	80	110	240	175				
1582	NEDUMANGAD, THIRUVANANTHAPURAM	KERALA	27	28	5	6.1	6.3	6.2	186	260	223	0.7	1.2	0.95	1.3	1.4	1.35	40	80	60	170	300	235	0.01	0.01	0.01	
1583	NEDUMANGAD, THIRUVANANTHAPURAM	KERALA	26	28	27	4.4	4.6	4.5	154	165	160	0.7	0.8	0.75	0.14	3.7	1.92	40	400	220	140	900	520				
1584	CHERTHALA, ALLEPPY, KERALA	KERALA	26	26	5	6.9	7	7.0	128	138	133	0.2	1.1	0.65	0.05	0.12	0.09	280	400	340	500	800	650				
1585	VYTTILA, ERNAKULAM	KERALA	27	29	28	7.4	7.5	7.5	309	610	460	0.8	3	1.9	1.6	10.6	6.10	110	220	165	220	350	285	0.18	0.18	0.18	
1586	EDAYAR, ERNAKULAM DISTT	KERALA	25	27	26	6.4	6.5	6.5	145	194	170	0.5	0.7	0.6	2.6	3	2.80	50	300	175	80	500	290	0.12	0.12	0.12	
1587	KALAMASSERY, ERNAKULAM	KERALA	26	27	26	6.9	7.4	7.2	88	1693	891	1.2	2	1.6	1.4	1.8	1.60	40	300	170	80	500	290	0.08	0.08	0.08	
1588	PUNKUNNAM TRISSUR DISTT.	KERALA	27	27	27	5.4	6.8	6.1	95	103	99	0.3	0.8	0.55	1.68	2.4	2.04	80	140	110	300	500	400	0.005	0.005	0.005	
1589	MALAPURAM, KERALA	KERALA	28	28	5	6	6.2	6.1	210	370	290	0.8	1	0.9	1.6	3.7	2.65	8	500	254	30	700	365				
1590	MAVOOR, KOZHIKKODE DISTT., KERALA	KERALA	25	25	25	6.8	7.3	7.1	118	129	124	0.4	0.7	0.55	0.21	2.95	1.58	2	4	3	4	60	32	0.06	0.06	0.06	
1591	KANNUR (MUNICIPALITY) KANNUR	KERALA	25	29	27	5	5.1	5.3	5.2	94	118	106	0.2	0.3	0.25	4.37	4.7	4.54	70	170	120	500	800	650	0.11	0.11	0.11
1592	PAYYANNUR, KANNUR DISTT	KERALA	26	28	27	6.6	7	6.8	209	226	218	0.2	0.6	0.4	2	9.7	5.85	2	2	2	21	30	26				
2308	FATHIMAPURAM (CHANGANASSERY)	KERALA	25	27	26	6.6	7	6.8	188	347	268	0.3	0.5	0.4	0.07	0.32	0.20	40	500	270	80	700	390				
2309	KAROOR (PALA)	KERALA	26	27	26	5.8	7.1	6.5	78	100	88	0.4	0.5	0.45	4.07	5.1	4.59	40	70	55	60	120	90				
2310	VAIKOM	KERALA	25	25	5	6.3	6.7	6.5	162	237	200	0.2	0.6	0.4	0.82	4.1	2.46	80	240	160	130	350	240				
2311	VADAVATHOOR (KOTTAYAM)	KERALA	26	26	4	6.2	6.6	6.4	97	217	157	0.5	1.2	0.85	1.87	3.3	2.59	110	300	205	140	500	320				
2313	SARVODAPURAM, ALAPPUZHA	KERALA	26	26	3	6.5	7	6.8	151	195	173	0.2	0.6	0.4	2.86	5	3.93	400	700	550	1100	1200	1150				
2314	KUREEPUZHA (KOLLAM)	KERALA	27	28	28	3	6	7.1	6.6	34	196	115	0.4	2.8	1.6	0.16	0.21	0.19	300	300	300	600	700	650			
2315	K.M.M.L. (KOLLAM)	KERALA	27	27	9	7.2	7.2	7.2	117	1460	780	0.6	2.7	1.65	1.9	2.6	2.25	110	170	140	400	500	450				
2316	CHELLORA TRENCHING GROUND (KANNUR)	KERALA	26	27	26	5	4.9	5.7	5.3	49	59	54	0.3	0.6	0.45	0.34	4.2	2.27	2	2	2	11	60	36	0.28	0.28	0.28
2317	PUNNALPETTIPALAM (TELLICHERRY MUNICIPALITY)	KERALA	26	28	27	5	5.9	6.2	6.1	212	352	282	0.4	0.6	0.5	1.5	2.35	1.93	2	40	21	11	1300	656	0.03	0.03	0.03
2320	MANJERI	KERALA	28	26	5	5	5.9	6.6	6.3	160	187	174	0.9	0.9	0.9	4.7	4.73	4.72	30	350	190	80	600	340			
2321	LALOOR (THRISSUR)	KERALA	28	28	28	4.5	7.2	5.9	200	290	245	0.4	0.6	0.5	1.1	2.2	1.65	170	300	235	280	1600	940				
2322	OLLUR (THRISSUR)	KERALA	28	28	28	4.5	6	5.3	210	250	230	0.4	0.8	0.6	0.5	10.8	5.65	11	60	36	50	400	225				
2323	BRAHMAPURAM M.S.W. DUMPARK (ERNAKULAM)	KERALA	25	28	25	6.2	7	6.6	226	260	243	0.5	1	0.75	5.3	9.8	7.55	70	500	285	1100	2200	1155	0.12	0.12	0.12	
2324	HAZARDOUS WASTE DUMP (AMBALAMUCHAL)	KERALA	27	28	27	5	6.8	7.9	7.4	240	389	315	0.3	1.6	0.95	2.3	4.7	3.50	4	21	13	2	140	71	0.22	0.22	0.22
2327	KARUKAMANI	KERALA	23	25	3	6.7	7.8	7.3	690	712	701	0.6	0.8	0.7	0.8	0.9	0.85	140	170	155	300	500	400	0.22	0.22	0.22	

TABLE 20.8 : - GROUND WATER QUALITY IN TAMILNADU AND PONDICHERY- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			NITRATE-N+ NITRITE-N (mg/l)			FLUORIDE			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA			6.5-8.5			6.5-8.5						< 1.0 mg/l						
32	WELL AT MUSIRI, TAMIL NADU	TAMILNADU	26	29	27	7.4	7.3	7.7	7.6	1373	1418	1396	0.042	0.343	0.19	0.19	0.59	0.39
1397	WELL AT MUTHALPET AREA(I)	PONDICHERY	30	31	30	6.5	6.5	6.65	6.6	1914	4920	3417	0.138	0.14	0.14	0.41	0.41	0.41
1398	WELL AT THENGATHITTU AREA,(II)	PONDICHERY	33	33	33	6.3	6.3	6.53	6.4	1084	1144	1119	0.055	0.68	0.37	0.15	0.15	0.15
1453	WELL AT MUTHARAPLAYAM (PWD)	PONDICHERY	31	32	31	6.4	6.4	6.52	6.5	558	627	593	2.2	5.566	3.88	0.32	0.32	0.32
1454	WELL AT KARAPET POND, UNIVER.	PONDICHERY	30	31	30	6.0	6.0	6.27	6.1	184.8	192.1	188	0.4	0.975	0.69	0.03	0.03	0.03
1687	NEHRU STATUE, PONDICHERY	PONDICHERY	30	30	30	7.1	7.1	7.37	7.3	1015	1101	1058	1.6	4.38	2.99	0.2	0.2	0.2
1688	KATTERKUPPAM, PONDICHERY	PONDICHERY	30	30	30	6.9	6.9	7.16	7.1	539	643	591	0.124	0.4	0.26	0.15	0.15	0.15
1689	CHUNBAR RIVER, PONDICHERY	PONDICHERY	28	30	29	7.9	7.9	8.9	8.4	675	718	697	0.05	0.05	0.05			
2009	KURUMBAPET	PONDICHERY	32	33	32	6.3	6.3	6.38	6.4	368	484	426	3.38	15.39	9.39	0.07	0.07	0.07
2010	METTUPALAYAM	PONDICHERY	28	32	30	5.8	5.8	6.05	6.0	515	734	625	3.4	4.193	3.80	0.19	0.19	0.19
2011	URUVAYAR	PONDICHERY	32	33	32	6.9	6.9	7.18	7.1	2.5	2120	1061	5.7	6.313	6.01	0.53	0.53	0.53
2012	KARUVADIKUPPAM	PONDICHERY	31	31	31	5	5	5.95	6.0	280.9	280.9	281	0	0.008	0.00	0.01	0.01	0.01
2013	T.R.PATTINAM, KARAIKAL	PONDICHERY	25	29	27	8.1	8.1	8.91	8.5	1628	1740	1684	0.318	0.318	0.32	0.6	0.6	0.6
2014	VADAMATTAM, KARAIKAL	PONDICHERY	26	30	28	8.1	8.1	8.52	8.3	1348	1430	1389	0.178	0.22	0.20	0.55	0.55	0.55
2446	PALLUR	PONDICHERY	28	28	28	6.7	6.7	6.78	6.8	280	280	280	0.3	0.8	0.55	0.1	0.1	0.1
2447	PANTHAKKAL	PONDICHERY	28	28	28	7.0	7.0	7.03	7.0	142.7	142.7	143	4.508	4.508	4.51			

TABLE 20.9 : - GROUND WATER QUALITY IN DAMAN & DADRA NAGAR HAVELI - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA			6.5-8.5			6.5-8.5						< 3 mg/l			< 5000 MPN/100ml			< 1.0 mg/l					
1440	WELL AT SOMNATH INDL ESTATE	DAMAN	28	31	29	7	7.4	7.2	771	1660	1200				0.3	2.1	1.2				0.37	0.67	0.51

2448	VILLAGE BHIMPORE,DAMAN	DAMAN	29	30	29	7.2	7.5	7.4	590	931	761				0.61	0.60	0.608	7	7	7	0.12	0.14	0.13	
2448	VILLAGE BHIMPORE,DAMAN	DAMAN	30	30	30	7	7.1	7.1	771	2218	1495	8	8	8	3.4	3.74	3.57				0.18	0.67	0.43	
2449	VILLAGE RINGANWADA,DAMAN	DAMAN	30	30	30	7	7.1	7.1	1500	1994	1747				1.1	2.3	1.7				0.51	0.8	0.66	
2450	VILLAGE DUNEIHA,DAMAN	DAMAN	29	31	30	7.1	7.7	7.4	521	594	565				1.5	4.3	2.9	2	2	2	0.3	0.3	0.3	
2451	VILLAGE DABHEL,DAMAN	DAMAN	30	30	30	3	7.3	7.5	7.4	754	1542	1148	8	8	8	1	2	1.5	10	10	10	0.09	0.27	0.18
2452	VILLAGE KACHIGAM,DAMAN	DAMAN	29	29	29	6.9	7	7.0	1942	2272	2107				1.52	3.1	2.31				0.21	0.72	0.47	
2453	VILLAGE KHANVEL, DADRA	DADRA NAGAR HAVELI	30	30	30	6.7	7.3	7.0	385	594	515				4.9	5.3	5.1	4	4	4	0.21	0.23	0.22	
2454	VILLAGE ATHAL, DADRA	DADRA NAGAR HAVELI	30	31	30	7.1	7.5	7.3	482	657	564				0.3	0.8	0.55	2	2	2	0.32	0.57	0.43	
2455	VILLAGE MASAT, DADRA	DADRA NAGAR HAVELI	30	31	30	6.9	7.6	7.2	1581	1995	1796	6	6	6	0.3	0.4	0.35	4	4	4	0.36	0.45	0.4	
2456	VILLAGE PIPERIA, DADRA	DADRA NAGAR HAVELI	29	29	29	6.9	7.4	7.2	1035	1542	1226				0.2	0.4	0.3	12	12	12	0.44	0.52	0.47	
2457	VILLAGE GALONDA, DADRA	DADRA NAGAR HAVELI	31	31	31	7.2	7.8	7.5	1165	1676	1421				0.7	0.8	0.75				0.21	0.59	0.4	
2458	VILLAGE, DADRA	DADRA NAGAR HAVELI	29	31	30	7.3	7.7	7.5	2199	2693	2506	6	6	6	0.3	0.5	0.4	14	14	14	0.37	0.69	0.51	

TABLE 20.10 : - GROUND WATER QUALITY IN MAHARASHTRA AND GOA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l		
2824	DUG WELL AT NAREGAON VILLAGE- NAREGAON, TALUKA- AURANGABAD, DISTRICT- AURANGABAD.	MAHARASHTRA	32	32	32	8.1	8.1	8.1	1077	1077	1077	3.8	3.8	3.8	0.26	0.26	0.26	2	2	2	140	140	140	0.8539	0.8539	0.85
2825	BORE WELL AT WAHEGAON, NEAR ZILLA PARISHET SCHOOL, VILLAGE- WAHEGAON, TALUKA- PAITHAN, DISTRICT- AURANGABAD.	MAHARASHTRA	24	32	28	8.3	8.8	8.6	2557	5212	3885	3.2	5.2	4.2	5.16	5.16	5.16	2	2	2	14	80	47	0.9005	1.5746	1.24
2829	BORE WELL AT MIDC SHIROLI NEARMS PRATIBHA ENTERPRISES. VILLAGE- SHIROLI, TALUKA- HATKANANGALE, DISTRICT- KOLHAPUR.	MAHARASHTRA	23	23	23	8.6	8.67	8.6	821.4	824.6	823	2.4	2.8	2.6	0.79	1.48	1.13	2	8	5	40	60	50			
2830	BORE WELL AT MIDC GOKUL- SHIRGAON, VILLAGE- GOKUL- SHIRGAON, TALUKA- KARVIR, DISTRICT- KOLHAPUR.	MAHARASHTRA	23	23	23	8.1	8.44	8.3	1780	1875	1828	2.2	2.4	2.3	3.92	4.8	4.36	2	6	4	50	60	55			
2831	DUG WELL AT SAKHARALI NEAR MIDC ISLAMPUR NEAR KRISHNA MILK INDUSTRY, VILLAGE- SAKHARALI, TALUKA- WALWA, DISTRICT- SANGLI.	MAHARASHTRA	24	24	24	7.7	8.11	7.9	3207	4431	3819	2.2	2.2	2.2	3.8	3.9	3.85	4	4	4	110	110	110			
2832	DUG WELL NO.1 AT BRAHMANWADI- ANJANWEL, OWNED BY SHRI. VAIDYA, VILLAGE- ANJANWEL, TALUKA- GUHAGAR, DISTRICT- RATNAGIRI.	MAHARASHTRA	25	26	25	7.2	7.6	7.4	280.2	435	358	2.2	2.4	2.3	0.69	1.76	1.23	2	4	3	50	80	65			
2833	DUG WELL NO.7 AT GROUP GRAM PANCHAYAT AT ARKETWADI, NEAR MASJID VILLAGE- ARKETWADI, TALUKA- KHED, DISTRICT- RATNAGIRI.	MAHARASHTRA	25	26	25	7.5	7.86	7.7	615.4	2751	1883	2	2.4	2.2	0.57	2.97	1.77	2	4	3	70	90	80			
2834	DUG WELL NO.2 AT ARKETWADI VILLAGE- ARKETWADI, TALUKA- KHED, DISTRICT- RATNAGIRI.	MAHARASHTRA	25	30	27	7.5	8.29	7.9	528.5	665.5	597	2	2.2	2.1	0.53	1.86	1.2	2	2	2	60	90	75			
2835	DUG WELL NO. 2, OWNED BY GROUP GRAM PANCHAYAT, BRAHMANWADI- ANJANWEL, VILLAGE- ANJANWEL, TALUKA- GUHAGAR, DISTRICT- RATNAGIRI.	MAHARASHTRA	26	27	26	7.6	7.78	7.7	243.3	342	293	2	2.8	2.4	0.46	1.98	1.22	2	6	4	40	80	60			
1984	INDL. ESTATE TARAPUR	MAHARASHTRA	27	27	27	7.8	7.8	7.8	1210	1210	1210	3	3	3	3.3	3.3	3.3	80	80	80	275	275	275	0.5692	0.5692	0.57
1985	MIRA-BHAYANDER	MAHARASHTRA	26	26	26	7.9	8.3	8.1	1292	2916	2104	4.8	6	5.4	0.93	5	0.93	8	85	47	25	110	68	0.2563	1.02	0.64
1986	DAHANU	MAHARASHTRA	27	27	27	7.4	7.5	7.5	647.8	750.2	699	3.8	4	3.9	0.63	1.38	1.31	25	50	38	45	140	93	0.45	0.9283	0.69

TABLE 20.10 : - GROUND WATER QUALITY IN MAHARASHTRA AND GOA- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l			
1987	VASAI	MAHARASHTRA	26	26	26	7.6	7.6	7.6	986.8	1101	1044	4	4.2	4.1	0.07	0.45	0.26	8	35	22	25	95	60	0.2498	0.6	0.42	
1988	PALGHAR	MAHARASHTRA	27	27	27	7.9	8.1	8.0	577.5	588.2	583	3	4	3.5	0.16	1.56	0.86	25	170	98	45	550	298	0.3683	0.95	0.66	
1989	MSW SITE, TALOJA, RAIGAD	MAHARASHTRA	28	28	28	8.2	8.2	8.2	848.9	848.9	849	5	5	5	0.02	0.88	0.45	50	50	50	130	130	130	0.4712	0.4712	0.47	
1990	BMW SITE, BURJIDGAON, AHMEDNAGAR	MAHARASHTRA				7.2	7.73	7.5	938	1183	1061	8	10	9	0.88	2	0.88							0.213	0.729	0.47	
1991	MSW SITE, PATHARDI, NASIK	MAHARASHTRA	25	26	25	7.4	7.75	7.6	700	760	730	3.2	7	5.1	3.12	96.8	1	49.97	4	34	19	22	50	36	0.032	0.032	0.03
1992	MSW SITE, PIMPRI-CHINCHWAD, PUNE	MAHARASHTRA	27	27	27	7.6	7.88	7.7	777.2	951.9	865	2.8	8.5	5.65	0.57	2.46	1.52	9	17	13	170	350	260	0.58	1.9	1.24	
1993	PHANDARPUR, GANGAPUR, AURANGABAD	MAHARASHTRA	28	32	30	7.4	8.4	7.9	1140	1880	1500	3.6	6.16	4.88	0.28	0.38	0.33	2	2	2	80	90	85	0.803	1.1445	0.97	
1994	TPS-DURGAPUR, CHANDRAPUR	MAHARASHTRA	20	22	21	7.5	7.65	7.6	636	1530	1083	3.6	4.8	4.2	10.2	5	23.51	13	33	23	40	130	85	0.3	1.25	0.78	
1995	KHAPERKHEDA, NAGPUR	MAHARASHTRA	20	22	21	7.9	8.5	8.2	934	1136	1035	5	6.8	5.9	1.48	1.88	1.68	11	40	26	23	110	67	0.593	0.76	0.68	
1996	KORADI, NAGPUR	MAHARASHTRA	20	22	21	7.9	8.2	8.1	1480	1820	1650	6	8	7	4.96	12.6	8.78	14	60	37	26	140	83	0.61	1.2	0.91	
1997	RAIPUR, NAGPUR	MAHARASHTRA	20	20	20	7.8	7.9	7.9	1512	1849	1881	5.2	40	22.6	4.8	13.2	9	40	40	40	110	130	120	0.27	0.3	0.29	
1998	BHAHMINI, KALMESHWAR, NAGPUR	MAHARASHTRA	22	24	23	6	8.5	8.3	984	1420	1202	5.6	7.4	6.5	1.62	2.85	2.24	17	22	20	30	80	55	0.68	1.3	0.99	
1999	SANGERA GONDIA	MAHARASHTRA	23	24	23	7.6	8.1	7.8	468	492	480	5	8	6.5	1.48	5.3	3.39	8	17	13	17	60	39	0.41	0.6	0.51	
2000	BHANDEWARI, NAGPUR	MAHARASHTRA	20	22	21	8.1	8.6	8.4	1010	1360	1185	6.2	7.2	6.7	1.88	2.62	2.25	13	27	20	34	170	102	0.63	0.8	0.72	
2001	SUKALI, AMRAVATI	MAHARASHTRA	20	22	21	7.1	8.08	7.8	492	492	492	3.8	5.3	4.55	5.68	8	6.84	22	30	26	70	170	120	0.25	0.51	0.38	

2002	AKOT, AKOLA	MAHARASHTRA	20	25	22.5	7.8	8.03	7.9	512	1032	772	4.4	5.6	5	0.98	3.62	2.3	13	40	27	30	140	85	0.2	0.55	0.38	
2003	SAWARGAO, YAVATMAL	MAHARASHTRA	18	20	19	7.4	7.5	7.5	426	870	948	3.6	4.2	3.9	1.39	2.96	2.18	8	27	18	13	140	77	0.2	0.23	0.22	
2004	PARVATI INDL. ESTATE, SHIROL	MAHARASHTRA	23	23	23	7.5	8.51	8.0	1440	1573	1507	1.2	2.2	1.7	1.24	1.84	1.44	2	4	3	40	50	45				
2005	KHANJIRENAGAR, ICHALKARANJLI	MAHARASHTRA	23	23	23	8.5	8.54	8.5	1540	1580	1560	2	2	2	4.2	4.26	4.23	4	6	5	70	80	75				
2006	MIDC, SHINOLI, CHENDGAD	MAHARASHTRA	24	24	24	7.2	8.57	8.1	1440	1536	1488	2.4	3.8	3.1	4.1	4.12	4.11	2	6	4	4	60	80	70			
2007	SAVALI, SANGLI	MAHARASHTRA	24	24	24	7.2	8.29	7.8	2006	5904	4405	2.4	2.4	2.4	3.6	4.3	3.95	2	4	3	3	50	140	95			
2008	RASULWADI-SAMBARWADI, SANGLI	MAHARASHTRA	23	24	23.5	7.8	8.22	8.0	3934	4677	4306	2	2.4	2.2	4.02	4.53	4.28	2	4	3	3	90	120	105			
2200	BORE WELL AT KATPUR, NEAR Z/P SCHOOL	MAHARASHTRA	24	32	28	8.3	8.5	8.4	3222	6717	4970	3.4	5	4.2	1.82	1.82	1.82	2	4	3	3	80	110	95	1.582	2.0482	1.82
2201	DUG WELL AT RANJANGAON.	MAHARASHTRA	26	32	29	7.1	8.1	7.6	2111	2180	2146	3.12	5.2	4.16	4.86	6	7.11	5.99	2	4	3	60	110	85	1.147	1.2775	1.21
2202	DUG WELL AT GHANE KUNT, NEAR AWASTHI, OWNED BY SHRI RAJENDRA AMDE	MAHARASHTRA	25	26	25.5	7.3	8.47	7.9	357	614.3	486	2	2	2	10.7	15.8	13.26	2	4	3	3	80	90	85			
2203	HAND PUMP IN THE PREMISES OF ZILLA PARISHAD PRIMARY SCHOOL	MAHARASHTRA				7.8	8.18	8.0	616	1010	813	4.6	6	5.3	0.4	3.94	2.17								0.52	0.52	0.52
2204	DUG WELL AT GUNJALWADI, SAGAMNER NEAR PRIMARY HEALTH CARE CENTER.	MAHARASHTRA				7.3	8	7.64	7.5	1170	1983	1577	9.5	10	9.75	0.86	3.68	2.27							0.197	0.578	0.39
2816	DUG WELL OF MR. SAMPAT WALUNJ, NEAR MS MAHAJEET CLAYTON VILLAGE- SHINDE VILLAGE, TALUKA- NASHIK, DISTRICT- NASHIK.	MAHARASHTRA	25	26	25.5	7.5	7.85	7.7	843	1100	972	3	6	4.5	0.1	0.1	0.1	4	23	14	21	80	50.5	0.134	0.134	0.13	
2817	BORE WELL AT CHITALI NR WAGH VASTHI, CHITALI, AHMADNAGAR.	MAHARASHTRA				7.4	7.4	7.4	808	808	808	2.6	2.6	2.6	3.4	8.7	6.05								0.612	0.612	0.61
2818	BORE WELL AT MS SPECTRON ETHERS, RASEGAON NEAR SIDDESHWAR MAHADEV MANDIR VILLAGE- RASEGAON, TALUKA- DINDORI, DISTRICT- NASHIK.	MAHARASHTRA	25	27	26	7.5	7.8	7.7	913	1000	957	3.8	8	5.9	5.05	5.05	5.05	11	30	20.5	27	300	164	0.082	0.082	0.08	
2819	DUG WELL OWNED BY SHRI DESHMUKH VILLAGE- MALEGAON, TALUKA- BARANATI, DISTRICT- PUNE	MAHARASHTRA	26	27	26.5	7.8	8	7.9	4654	6865	5760	2.5	4.2	3.35	2.84	5.66	4.25	25	25	25	200	350	275	0.58	1.4	0.99	
2820	DUG WELL OWNED BY SHRI SHIVAJI BABAN DAREKAR VILLAGE- SANASWADI, TALUKA- SHIRUR, DISTRICT- PUNE.	MAHARASHTRA	30	30	30	6.8	7.9	7.4	910.4	1357	1134	2.5	5.5	4	0.18	0.26	0.22	13	25	19	195	550	373	0.64	1.1	0.87	
2821	BORE WELL AT BALE RAILWAY STATION PREMISES OWNED BY SHRI. DIGAMBAR JOSHI, VILLAGE- DAHEGAON, TALUKA- NORTH SOLAPUR, DISTRICT- SOLAPUR	MAHARASHTRA	25	25	25	7.8	7.82	7.8	2905	2905	2905	4	4	4	0.22	0.31	0.27	11	11	11	11	350	350	350	1.8	1.8	1.8
2822	BORE WELL NEAR CHINCHOLI VILLAGE- CHINCHOLI, TALUKA- MOHOL, DISTRICT- SOLAPUR	MAHARASHTRA	25	25	25	7.4	7.49	7.5	1175	1175	1175	3.5	3.5	3.5	0.4	0.4	0.4	11	11	11	11	350	350	350	1.8	1.8	1.8
2823	BORE WELL AT SHETE VASTI, NEAR OLD TULJAPUR ROAD, VILLAGE- TULJAPUR NAKA, TALUKA- SOLAPUR, DISTRICT- SOLAPUR	MAHARASHTRA	25	25	25	7.8	7.88	7.9	1572	1572	1572	5	5	5	0.28	0.28	0.28	17	17	17	17	350	350	350	1.6	1.6	1.6
2826	DUG WELL NEAR RAILWAY STATION, COTTON MARKET, VILLAGE- WARDHA	MAHARASHTRA				8.0	8.88	8.5	559	886	723	4.8	6.2	5.5	9.78	11.5	10.66								0.49	0.49	0.49
2827	BORE WELL NEAR RAILWAY CROSSING AT DONRI BUZURG	MAHARASHTRA	20	24	22	7.5	7.92	7.7	496	840	668	4.4	5	4.7	0.74	1.32	1.03	8	22	15	50	80	65	0.36	1.1	0.73	
2828	DUG WELL NEAR JILLA PARISHET PRIMARY SCHOOL, VISAPUR, VILLAGE- VISAPUR, TALUKA- BALLARPUR, DISTRICT- CHANDRAPUR.	MAHARASHTRA	16	20	18	7.6	7.8	7.7	790	1498	1144	4.8	5.2	5	1.08	4.86	2.97	13	90	52	50	280	165	0.3	1.15	0.73	
2277	WELL AT VERNA INDL. ESTATE (MS CIPLA LIMITED)	GOA	28	32	30	6.2	6.22	6.2	242.4	387	315	1	1.3	1.15	0.11	0.28	0.2				10	28	19				
2278	WELL AT SANGOALE INDL. ESTATE	GOA	27	32	29	6.2	6.38	6.3	153.7	250.2	202	0.7	1.3	1	0.04	0.08	0.06				80	80	80				
2279	WELL AT ZUARI INDL. LTD, ZUARI NAGAR	GOA	27	31	29	5.8	5.9	5.9	108.7	262.2	185	2.6	2.6	2.6	0.02	0.69	0.36				11	23	17				
2280	WELL AT KUDA INDL. ESTATE (MS CADILA HEALTHCARE LIMITED)	GOA	26	32	29	5.7	5.86	5.8	147	241.1	194	1.7	2.9	2.3	0.31	0.39	0.35				4	4	4				
2281	WELL AT CORLIM INDL. ESTATE	GOA	25	32	28.5	6.1	6.53	6.3	45.5	55.1	50	1.6	2.3	1.95	0.03	1.09	0.56				4	125	65				
2282	WELL AT PILERNE INDL. ESTATE (MS UNICHEM)	GOA	28	33	30.5	5.9	6.5	6.2	199.8	312	256	1	1.6	1.3	0.67	0.78	0.73	4	4	4	150	150	150				

TABLE 20.11 :- GROUND WATER QUALITY IN GUJARAT-2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE				
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean		
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l							
1950	JUNAGADH	GUJARAT	27	27	27	7.5	7.56	7.6	1180	1180	1180	2	2	2	0.12	0.12	0.12	2	2	2	2	2	2	2	1.15	1.15	1.15	
1959	NADIAD	GUJARAT	28	28	28	8.4	8.4	8.4	1693	1693	1693	2	2	2	1.36	1.35	1.36	4	4	4	4	20	20	20	0.44	0.44	0.44	
1960	DAHOD	GUJARAT	28	28	28	7.6	8.5	8.1	381	1127	754	1.8	1.6	1.8	0.52	0.52	0.52	2	7	5	4	21	13	0.03	0.03	0.03		
1961	GODHARA	GUJARAT	29	30	5	7.4	8.5	8.0	410	682	546	1.8	5	3.4	0.01	0.46	0.24	4	9	7	11	23	17	0.38	0.38	0.38		
1962	VADDARA (INDUSTRIAL-NANDESARI)	GUJARAT	26	29	27.5	7.8	8.36	8.1	1350	3830	2990	1.7	2	1.85	0.02	0.12	0.07	2	7	5	6	20	13					
1964	PANDESARA (INDUSTRIAL) SURAT	GUJARAT	29	29	29	7.6	7.62	7.6	1201	1201	1201	8	8	1.42	1.42	1.42	0.43	1.22	0.82	3	3	3	3	3	3	0.08	0.08	0.08
1965	MORA-HAJIRA (INDUSTRIAL), HAJIRA	GUJARAT	27	27	27	8.2	8.23	8.2	2098	2098	2098	0.8	0.8	0.8	0.48	0.48	0.48	3	3	3	3	3	3	3	0.37	0.37	0.37	
1966	GABHENI VILL., SURAT (INDUSTRIAL)	GUJARAT	29	29	29	8.0	8.01	8.0	2033	2033	2033	1.64	1.64	1.64	0.09	0.09	0.09	3	3	3	3	3	3	3	0.009	0.009	0.009	
1968	VAPI INDUSTRIAL AREA IN DIS, VAPI	GUJARAT	29	29	29	8.1	8.16	8.2							0.19	0.19	0.19											
1969	SARIGAM VILLAGE (DIS OF INDUSTRIAL AREA), VAPI	GUJARAT	29	29	29	8.1	8.19	8.2							2.12	2.12	2.12											
1970	BW DIS TSDF SITE, GIDC INDL AREA, VAPI	GUJARAT	29	29	29	8.2	8.29	8.3							3.42	3.42	3.42											
2084	BORE WELL OF PALSANA VILLAGE.	GUJARAT	28	28	28	7.6	7.96	8.0	1378	1378	1378	0.9	0.9	0.9	0.1	0.15	0.13	3	3	3	3	3	3	3	0.19	0.19	0.19	
2087	BW- HAZARDOUS W. DISPOSAL SITE (GUJ. ENVIRO P. & I. LTD.)	GUJARAT	29	29	29	7.9	7.98	8.0	866	866	866	1.22	1.22	1.22	0.42	0.42	0.42	3	3	3	3	3	3	3	0.21	0.21	0.21	

2088	BORE WELL OF SACHIN GIDC.	GUJARAT	29	29	29	7.9	7.99	8.0	1121	1121	1121	3.1	3.1	3.1	0.22	0.22	0.22	3	3	3	3	3	3	0.11	0.11	0.11
2089	BW NEAR INDL. AREA BORASARA & NAVAPURA, DIST. SURAT.	GUJARAT	30	30	30	8.0	8.06	8.1	2224	2224	2224	1.1	1.1	1.1	0.18	0.18	0.18	7	7	7	21	21	21	0.29	0.29	0.29
2090	WELL AT OLD PAD.	GUJARAT	29	29	29	7.8	7.81	7.8	8406	8406	8406	1.1	1.1	1.1	0.04	0.03	0.04	3	3	3	3	3	3	0.17	0.17	0.17
2091	BORE WELL OF NAVSARI GIDC INDUSTRIES ASSOCIATION OFFICE.	GUJARAT	29	29	29	8.1	8.11	8.1	2234	2234	2234	1.14	1.14	1.14	0.09	0.09	0.09	3	3	3	3	3	3	0.17	0.17	0.17
2092	FROM WATER WORKS OF NAVSARI NEAR DHUDDA TALAV.	GUJARAT	29	29	29	8.0	8.03	8.0	3542	3542	3542	0.82	0.82	0.82	0.03	0.03	0.03	3	3	3	3	3	3	0.19	0.19	0.19
2093	BORE WELL - BARDOLI REST HOUSE.	GUJARAT	30	30	30	8.0	8.06	8.1	1602	1602	1602	1.1	1.1	1.1	0.27	0.27	0.27	3	3	3	3	3	3	0.54	0.54	0.54

TABLE - 20.12 : GROUND WATER QUALITY IN RAJASTHAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l			
1415	WELL OF LOONI, CHAUDHARY, NEAR NAYAGAON, PALLI, (1/5 1 KM. FROM PALLI TOWN)	RAJASTHAN	28	28	28	7.6	8.37	8	2800	1040	6600	0.9	1.47	1.19	1.14	4.2	2.67	4	7	6	20	460	240	1.55	1.6	1.58	
1416	WELL (1/5 1 KM FROM JODHPUR TOWN)	RAJASTHAN	24	24	24	8.5	8.64	8.6	8400	1590	1210	0	18.8	24.12	21.46	0.8	2.2	1.5	4	7	6	28	75	52	0.16	1.22	0.69
1706	RIICO PUMP HOUSE NEAR MONTO MOTORS, MIA, ALWAR	RAJASTHAN	30	30	30	7.6	7.65	7.6	1350	1410	1380	0.7	1.25	0.98	0.16	0.3	0.23	3	3	3	3	7	5	0.68	1.14	0.91	
1707	BORE WELL IN MOST ALKALIS & CHEMICALS, MIA, ALWAR	RAJASTHAN	32	32	32	8	7.78	7.8	1460	1460	1460	0.65	0.65	0.65	0.38	0.38	0.38	3	3	3	3	4	4	0.7	0.7	0.7	
1708	WELL KOTHI IN VILLAGE BAGAR RAJPUT, ALWAR	RAJASTHAN	29	29	29	7.5	7.73	7.6	1490	3100	2295	0.15	1.6	0.88	0.16	0.98	0.57	3	4	4	3	14	9	0.8	0.98	0.89	
1709	WELL AT VILLAGE SANTHALA VERY NEAR BHIWADI INDUSTRIAL AREA, BHIWADI	RAJASTHAN	30	31	30	7.2	8.06	7.6	2500	3300	2900	0.05	0.35	0.2	0.32	4.5	2.41	3	4	4	3	9	6	0.56	0.74	0.65	
1710	WELL AT VILLAGE ALPUR, VERY NEAR BHIWADI INDUSTRIAL AREA, BHIWADI	RAJASTHAN	29	29	29	7.7	8.6	8.2	1740	2400	2070	0.55	1.03	0.79	0.38	5.5	2.94	3	3	3	3	7	5	0.98	1.3	1.14	
1711	WELL AT VILLAGE HARCHANDPUR, VERY NEAR, BHIWADI TO BHIWADI INDUSTRIAL AREA, BHIWADI	RAJASTHAN	28	28	28	7.6	8.25	7.9	1640	4300	2970	0.4	0.6	0.5	0.3	0.48	0.39	3	3	3	3	7	5	0.98	1.14	1.06	
1712	WELL AT VILLAGE BHIWADI, VERY NEAR, BHIWADI TO BHIWADI INDUSTRIAL AREA, BHIWADI	RAJASTHAN	30	31	30	7.8	8.57	8.2	1520	1900	1710	0.32	1.05	0.69	0.3	0.8	0.55	3	3	3	3	9	6	0.2	0.64	0.42	
1713	WELL AT VILLAGE GATTAL, NEAR, BHIWADI TO BHIWADI INDUSTRIAL AREA, BHIWADI	RAJASTHAN	29	30	29	7.2	8.2	7.7	1470	1520	1495	1.2	5.24	3.22	0.08	18.9	9.52	3	4	4	3	20	12	0.4	0.52	0.46	
1715	HAND PUMP NEAR SECONDARY SCHOOL, ABOUT 300m FROM KANSUA NALLAH KOTA	RAJASTHAN	25	27	26	8.3	8.59	8.5	1510	1860	1685	0.45	1.28	0.87	2.74	6	4.37	3	3	3	4	4	4	0.98	1.12	1.05	
1720	CHAUDHARY KA WELL VILLAGE PANJALA, KOTAPUTALI NEAR ASSOCIATES ALCOHOL BREWERIES LTD JAIPUR	RAJASTHAN	28	28	28	7.9	8.08	8	1050	1470	1260	0.25	0.34	0.3	0.62	1.5	1.06	3	4	4	7	7	7	0.82	1.6	1.21	
1721	PHED WELL NEAR RAILWAY LINE JHOTAWARA, JAIPUR	RAJASTHAN	30	31	30	7.9	8.03	8	510	870	690	0.47	0.7	0.59	0.48	1.6	1.04	3	4	4	7	9	8	0.54	0.66	0.6	

TABLE - 20.12 : GROUND WATER QUALITY IN RAJASTHAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE			
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
WATER QUALITY CRITERIA						6.5-8.5						< 3 mg/l						< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l			
1722	PHED WELL NEAR NEI KHATIPURA	RAJASTHAN	28	30	29	7.2	7.43	7.4	1380	1510	1445	0.29	0.85	0.57	0.08	0.42	0.25	3	3	3	3	4	4	0.16	0.56	0.36	
1723	HAND PUMP OF VIDHANI VILLAGE GONER ROAD JAIPUR	RAJASTHAN	29	31	30	7.4	7.87	7.7	3000	3100	3050	1	1.2	1.1	0.16	6	3.08	3	4	4	7	20	14	1.15	1.5	1.33	
1724	WELL OF GOJAJARON KI TALAI, MOHANA ROAD SANGANER, JAIPUR	RAJASTHAN	30	31	30	7.9	8.21	8.1	1250	1530	1390	0.27	0.55	0.41	0.14	1.34	0.74	3	4	4	4	7	6	0.36	0.9	0.63	
1725	PUBLIC HAND PUMP BEFORE SANGANER PULIA	RAJASTHAN	28	31	29	7.3	7.5	7.4	660	1800	1230	0.33	0.75	0.54	0.02	0.38	0.2	3	4	4	3	9	6	0.2	0.52	0.36	
2015	PABUPURA ROAD NEAR CIVIL AIR PORT, JODHPUR (MANGILAL RATHOR)	RAJASTHAN	22	25	23	7.5	7.7	7.7	2900	3000	2950	2.75	4.53	3.64	0.21	0.4	0.31	3	4	4	7	14	11	1.32	1.6	1.46	
2016	VILLAGE VINAYAKA, JODHPUR (HIRALAL KUMHAR)	RAJASTHAN	23	24	23	7.4	7.5	7.5	2000	2200	2100	1.4	14.97	6	8.19	0.08	19.6	9.84	3	7	5	4	14	9	0.52	1.22	0.87
2017	VILLAGE VINAYAKA, JODHPUR (BADRI KUMHAR)	RAJASTHAN	23	23	23	7.4	7.6	7.5	2400	2600	2500	0.95	1.75	1.35	0.42	0.74	0.58	4	7	6	9	1100	555	0.4	0.64	0.52	
2018	VILLAGE VINAYAKA, JODHPUR (BIRJUM SINGH RATHORE)	RAJASTHAN	23	25	24	7.5	7.99	7.7	4300	4700	4500	1.25	1.3	1.28	1.2	1.6	1.4	4	4	4	9	210	110	0.98	1.6	1.29	
2019	NEAR UTI BRIDGE, UDAIPUR	RAJASTHAN	22	24	23	7.2	7.88	7.5	1710	2000	1855	0.24	7.2	3.72	0.16	1.82	0.99	3	4	4	4	28	16	0.28	0.52	0.4	
2020	NEW FATEHPURA, 200 FT FROM PANCHWATI NALLAH, UDAIPUR	RAJASTHAN	22	24	23	7.1	8.41	7.8	2200	2400	2300	0.09	10.6	5.35	0.92	1.66	1.29	3	3	3	7	7	7	0.38	0.56	0.47	
2021	NEAR ARVIND GENERAL STORE, ALOO FACTORY, KACCHI BASTI, SARBAPURA, UDAIPUR	RAJASTHAN	20	24	22	7.3	7.84	7.6	1610	3100	2355	0.7	12.2	6.45	1.14	6.24	3.69	3	4	4	4	20	12	0.36	0.82	0.59	
2022	NEAR RANA PRATAP NAGAR, RAILWAY STATION, UDAIPUR	RAJASTHAN	22	24	23	7.2	7.64	7.4	2300	2400	2350	1.52	2.1	1.81	0.58	11.2	5.89	3	7	5	7	460	234	0.86	1.14	1	
2023	HOTEL ORIENT PLACE, SUBHAS NAGAR, UDAIPUR	RAJASTHAN	21	23	22	7.3	7.57	7.5	1900	2200	2050	0.33	0.8	0.57	0.72	6	3.96	3	3	3	7	7	7	0.4	0.54	0.47	
2024	IN SIDE SHY TEMPLE NEAR AIR FORCE STATION AMER ROAD, JAIPUR	RAJASTHAN	28	30	29	7.1	7.41	7.3	1200	1400	1300	0.65	1.01	0.83	0.32	5.48	2.9	3	4	4	4	9	8	0.98	1.36	1.17	
2025	NEAR SHREE KALYANESHWAR MAHADEVY TEMPLE, JAI SINGH PURA KHURD, JAIPUR	RAJASTHAN	28	29	28	7.0	7.58	7.3	2400	2500	2450	0.24	0.55	0.4	0.08	0.38	0.23	3	4	4	4	7	6	0.28	0.74	0.51	
2026	NEAR FOJI NAGAR, KACCHI BASTI, AMBASARI, JAIPUR	RAJASTHAN	28	29	28	7.3	7.78	7.6	790	1020	905	0.85	1.21	1.03	0.22	5.48	2.85	3	3	3	7	9	8	0.16	0.38	0.27	
2027	NEAR ABN CENTRAL ACADEMY, SUSILPURA, SODALA, JAIPUR	RAJASTHAN	27	29	28	7	8.13	7.8	870	970	920	0.26	0.85	0.56	0.02	1.14	0.58	3	3	3	3	4	4	0.16	0.98	0.57	
2028	NEAR SAMSHAN VISHWAKARMA NAGAR, MANWARANEROM, JAIPUR	RAJASTHAN	27	29	28	7.5	7.9	7.7	1190	1220	1205	0.31	0.4	0.36	0.14	0.42	0.28	3	3	3	3	4	4	0.16	0.42	0.29	
2029	NEAR GANDHI BHWAN, AJMER	RAJASTHAN	22	22	22	7.5	8.11	7.8	660	710	685	0.3	0.8	0.55	0.08	0.22	0.15	3	4	4	7	9	8	0.16	0.3	0.23	

2030	OPPOSITE PRIVATE BUS STAND, AJMER	RAJASTHAN	22	24	23	7.1 9	7.37	7.3	3600	4300	3950	2.8	6.72	4.76	0.48	2	1.24	4	4	4	14	14	14	0.4	0.84	0.62	
2031	NEAR 9 NO. PETROL PUMP, NEAR ADARSH NAGAR GATE, AJMER	RAJASTHAN	23	23	23	7.5 8	7.55	7.5	1180	1270	1225	0.35	2.56	1.46	0.14	2.1	1.12	4	4	4	14	39	27	1.15	1.16	1.16	
2032	NEAR KHANPURA TALAB, AJMER	RAJASTHAN	23	23	23	7.2 6	8	7.6	4900	5000	5100	5	5.52	5.26	0.14	1.76	0.95	3	4	4	14	14	14	0.24	0.8	0.52	
2033	OUTSIDE JLN HOSPITAL, AJMER	RAJASTHAN	22	24	23	7.5 7	7.7	7.6	1200	1220	1210	0.45	0.8	0.63	0.3	2.46	1.38	4	7	6	9	150	80	0.16	0.68	0.42	
2957	WELL HAND PUMPS IN THE RICCO INDUSTRIAL AREA, BANSHWARA	RAJASTHAN	24	30	27	8.1 2	8.32	8.2	790	1010	900	0.95	2.38	1.67	0.64	1.2	0.92	3	3	3	7	7	7	0.9	0.96	0.93	
2958	WELL OF SH. BHURA RAM, KHETRI NGAR, JHUNJHUNJU	RAJASTHAN	26	34	30	7.3 3	7.3	7.3	4200	4200	4200	0.65	1.5	1.08	0.32	3	1.66	4	14	9	20	150	85	1.3	1.44	1.37	
2959	WELL OF SH. BRIJA RAM, KHETRI NGAR, JHUNJHUNJU	RAJASTHAN	27	34	30	7.3 7	7.41	7.4	4300	4400	4350	0.9	1.05	0.98	0.16	1.82	0.99	7	7	7	28	28	28	1	1.38	1.19	
2960	WELL INFRONT OF SINGHANA POLICE STATION, SINGHANA, JHUNJHUNJU	RAJASTHAN	8	34	4	7	7.45	7.4	3600	4100	3850	0.8	1.45	1.13	0.14	0.42	0.28	4	4	4	14	14	14	1.12	1.44	1.28	
2961	WELL OF SH. MURALI CHAND MEENA, MANPUR MACHERI, JAIPUR	RAJASTHAN	28	33	5	4	8.56	8.4	770	1800	1285	0.95	4.01	2.48	0.22	5.24	2.73	3	4	4	3	14	9	0.24	0.9	0.57	
2962	WELL OF SH. MOOL CHAND RAIGER, MANPUR MACHERI, JAIPUR	RAJASTHAN	28	34	31	8.1 1	8.15	8.1	730	740	735	1	1.4	1.2	0.02	2	1.01	3	3	3	7	7	7	0.16	0.84	0.5	
2963	WELL OF RICO AT LEATHER COMPLEX, MANPUR MACHERI, JAIPUR	RAJASTHAN	29	32	5	7.9 7.8	8.24	8.1	530	640	585	0.8	3.01	1.91	0.02	2.74	1.38	3	4	4	3	9	6	0.3	0.62	0.46	
2964	WELL AT INDIA PUBLIC SCHOOL, MANPUR MACHERI, JAIPUR	RAJASTHAN	28	32	30	5	8.1	8	500	950	725	0.5	0.8	0.65	0.14	1.14	0.64	3	4	4	4	7	6	0.28	0.74	0.51	
2965	SHRI GIRDHARI SINGH CHOUDHARY NEAR BANDI RIVER BRIDGE, PALI BYE PASS ROAD, PALI	RAJASTHAN	22	26	24	7.6 7	8.26	8	1050	1280	1165	0	0.5	1.71	1.11	0.16	1.68	0.91	4	7	6	9	2400	1205	1.28	1.56	1.42
2966	SHRI GIRDHARI SINGH RAJPUROHIT NEAR VILLAGE PUNAYATA, JOHPUR-SUMERPUR BYE PASS ROAD, PALI	RAJASTHAN	26	27	26	8.1 8	8.47	8.3	640	5000	2820	1	2.95	1.98	0.32	1.72	0.76	4	4	4	7	14	11	1.02	1.6	1.31	
2967	SH. POL SINGH PUROHIT, VILLAGE PUNAYATA, PALI	RAJASTHAN	24	28	26	7.9 9	8.24	8.1	5800	1190	8850	0.76	5.4	3.08	0.16	0.74	0.45	4	11	8	14	28	21	1.14	1.28	1.21	
2968	SH. BHANA RAM KALAL, DHARU NAGAR, NEAR NARI MANDIA ROAD, OPP. VILLAGE MANDIA, PALI	RAJASTHAN	26	28	27	8.0 7	8.47	8.3	6400	9400	7900	0.76	5.2	2.98	0.32	0.84	0.58	4	7	6	9	210	110	3.12	2.85	2.96	

TABLE - 20.12 : GROUND WATER QUALITY IN RAJASTHAN - 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE				
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean		
WATER QUALITY CRITERIA																												
2969	M/S SPECIALTY SILICA LTD., MHA ALWAR AGRO FOOD PARK, ALWAR	RAJASTHAN	32	32	32	7.2 7.1	7.24	7.2	880	880	880	1.4	1.4	1.4	0.72	0.84	0.78	4	4	4	14	14	14	0.4	0.4	0.4		
2970	RIICO TUBE WELL, RIA, BEHROR	RAJASTHAN	30	32	30	7.1 8	8.2	7.6	950	2100	1627	1.25	3.4	2.33	0.22	0.22	0.22	3	4	3	3	7	4	0.8	0.98	0.92		
2971	RIICO TUBE WELL, RIA, NEEMANA	RAJASTHAN	31	32	5	7.2 7	7.42	7.3	1760	1780	1770	0.15	0.25	0.2	0.14	0.38	0.26	3	3	3	3	7	5	0.8	0.96	0.88		
2972	RIICO TUBE WELL, RIA, SOTANALA	RAJASTHAN	30	30	30	7.4 4	8.66	8.1	2400	2400	2400	0.25	0.45	0.35	0.22	0.38	0.3	3	3	3	3	4	4	0.9	1.3	1.1		
2973	RIICO TUBE WELL, RIA, SHAHAJANPUR	RAJASTHAN	29	31	30	7.1 7	7.38	7.3	1560	5000	3280	0.59	1.7	1.15	0.16	0.32	0.24	3	3	3	4	9	7	0.7	0.92	0.81		
2974	VILLAGE AGYARA, TEHSIL- RAMGARH, ALWAR	RAJASTHAN	29	29	29	7.4 1	7.82	7.6	410	1310	860	0.2	0.6	0.4	0.16	0.48	0.32	3	4	4	3	7	5	1.1	1.15	1.13		
2975	VILLAGE BAGER MEO, TEHSIL- RAMGARH, ALWAR	RAJASTHAN	28	29	5	3	7.35	7.3	1560	3500	2530	0.6	1.8	1.2	0.14	0.16	0.15	3	4	4	3	7	5	1.02	1.1	1.06		
2976	SUJAN GANGA, BHARATPUR	RAJASTHAN	26	26	26	7.7 4	7.74	7.7	5400	5400	5400	20	20	20	0.3	0.62	0.46	4	4	4	14	14	14	0.96	0.96	0.96		
2977	WELL OF RAM CHANDRA DEWRA, VILLAGE- SANGARIA, JOHPUR	RAJASTHAN	23	25	1	3	7.8	7.7	0	1800	1860	1830	0	0.7	0.95	0.83	0.38	0.38	0.38	4	4	4	7	14	11	1.48	2.76	2.12
2982	WELL OF BIRMA RAM PATEL, SALAWAS, JOHPUR	RAJASTHAN	20	23	21	7.5 7.1	7.96	7.7	5500	8900	7200	3.15	4.05	3.6	0.08	0.62	0.35	3	4	4	9	14	12	1.62	1.6	1.56		
2985	WELL OF GIRDHARI RAM MEGHWAL, VILLAGE- NANDWAN, JOHPUR	RAJASTHAN	4	4	9	5	7.4	7.3	0	1420	1420	0	1.1	1.25	1.18	0.14	0.3	0.22	3	4	4	7	14	11	0.9	1.2	1.05	
2986	TUBE WELL OF GIRDHARI LAL, BHITUJA	RAJASTHAN	24	33	5	3	7.7	7.7	8100	0	0	0.1	1.2	0.65	0.02	0.42	0.22	3	4	4	9	20	15	1.3	1.42	1.36		
2987	CWR OF PHED, BHITUJA	RAJASTHAN	24	33	28	7.2 5	7.54	7.4	7600	8700	8150	0.06	1.2	0.63	0.22	0.3	0.26	4	4	4	7	150	79	1.32	1.36	1.34		
2988	WELL OF PEMA RAM MALI BHITUJA	RAJASTHAN	24	31	5	6.4	7.05	6.7	8400	0	9600	0.79	1.8	1.3	0.14	0.3	0.22	4	7	6	14	210	112	1.02	1.6	1.31		
2989	WELL OF BABULAL UKHAD, JI MALL SAKARNA BERA, BALOTRA, JOHPUR	RAJASTHAN	24	33	5	7.4	7.88	7.6	9400	1700	1320	0	1.24	2.15	1.7	0.08	0.08	0.08	3	3	3	4	7	6	1.38	1.58	1.48	
2990	WELL OF BHIKSINGH S/O AMAR SINGH PUROHIT, SAKARNA BERA, BALOTRA, JOHPUR	RAJASTHAN	24	33	28	7.1 2	7.75	7.4	8400	1050	9450	0.87	5.29	3.08	0.16	0.16	0.16	4	4	4	14	28	21	0.98	1.53	1.26		
2991	WELL OF BHAG JI LAXMAN RAM MALL SAKARNA BERA, BALOTRA, JOHPUR	RAJASTHAN	24	32	28	3	7.78	7.7	9700	1360	1165	0	0.07	0.81	0.44	0.16	0.22	0.19	4	7	6	14	20	17	1.36	1.44	1.4	
2993	WELL OF CHOUTHA RAM PUSA PAK, LEFT SIDE OF BRIDGE LUNI, BALOTRA	RAJASTHAN	24	30	27	7.3 1	7.57	7.4	0	1900	2400	2150	0	1.27	1.35	1.31	0.08	0.08	0.08	4	4	4	9	20	15	1.44	1.52	1.48
2997	TUBE WELL OF M/S P. PARIHAR INDUSTRIES, JASOL	RAJASTHAN	25	31	28	7.2 2	7.5	7.4	2000	2600	2300	1.35	3.4	2.38	0.02	0.14	0.08	3	4	4	9	11	10	1.26	1.34	1.3		
3000	BORE WELL SH. UMESH KUMAR S/O SH. HORIDWARI RAM 3A-16 UIT, BHITUJA	RAJASTHAN	29	29	29	8.2 8	8.22	8.2	3200	3200	3200	0.38	0.38	0.38	0.08	0.22	0.15	3	3	3	4	4	4	0.4	0.4	0.4		
3001	BORE WELL SH. BHIRAM JEET SERVICE STATION, BHIWADI	RAJASTHAN	28	29	5	7.2 8	8.16	7.7	1800	1820	1810	0.45	1.46	0.96	0.14	0.14	0.14	3	4	4	3	14	9	0.74	1.1	0.92		
3002	BORE WELL M/S R.C. PALACE HOTEL, BHIWADI	RAJASTHAN	28	29	28	7.8 4	8.49	8.2	910	950	930	0.92	1.05	0.99	0.38	9	4.69	3	3	3	3	4	4	0.98	1.1	1.04		
3003	BORE WELL OFFICE OF RAJ. HOUSING BOARD, BHIWADI	RAJASTHAN	28	31	5	1	8.4	7.8	3300	3500	3400	0.15	0.81	0.48	0.58	2.28	1.43	3	4	4	4	7	6	0.54	1.26	0.9		
3004	BORE WELL OF M/S MODERN PUBLIC SCHOOL, BHIWADI	RAJASTHAN	30	30	30	8.2 5	8.68	8.5	1000	1030	1015	0.81	1.2	1.01	0.3	1.76	1.03	3	3	3	4	7	6	0.28	1	0.64		
3006	HAND PUMP NEAR NEVTA TIRAHA, NEVTA DAM, SANGANER, JAIPUR	RAJASTHAN	27	28	5	1	8.42	8.4	1500	1510	1505	0.22	0.6	0.41	0.32	0.74	0.53	3	3	3	3	4	4	1.34	1.48	1.41		

TABLE 20.13 : GROUND WATER QUALITY IN UTTAR PRADESH & UTTARAKHAND- 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
WATER QUALITY CRITERIA																										
6.5-8.5																										
< 3 mg/l																										
< 2500 MPN/100ml																										
< 5000 MPN/100ml																										
< 1.0 mg/l																										

1658	NEAR RIVER KUSHABHADRA, PURI, ORISSA	ORISSA	30	30	30	7.8	7.8	7.8	573.2	573.2	573	0.9	0.9	0.9	0.85	0.84	0.85	2	2	2	2	2	2	2	0.0701	0.0701	0.07
------	--------------------------------------	--------	----	----	----	-----	-----	-----	-------	-------	-----	-----	-----	-----	------	------	------	---	---	---	---	---	---	---	--------	--------	------

TABLE 20.15 :- GROUND WATER QUALITY IN BIHAR – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
			6.5-8.5			< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l								
1825	PATNA	BIHAR	23	23	23	7.1	7.3	7.2	640	6922	3781	4	8	6	9	23	16	1	1	1
1826	PATNA	BIHAR	22	23	22	7.1	7.2	7.2	632	674	653	4	4	4	9	13	11	1	1	1
1827	PATNA	BIHAR	22	22	22	7.2	7.28	7.2	509	705	607	1	1	1	2	2	2	0.8	0.8	0.8
1828	PATNA	BIHAR	21	23	22	7.1	7.5	7.3	506	842	674	1	1	1	2	2	2	0.9	0.9	0.9
1829	PATNA	BIHAR	22	22	22	7.1	7.2	7.2	644	784	714	1	1	1	2	2	2	0.8	0.8	0.8
1830	MUZAFFARPUR	BIHAR	20	28	24	7.5	8.1	7.8	815	816	816	2	7	5	4	11	8	0.6	0.6	0.6
1831	MUZAFFARPUR	BIHAR	19	27	23	7.8	8.4	8.1	836	910	873	1	4	3	2	8	5	0.8	0.8	0.8
1832	BEGUSARAI	BIHAR	25	26	25	7.6	7.9	7.8	952	952	952	7	8	8	14	21	18	0.4	0.4	0.4
1833	BEGUSARAI	BIHAR	25	26	25	7.6	7.8	7.7	915	915	915	1	4	3	13	21	17	0.6	0.6	0.6
1834	PURNEA	BIHAR	25	26	25	7.5	7.8	7.7	462	462	462	8	13	11	11	22	17	0.8	0.8	0.8
1835	PURNEA	BIHAR	25	26	25	7.6	7.8	7.7	356	356	356	4	7	6	7	17	12	0.8	0.8	0.8
1836	BEGUSARAI	BIHAR	23	23	23	8	8	8.0	-	-	-	14	14	14	21	21	21			
1837	BEGUSARAI	BIHAR	23	25	24	7.8	7.8	7.8	856	856	856	4	9	7	7	22	15	0.8	0.8	0.8
1838	MUNGER	BIHAR	24	24	24	7.6	7.8	7.7	637	637	637	7	8	8	11	13	12	0.9	0.9	0.9
1839	MUNGER	BIHAR	24	24	24	7.6	7.6	7.6	962	962	962	2	2	2	4	4	4	0.9	0.9	0.9
1840	MOTHARI	BIHAR	19	28	23	7.6	8.2	7.9	480	542	511	1	8	5	2	17	10	0.8	0.8	0.8
1841	GAYA	BIHAR	22	24	23	8.1	8.21	8.2	1036	1034	1015	9	11	10	22	27	25	0.8	0.8	0.8
1842	GAYA	BIHAR	22	22	22	8.6	8.61	8.6	484	502	493	1	2	2	2	3	3	0.6	0.6	0.6
1843	RAJGIR	BIHAR	22	22	22	8	8.18	8.1	516	532	524	4	7	6	14	14	14	0.9	0.9	0.9
1844	CHAPRA	BIHAR	23	24	23	7.8	8.62	8.2	414	484	449	2	9	6	4	21	13	0.8	0.8	0.8
2576	AURANGABAD	BIHAR	23	23	23	7.4	7.42	7.4	532	564	548	4	7	6	11	11	11	0.9	0.9	0.9
2577	ARRARIA	BIHAR	25	26	25	7.5	7.8	7.7	668	668	668	8	17	13	17	26	22	0.9	0.9	0.9
2578	BHOJUPUR	BIHAR	23	24	23	8	8.14	8.1	563	584	574	2	4	3	4	8	6	1	1	1
2579	WELL-1 AT BUXAR	BIHAR	24	27	25	8.1	8.18	8.1	552	562	557	4	4	4	7	8	7.5	0.8	0.8	0.8
2580	BHABHUA	BIHAR	22	24	23	7.2	7.24	7.2	780	810	795	4	8	6	9	13	11	0.8	0.8	0.8
2581	WELL-1 AT DARBHANGA	BIHAR	25	25	25	7.6	7.66	7.7	410	410	410	13	13	13	23	23	23			
2582	WELL-2 AT DARBHANGA	BIHAR	26	26	26	7.7	7.72	7.7	440	440	440	23	23	23	50	50	50			
2583	WELL-1 AT GOPALGANJ	BIHAR	22	23	22	8.3	8.82	8.6	512	552	532	4	4	4	8	9	9	0.8	0.8	0.8
2584	WELL-2 AT GOPALGANJ	BIHAR	23	23	23	8	8.3	8.0	790	862	826	1	4	3	2	11	7	0.9	0.9	0.9
2585	JAHANABAD	BIHAR	20	27	23	7.8	8	7.9	552	610	581	4	7	6	7	17	12	0.8	0.8	0.8
2586	KATIHAR	BIHAR	28	28	28	7.5	7.5	7.5	672	672	672	7	7	7	17	17	17	0.9	0.9	0.9
2587	KHAGARIA	BIHAR	25	26	25	7.6	7.9	7.8	854	854	854	8	8	8	13	23	18	0.8	0.8	0.8
2588	KISHANGANJ	BIHAR	25	26	25	7.6	7.8	7.7	558	558	558	7	11	9	11	21	16	0.9	0.9	0.9
2589	MADHEPURA	BIHAR	26	28	27	7.5	7.8	7.7	940	940	940	4	13	9	11	22	17	0.8	0.8	0.8
2590	WELL AT MADHUBANI	BIHAR	25	25	25	7.5	7.53	7.5	572	572	572	8	8	8	14	14	14			
2591	WELL-1 AT NALANDA	BIHAR	21	23	22	8.2	8.21	8.2	694	716	705	2	7	5	17	17	17	0.6	0.6	0.6
2592	WELL-2 AT NALANDA	BIHAR	22	22	22	7.3	7.41	7.4	705	754	730	4	4	4	9	13	11	0.6	0.6	0.6
2593	NAWADAH	BIHAR	23	24	23	7.2	7.22	7.2	884	916	900	4	7	5.5	8	11	10	0.8	0.8	0.8
2594	SAHARSA	BIHAR	26	28	27	7.5	7.8	7.7	686	686	686	7	11	9	17	21	19	0.4	0.4	0.4
2595	SAMASTIPUR	BIHAR	27	27	27	7.2	7.27	7.3	829	829	829	4	4	4	11	11	11			
2596	SITAMARHI	BIHAR	23	26	24	7.5	8.4	8.0	454	812	633	1	7	4	2	17	9.5	0.6	0.6	0.6
2597	SIWAM	BIHAR	24	24	24	7.7	7.7	7.7	510	556	533	4	8	6	11	17	14	0.9	0.9	0.9
2598	WELL-1 ROHTAS	BIHAR	23	23	23	7.9	8.11	8.0	402	416	409	1	4	3	2	11	7	0.6	0.6	0.6
2599	WELL-2 ROHTAS	BIHAR	22	24	23	7.4	7.52	7.5	901	946	924	2	4	3	4	11	8	0.8	0.8	0.8
2600	VAISHALI	BIHAR	25	26	25	7.5	8.1	7.8	766	905	836	2	7	4.5	4	11	8	0.6	0.6	0.6

TABLE 20.16 :- GROUND WATER QUALITY IN WEST BENGAL – 2011

STATION CODE	LOCATIONS	STATE	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			B.O.D. (mg/l)			NITRATE-N+ NITRITE-N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)			FLUORIDE		
			Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
			6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 5000 MPN/100ml			< 1.0 mg/l											
1766	MINE PIT WATER ASSANSOL, WEST BENGAL	WEST BENGAL	30	30	29	7.8	7.94	7.9	723	737	730	0.9	2.09	1.5	9.05	11.2	13	13	13	23	23	23	0.51	0.51	0.51	
1767	DURGAPUR TOWN, NEAR ISSCO, WEST BENGAL	WEST BENGAL	29	33	31	7	8.04	7.5	898	1015	957	0.96	2.03	1.5	0.29	0.30	0.29				0.4	0.4	0.4			

