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STATUS OF WATER QUALITY IN INDIA- 2007

CENTRAL POLLUTION CONTROL BOARD
MINISTRY OF ENVIRONMENT & FORESTS
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FOREWORD

In order to effectively plan and execute nation wide programme on water pollution control, it is essential to keep continuous watch on water quality of different important water bodies in the country. The data generated through this exercise help in assessing the nature and magnitude of pollution control required and in evaluating effectiveness of pollution control efforts. Keeping this in mind, CPCB has adopted a National Water Quality Monitoring Programme and at present water quality monitoring is carried out at 1245 stations located on all important rivers and lakes as also some of the groundwater wells. The data generated through this exercise are transmitted to CPCB, and are scrutinized, analysed and put on website of CPCB for public use. The data collected during 2007 are presented in this Report.

The data collected during 2007 indicate that organic pollution, as indicated by Biochemical Oxygen Demand (BOD) and Coliform counts, continue to be the major water quality issues in our country. Out of 6000 observations taken, as many as 69 % showed BOD to be within the acceptable range of 3 mg/l. Similarly 66 % of observations showed Fecal Coliform to be within the acceptable range of less than 500 MPN/ 100 ml. Based on these results the polluted stretches are to be identified and restoration plan implemented by the concerned State Pollution Control Boards / Pollution Control Committees.

The contribution of Ms.Garima Dublish, Ms.Sandhya Shrivastava and Ms.Shweta Gaur, all Junior Research Fellows and Shri R.M.Bhardwaj, Scientist,'C' in compilation of data and preparation of this Report under the supervision of Dr.R.C. Trivedi, Additional Director is worthy of appreciation. The co-operation extended by State Pollution Control Boards, Pollution Control Committees and Zonal Offices of Central Pollution Control Board in this national endeavor is gratefully acknowledged.

I hope, this Report will be useful to all concerned with water quality management and its restoration to pristine purity.

17 July, 2008

(J.M.Mauskar)

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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.

During 2007 the highest BOD (one of the most important indicators of pollution) was observed in rivers Amlakhedi (522 mg/l) followed by Sabarmati (310 mg/l), Kalinadi (233 mg/l), Markanda (218 mg/l), Khan (125 mg/l), Hindon (120 mg/l), Yamuna (93 mg/l), Ghaggar (81 mg/l), Musi (51 mg/l), Birupa (42 mg/l), Cauvery (38 mg/l), Kharoon (38 mg/l), Sukhana (36 mg/l), Bharalu (36 mg/l), Godavari (36 mg/l), Kuakhai (36 mg/l), Kathajodi (36 mg/l), Chambal (34 mg/l), Seonath (30 mg/l), Bhima (28.6 mg /l), Satluj (28 mg/l), Ib (25.2 mg/l), Tapi (25 mg/l), Kali-Hindon (24 mg/l), Girna (23 mg/l), Bhadra (22.5 mg/l), Khari (19 mg/l), Kolak (19 mg/l), Manjira (18 mg/l), Tunghabhadra (16.5 mg/l), Damanganga (16 mg/l), Kshipra (15 mg/l), Nambul (14.6 mg/l), Ganga (14 mg/l), Ramganga (14 mg/l), Tunga (13.5 mg/l), Karamana (13.2 mg/l), Gomti (12 mg/l), Nira (11.5 mg/l), Deepar Bill (11 mg/l), Chandrabhaga (10.2 mg/l), Laxmantirtha (10 mg/l) and Krishna (9.8 mg/l). The relatively low values of BOD are measured in river(s) Beas, Mahi, Narmada, Brahmaputra, Mahanadi, Pennar, Baitarni and Brahmani.

Very high values of Biochemical Oxygen Demand (BOD) observed in Lakes, Ponds and Tanks are Elangabeel System (174.0 mg/l) in Assam, Saroonagar, Ranga Reddy Dist. A.P (24 mg/l), Udhagamadalem Lake (Ooty) (21 mg/l), Heballa Valley Lake, Mandya (18 mg/l), Hussain Sagar Lake, Budamaru, A.P (16 mg/l), Bahour Lake (14 mg/l), Pushkar Lake (13.3 mg/l), Oruvathilkotta Lake (12.2 mg/l), Bindu Sarovar at Siddhpur, Patan, Gujarat (12 mg/l), Osteri Lake (12 mg/l), Sursagar Lake (11 mg/l), Udaisagar Lake (10.8 mg/l) and Thol Tank (Kalol) (Dist. Mehasana) (10 mg/l).

The level of DO is observed more than 4 mg/l in river Narmada, Brahmaputra, Mahanadi, Brahmani, Baitarni, Subernarekha and Beas throughout the year to sustain aquatic life whereas, the values less than 4 mg/l are observed in stretches of river Satluj (3.2 mg/l), Ganga (1.4 mg/l), Yamuna (0.0 mg/l), Hindon (0.0 mg/l), Mahi (0.4 mg/l), Gomti (1.1 mg/l), Dhansiri (1.2 mg/l), Sabarmati (0.0 mg/l), Shedi (3.7 mg/l), Godavari (3.2 mg/l), Tapi (3.7 mg/l), Krishna (3.0 mg/l), Bhima (1.7 mg/l), Panchaganga (2.3 mg/l), Musi (0.0 mg/l), Pennar (2.8 mg/l), Cauveri (0.0 mg/l), Damanganga (3.1 mg/l), Karamana (0.0 mg/l), Ghaggar (1.0 mg/l), Swan (2.4 mg/l), Himachal Pradesh, Kali (East) (0.0 mg/l), Kali (West) (0.0 mg/l), Chambal (0.0 mg/l), Bharalu (0.0 mg/l), Sankh (1.9 mg/l), Maner (2.9 mg/l), Lakshmantirtha (0.0 mg/l), Bhavani (2.8 mg/l), Kolak (2.8 mg/l), Mindhola (2.5 mg/l), Periyar (2.7 mg/l), Pamba (3.7 mg/l), Manimala (0.6 mg/l), Irumpanam (2.2 mg/l), Markanda (1.0 mg/l), Sukhna (3.0 mg/l), Imphal (3.4 mg/l), Khuga (3.8 mg/l), Ganol (1.4 mg/l), Simsang (2.0 mg/l), Gumti (3.7 mg/l),

Sekmai (3.2 mg/l) and at few locations downstream of urban settlements due to discharge of untreated/partially treated municipal wastewater, which is responsible for high oxygen demand.

Total Coliform and Faecal Coliform Numbers are observed very high in river Yamuna with highest count of $32X10^7$ MPN/100 ml and $23X10^7$ MPN/100 ml respectively followed by Kali ($35X10^6$ MPN/100 ml and $16X10^4$ MPN/100 ml), Hindon ($35X10^6$ MPN/100 ml and $16X10^4$ MPN/100 ml), Chambal($87X10^5$ MPN/100 ml and $22X10^3$ MPN/100 ml), Damodar ($45X10^5$ MPN/100 ml and $25X10^5$ MPN/100 ml), Ghaggar ($35X10^5$ MPN/100 ml and $23X10^4$ MPN/100 ml), Ganga ($31X10^5$ MPN/100 ml and $7X10^5$ MPN/100 ml), Tons river ($131X10^4$ MPN/100 ml and 121 $X10^2$ MPN/100 ml), Rupnarayan ($7X10^5$ MPN/100 ml and $4X10^5$ MPN/100 ml), Kali-Hindon ($27X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Brahmaputra ($24X10^4$ MPN/100 ml and $24X10^4$ MPN/100 ml), Bharalu ($24X10^4$ MPN/100 ml and $24X10^4$ MPN/100 ml), Bhogdoi ($24X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Satluj ($17X10^4$ MPN/100 ml and $9X10^4$ MPN/100 ml), Kathajodi ($16X10^4$ MPN/100 ml and $92X10^3$ MPN/100 ml), Gomti ($16X10^4$ MPN/100 ml and $9X10^4$ MPN/100 ml), Barakar ($16X10^4$ MPN/100 ml and $5X10^4$ MPN/100 ml), Mindhola ($11X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Borak ($11X10^4$ MPN/100 ml and $15X10^3$ MPN/100 ml), Sabarmati ($75X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Krishna ($716X10^2$ MPN/100 ml and 1600 MPN/100 ml), Brahmani ($54X10^3$ MPN/100 ml and $22X10^3$ MPN/100 ml), Tapi ($46X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Kathakal river ($46X10^3$ MPN/100 ml and $93X10^2$ MPN/100 ml), Baleshwar Khadi ($46X10^3$ MPN/100 ml and $24X10^3$ MPN/100 ml), Purna ($46X10^3$ MPN/100 ml and $24X10^3$ MPN/100 ml), Karmana ($39X10^3$ MPN/100 ml and $31X10^3$ MPN/100 ml), Godavari ($36X10^3$ MPN/100 ml and 2200 MPN/100 ml), Mahanadi ($35X10^3$ MPN/100 ml and $17X10^3$ MPN/100 ml), Kuakhai ($35X10^3$ MPN/100 ml and $17X10^3$ MPN/100 ml), Nagavalli ($35X10^3$ MPN/100 ml and 2600 MPN/100 ml), Cauvery ($28X10^3$ MPN/100 ml and $17X10^3$ MPN/100 ml), Valvant ($24X10^3$ MPN/100 ml and $16X10^3$ MPN/100 ml), Kaveri ($24X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Mahananda ($22X10^3$ MPN/100 ml and $4X10^3$ MPN/100 ml), Bhavani ($22X10^3$ MPN/100 ml and 3300 MPN/100 ml), Ambika ($21X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Kalna ($16X10^3$ MPN/100 ml and 9200 MPN/100 ml), Khandepar ($16X10^3$ MPN/100 ml and 9200 MPN/100 ml) and Sikrana ($16X10^3$ MPN/100 ml and $9X10^3$ MPN/100 ml) at certain other locations. The river Mahi, Subernarekha, Pennar, Beas, Baitarni and Narmada are relatively clean rivers as the number of Total Coliform and Faecal Coliform count are relatively less than 4300 MPN/100 ml and 1700 MPN/100 ml respectively.

The monitoring results obtained during 2007 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 69% of the observations are having BOD less than 3 mg/l, 18% between 3-6 mg/l & 13% 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 66% observations are having Faecal Coliform less than 500 MPN /100 ml.

- Water quality of river Satluj at D/s of Budhanala in Ludhiana, at Boat Bridge Dharmkotnakodar Road, Bridge Harike at Amritsar, at D/s of East Bein in Jallandhar, river Swan at D/s Nangal and river Sirsa D/s Nalagarh (Distt. Solan) found deteriorated and degraded as compared to stipulated requirement.

- River Ganga at downstream of Haridwar D/s, Garhmukteshwar, Narora, Kannauj, Bithoor, Kanpur, Allahabad, Varanasi, Trighat, Behrampur, Dakshineshwar, Garden Reach, Uluberia, Diamond Harbour, Dalmau (Raibareilly) and Palta is not meeting the desired water quality for bathing as well as organized water supply for drinking purpose. The water quality of river Yamuna is deteriorated at Paonta Sahib, Kalanaur, Sonipat, Palla, Nizammudin, Okhla, Mazawali, Mathura, Agra, Bateshwar, Etawah, Juhika and Allahabad. After the intake point of Warzirabad Barrage river Yamuna does not confirm to criteria for beneficial uses for over 500 km that extends beyond Etawah. Water quality at Okhla, Nizammudin Bridge is worst affected due to high BOD and Ammonia in the river Yamuna. Other tributaries having higher concentration of pollutants are Khan at Kabit Khedi; Hindon at Saharanpur downstream, Puramahadev and Ghaziabad; Kalinadi (West) at Downstream of Muzaffarnagar; Kali (tributary of river Ganga) along Gulaothi and Kannuaj; Ramganga at Kannuj; Gomti at Jaunpur D/s, Sitapur, Varanasi and Lucknow; Sikrana at Chanpatiya; River Chambal at Nagda, Rameshwarghat, Gandhi Sagar Dam and Kota D/s; River Kshipra at Siddhawat, Ramghat and Triveni Sangam; Tons at Madhavgarh; Mandakini at Chitrakoot; River Damodar near Mujher mana village, Haldia Downstream and Narainpur; Rapti after conflunce of River Honin; Saryu at Ayodhya; Parvati near intake point Pillukhedi Distt. Rajgarh; Sone at Koelwar; Betwa B/C Yamuna at Hamirrpur are also not meeting the desired criteria.

- The mainstream of River Brahmaputra is exceeding the criteria at Kherghat, Nimatighat, Chandrapur (Guwahati), Sualkuchi, Dhenukhapahar and Jogigopa. The tributary streams Digboi, Bharalu, Deeparbil, Dhansiri, Burhiding, Mora Bharali, Kolong and Borak are also polluted and not conforming to the desired criteria.

- River Mahi is conforming to the desired water quality at all the monitoring stations except at Vasad, Mujpur, Veerpur in Gujarat.

- River Sabarmati is grossly polluted at Kheroj Bridge, Dharoi dam, Village Miroli Taluka, V.N.Bridge, Hansol Bridge and in the reach of Ahmedabad to Vautha. Water quality of tributary streams Shedi and Khari are grossly polluted with respect to BOD, Total and Faecal Coliforms and very high dissolved solids content in terms of Conductivity.

- The mainstream of River Narmada and tributary stream Chota Tawa are confirming to water quality for all the criteria parameters.

- The water quality of mainstream of river Tapi is exceeding criteria limits at Uphad village, Ajnad village, Bhusawal upstream, Ukai, Mandavi, Kathore, Surat and tributary stream Girna at Malegaon & Jalgaon and Rangavali at Navapur.

- The water quality of mainstream of Mahanadi does not meet the criteria with respect to BOD at downstream of Rajim in Chattisgarh; and Cuttack and Sambhalpur in Orissa due to discharge of untreated sewage from cities. The Water Quality of tributary stream Seonath, Ib and Birupa are complying to the water quality criteria. Other streams such as Arpa at Bilaspur, Kuakhai downstream of Bhubaneshwar, Kathajodi downstream of Cuttack and Birupa at Choudwar are not meeting the criteria limit in respect of BOD.

- The water quality of mainstream of Brahmani with respect to BOD, Total and Faecal Coliform is exceeding the criteria limit at downstream of Panposh due to wastewater discharges from the industrial and residential complexes of Rourkela, Talcher, Bhuban and Dharamashala. The water quality of tributary stream Koel is not meeting the criteria with respect to indicator of organic pollution. The water quality of major tributary streams Baitarni is complying with the criteria limit.

- In river Subarnarekha, BOD is exceeding the criteria limit at Ranchi Tatisilwai.

- The water quality of river Godavari at Nasik D/s, Panchavati at Ramkund and U/s of Gangapur Dam at Nasik in Maharashtra does not meet the criteria due to proximity of large city. Manjira near Ganapati Sugars, Nira at Pulgaon cotton mill, Kolar before confluence to Kanhan at Kamptee & D/s of Nagpur, Wardha at Rajura Bridge, Purna at Dupeshwar, Wainganga at Ashti & A/c with Kanhan in Maharashtra and Maner at Warangal U/s in Andhra Pradesh are not meeting the criteria for BOD.

- River Krishna does not meet the water quality criteria at Sangli, Krishna Bridge-Karad, Mahabaleshwar(Dhom dam near Koina dam), Rajapur weir, Kurndwad (Kolhapur), Vedadri (Guntur), Hamsala Devi (Guntur) and U/s of Ugarkhurd barrage. River Bhima at Pune u/s, Vitthalwadi, d/s of Bundgarden(Pune), Pargaon after confluence with Mula Mutha, Narsinghpur D/S after confluence with river Nira and D/s of Road Bridge at Gangapur Village; Nira at Sarole bridge on Pune-Bangalore highway; Panchganga D/s of Kolhapur town and at Ichalkaranji; Tunghabhadra at Honnali Bridge, Haralehalli Bridge, Ullanur and Mantralayam; Tungha at D/s of Shimoga Town; Bhadra at D/s of KIOCL Road Bridge near Holehunnur & D/s of Bhadrawati; Chandrabhaga U/s & D/s of Padharpur Town and Musi D/s of Hyderabad are potentially polluted locations having higher BOD levels.

- River Pennar is meeting the desired water quality criteria at all locations.

- The Water Quality of River Cauvery is not meeting the desired water quality criteria at Erode near Chirapallayam, Pitchavaram, Trichy at Grand anaicut and Tiruchirapalli D/s whereas the tributary streams not meeting the criteria are Bhavani at Bhavani Sagar and Lakshamantirtha at D/s of Hunsoor Town.

- Kolak at Vapi; Ambika at Billimora; Amlakheri at Ankleshwar; Baleshwar Khadi; River Purna; Dhadar at Kothada; Mindhola and Kaveri at Valsad road in Gujarat are exceeding the criteria limit for BOD. River Madai at Dabos- Valpoi in Goa is not meeting the criteria limit. River Patalganga at Shilphata and near intake of MIDC Water Works; Kundalika at Roha city; river Ulhas at U/s of Badlapur & upstream of NRC Bund at Mohane; Bhatsa at D/s of Pise Dam and Kalu at Atale village in Maharashtra are not meeting the criteria due to higher level of BOD in these rivers. The rivers in Kerala are meeting the criteria limit for BOD except Karmana at Moonnattumukku, Irupanamn, Amravila and Muvattapuzha. BOD observed more than criteria limit in river Arasalar in Pondicherry; Tambiraparani at Rail Bridge Ambasanudam, Arumuganeri, Muraepanadu and Tirunelveli and Palar at Vaniyambadi Water Supply Headworks. The river Ghagger is grossly polluted at majority of monitoring locations such as at D/s Patiala, Moonak, U/s & D/s Sardulgarh, Ratanheri D/s of Patiala Nadi, D/s of Chhatbir, Derabassi, Mubarakpur Rest House, U/s & D/s of Jharmal nadi, Chandrapur Syphon, U/s of Dhakansu nallah, GH-1 at road bridge in Sirsa and before Ottu weir due to the discharge of municipal and industrial wastewater. River Sukhna at Parwanoo and Markanda at D/s of Kala Amb are grossly polluted locations. N-choe, Patiala ki Rao and Sukhna choe are grossly polluted tributary streams of river Ghaggar carrying the waste water of Chandigarh. River Nambul at Hump Bridge and at Heirangoithong (Manipur), River Umtrew at Byrnihat East and River Kharkhala near Sutngan and Haora River at Chandrapur (Agartala) are observed as polluted due to high level of BOD.

- Three creeks in the vicinity of Mumbai are having high concentration of BOD and conductivity due to discharge of waste water from metropolitan region and effect of sea water respectively.

- The Western Yamuna canal downstream of Yamuna Nagar at Damla is grossly polluted due to municipal and industrial waste water disposal. Similarly Pragati Vidhya Bhawan Canal in Agartala is also not meeting the criteria limits.

- Lakes and Tanks having high concentration of organic matter and does not comply to the standard limits for BOD are Hussain Sagar Lake, Dharamsagar Tank (Warangal), Bibinagar Tank, Saroornagar Lake, Pulicate Lake, Heballa Valley Lake, Kayamkulam Lake, Ulsoor Lake, Bahour Lake, Osteri Lake, Alappuzha Lake, Udhagamandalam Lake, Kodai Kanal Lake, Oruvathikotta Lake, Kochi Oil Tanker Jetty, Lower Lake (Bhopal), Udaisagar Lake, Fateh Sagar Lake, Nakki Lake, Kaylana Jheel, Kankoria Lake, Sursagar Lake, Bindu Sarovar (Siddhapur), Thol Tank, Kheta Talav (Nadiad), Narsimehta Talav (Junagarh),

- The groundwater monitoring locations observed with high conductivity which exceeds water quality criteria for irrigation are observed at Rama Temple (Visakhapatnam); Panchayat Office (Bolaram); Open well near Pratap Nagar bridge (Kakinada); Peddanuyyi (Vizianagram); bore well near Swarnamukhi River (Srikalahasti- Chittoor); near Ckm College (Enumamula (V)- Warangal) and Nagiri (Chittoor-Andhra Pradesh). Conductivity observed high in well at Nehru Statue (Vadamattai) and well near Chunmbar River (Pondicherry) due to sea water intrusion; at Mira-Bhayander, Mehsana, Narole-Ahmedabad, Palghar, Surendranagar, Nadiad, Nandesari, Bhuj and Dahanu (Gujarat); Rasulwadi-Sambalwadi, Khanjirenagar, Ichalkaranji, Savali, Sangli, Parvati Industrial Estate-Sherole, Bhahmni Kalmeshwar (Nagpur) in Maharashra; Village Vinayakia (Jodhpur); Near Khanpura Talav,Opp. Private Bus Stand & Outside JLN Hospital in Ajmer; Nayagaon in Pali, village Bagar Rajput (Alwar); Pabupura road near Civil Airport (Jodhpur); near Kansua Nallah (Secondary School-Kota); Vidhani village, Goner road & Near Shri Kalyaneshwar Mahadev Temple Jaisingh Pura Khurd (Jaipur); Hotel Orient Place (Subhash Nagar-Udaipur); and village Harchandpur (Bhiwadi Industrial Area) in Rajasthan; and Sahibabad industrial area Ghaziabad & Roadways Bus Station Unnao (Uttar Pradesh).

  Groundwater locations with BOD levels higher than the criteria are east of Saichevuru Padipally, Warangal Distt., Open Well Bhoomaiah near Ash Pond Of NTPC in Kundanpally and Ramagundam (Karimnagar) in Andhra Pradesh; Guwahati, Berpeta and Sibsagar in Assam; Shimla D/s of MSW Dumping Site in Himachal Pradesh; bore well near Chunmbar River and Nehru Statue in Pondicherry; Collector well at Thirupuvanam for Madurai water supply scheme in Tamilnadu; MSW site Pathardi Nasik, BMW site Burudgaon Ahmednagar, Bhahmni Kamleshwar & Koradi (Nagpur), Industrial Estate Tarapur & TPS Durgapur (Chandrapur), Mira Bhayander (Vasai), MSW site (Taloja-Raigad) in Maharashtra; Well near Pali town and well near Jodhpur Town in Rajasthan; and Sardar Nagar and Captain Ganj in Uttar Pradesh.

  The nitrate concentration observed high than the desired criteria at B/w near M/s Andhra Sugars Ltd. Kovvur (Warangal) and Peddanuyyi – Vizianagaram in Andhra Pradesh. Total Coliforms are not meeting the desired criteria in ground water at open well Near Pratap Nagar Bridge (Kakinada), B/w near M/s Andhra Sugars Ltd. Kovvur (Warangal) and Peddanuyyi – Vizianagaram in Andhra Pradesh; Silchar, Guwahati and Bonaigaon in Assam. pH is observed below 6.5 at Ckm College in Andhra Pradesh; Silchar and Guwahati in Assam; Ramhlum (Northern Part) in Mizoram; Kunjban & A.D.Nagar, Agartala in Tripura; Industrial Area Govindpura, Bhopal in Madhya Pradesh; Dasmesh Nagar, Ludhiana in Punjab; Eloor, Chungapally, Pappanamkode & Nedumangad in

Thiruvananthpuram, Kundra in Kollam, Cherthala in alleppy, Edayar & Kalamassery in Ernakulam, Punkunnam Trissur Distt., Payyannur in Kunnur and Mavoor, Kozhikkode in Kerala; Well at Kalapet in Pondicherry Univ. Admn. Block & Mettopalayam in Pondicherry; Parvati Industrial Estate, Shirol, Khanjirenagar, Ichalkaranji and MIDC, Shinoli in Maharashtra and M/s Kanoria Chemical, Sonbhadra in Uttar Pradesh.

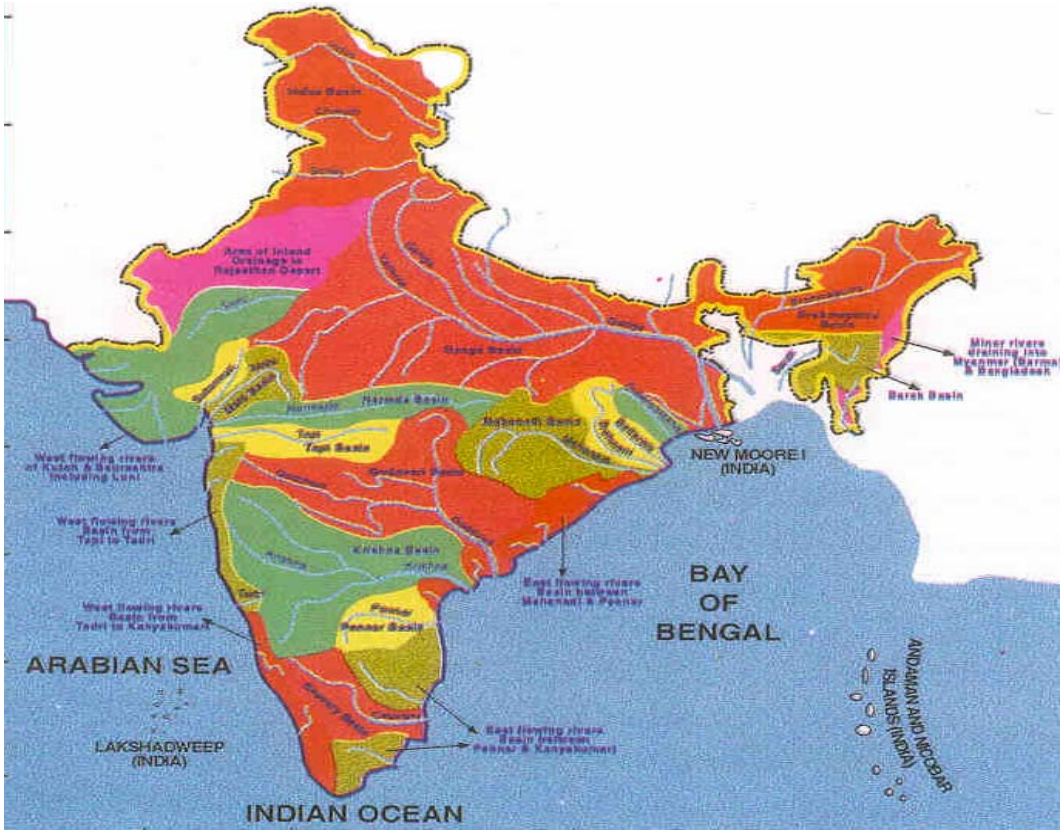
CHAPTER - I

Introduction and Methodology of National Water Quality Monitoring Programme

1.1 Introduction

In order to perform the functions specified under the Water (Prevention and Control of Pollution) Act, 1974, Central Pollution Control Board (CPCB) and State Pollution Control Boards/Pollution Control Committees (SPCBs/PCCs) need adequate knowledge on nature and extent of pollution control required in different parts of the country. Also they have to evaluate performance of the pollution control efforts. To achieve this, a continuous water quality monitoring is required. Realising this CPCB in collaboration with concerned SPCBs/PCCs established a wide network of water quality monitoring.

1.2 Water Resources of India



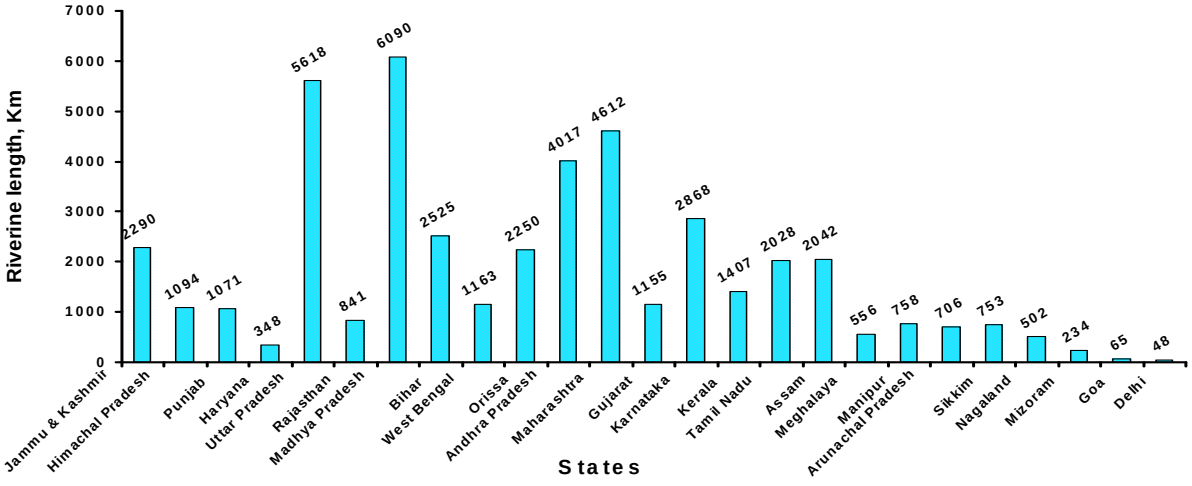
India receives 4000 Km^3 of water through rainfall. Of this 3/4 part occurs only during monsoon. The surface flow is estimated as 1880 Km^3. The annual replenishable ground water resources are assessed to be about 600 Km^3 of which the annual usable resources are estimated at 420 Km^3. Inland water resources of the country are classified as rivers and canals; reservoirs; tanks and ponds; beels, oxbow

lakes, derelict water; and brackish water. Other than rivers and canals, total water bodies cover an area of about 7 million hectare. Statewise details of inland water resources are given in table 1; there are few desert rivers, which flow for some distance and get lost in deserts. There are complete arid areas where evaporation equals rainfall and hence no surface-flow. The medium and minor river basins are coastal rivers. The Brahmaputra, Ganga, Indus and Godavari putting together cover more than half of the area of the country. The whole of the west coast stretching 1500 km between Surat in Gujarat and Cape Comorin in Tamilnadu are fed by fourteen medium and eighteen minor river basins leaving important cities like Bombay, Panaji, Cochin, Trivandrum out of major river basins. On the east coast of Peninsular India there are three pockets, which are out of any major river basins. These three pockets are: the area south of River Cauvery starting from Madurai to Cape Comorin; the area between Pennar and Cauvery basin wherein Chennai and Pondicherry are located; and the area between Mahanadi and Godavari basins in Orissa coast. There is a tremendous variation both in the quantity of discharge from a major basin to minor one and also in the quality of discharge from region to region.

1.2.1 Surface Water

All the major river basins are not perennial. Only four of the thirteen major basin posses areas of high rainfall, i.e. Brahmaputra, Ganga, Mahanadi and Brahamani having annual average discharge of a minimum of 0.47 million cubic meter per Km^2, and they are perennial. Six basins (Krishna, Indus, Godavari, Narmada, Tapi and Subernarekha) occupy the area of medium rainfall and have annual average discharge of a minimum of 0.26 million cubic meter per Km^2, and the remaining four (Cauvery, Mahi, Sabarmati and Pennar) occupy the area of low rainfall and have annual average discharge between of 0.06 and 0.24 million cubic meter per Km^2. Thus, many of the major river basins also go dry during summer leaving no available water for dilution of waste water discharged in them. State wise perennial riverine length in India is given in figure 1.1. The riverine length in Uttar Pradesh is inclusive of Uttaranchal. Similarly, the Chattisgarh is covered under Madhya Pradesh; and Jharkhand under Bihar.

Figure 1.1 : State-wise Perennial Riverine Length in India



1.2.2 Ground Water

Total replenishable ground water potential of the country, has been estimated by Ministry of Water Resources as 431 Km^3 cubic kilometre per year. After making provision for drinking, industrial and other purposes (other than irrigation), which is about 16 percent of total potential, the potential available for irrigation is 360 Km^3 per year. The figure for net draft of ground water considering the present utilisation indicates that substantial portion of total potential (about 68 percent) is still remaining untapped.

Table-1.1 State wise Details of Inland Water Resources (Lakh Hectares)

S. No.	Name of the State/UT	Rivers/ Canals (Length, Kms)	Reservoir	Tanks, Lakes & Ponds	Beels, Oxbow Lakes & Derelict Water	Brackish Water	Total Water Bodies
1.	Andhra Pradesh	11514	2.34	5,17	-	0.64	8.15
2	Arunachal Pradesh	2000	-	0.01	0.03	-	0.04
3.	Assam	4820	0.02	0.23	1.10	-	1.35
4.	Bihar	3200	0.60	0.95	0.05	-	1.60
5.	Goa	250	0.03	0.03	-	-	0.06
6.	Gujarat	3865	2.43	0.71	0.12	3.76	7.02
7.	Haryana	5000	NEG	0.10	0.10	-	0.20
8.	Himachal Pradesh	27781	0.07	0.17	0.06	-	0.30
9.	Jammu and Kashmir	3000	0.42	0.01	-	-	0.43
10.	Karnataka	9000	2.20	4.14	-	0.08	6.42
11.	Kerala	3092	0.30	0.30	-	2.43	3.03
12.	Madhya Pradesh	20661	2.94	1.19	-	-	4.13
13.	Maharashtra	16000	2.79	0.50	-	0.10	3.39
14.	Manipur	3360	0.01	0.05	0.40	-	0.46
15.	Meghalaya	5600	0.08	0.02	NEG	-	0.10
16.	Mizoram	1395	-	0.02	-	-	0.02
17.	Nagaland	1600	0.17	0.50	NEG	-	0.67
18.	Orissa	4500	2.56	1.14	1.80	4.17	9.67
19.	Punjab	15270	NEG	0.07	-	-	0.07
20.	Rajasthan	N.A.	1.20	1.80	-	-	3.00
21.	Sikkim	900	-	-	-0.03	-	0.03
22.	Tamil Nadu	7420	0.52	6.91	N.A.	C.56	7.99
23.	Tripura	1200	0.05	0.12	-	-	0.17
24.	Uttar Pradesh	31200	1.50	1.62	1.33	-	4.45
25.	West Bengal (P)	2526	0.17	2.76	0.42	2.10	5.45
UNION TERRITORIES							
26	Andaman & Nicobar Islands	115	0.01	0.03	-	0.37	0.41
27	Chandigarh	2	-	NEG	NEG	-	-
28.	Dadra & Nagar Naveli	54	0.05	-	-	-	0.05
29.	Daman & Diu	12	-	-	-	-	-
30.	Delhi	150	0.04	-	-	-	0.04
31	Lakshadweep	-	-	-	-	-	-
32.	Pondicherry	247	-	NEG	0.01	0.01	0.02
	Total	**185734**	**20.50**	**28.55**	**5.45**	**14.22**	**68.72**

Source: Fisheries Division, Dept. of Agriculture & Co-operation, Ministry of Agriculture
N.A. : Not Available
(P) : Provisional
NEG : Negligible
: Included in brackish water area

1.3 Water Quality Monitoring Programme

1.3.1 Objectives

Water quality monitoring is an important exercise, which helps in evaluating the nature and extent of pollution control required, and effectiveness of pollution control measures already in existence. It also helps in drawing the water quality trends and prioritising pollution control efforts. The pollution control boards in India are responsible for restore and maintain the wholesomeness of aquatic resources. To ensure that the water quality is being maintained or restored at desired level it is important that the pollution control boards regularly monitor the water quality. The water quality monitoring is performed with following main objectives in mind.

- For 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 is 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.

1.3.2 Monitoring Network

The above programme helps in evaluating the nature and extent of pollution control required, and effectiveness of pollution control measures already in existence. It also helps in drawing the water quality trends and prioritising pollution control efforts. Keeping this in mind the Central Pollution Control Board (CPCB) has established a network of monitoring stations on rivers across the country. The present network comprises of 1245 stations in 27 States and 6 Union Territories spread over the country. The monitoring is done on monthly or quarterly basis in surface waters and on half yearly basis in case of ground water. The monitoring network covers 250 Rivers, 78 Lakes, 6 Tanks, 26 Ponds, 8 Creeks, 19 Canals, 19 Drains and 382 Wells. Among the 1245 stations, 695 are on rivers, 86 on lakes, 19 on drains, 19 on canals, 6 on tank, 12 on creeks/seawater, 26 on pond and 382 are groundwater stations (Figure 1). Presently the inland water quality-monitoring network is operated under a three-tier programme i.e. GEMS, Monitoring of Indian National Aquatic Resources System and Yamuna Action Plan. Water samples are being analyzed for

28 parameters consisting of physico-chemical and bacteriological parameters for ambient water samples apart from the field observations. Besides this, 9 trace metals and 28 pesticides are analyzed in selected samples. Biomonitoring is also carried out on specific locations. In view of limited resources, limited numbers of organic pollution related parameters are chosen for frequent monitoring i.e. monthly or quarterly and major cations, anions, other inorganic ions and micro pollutants (Toxic Metals & POP's) are analyzed once in a year to keep a track of water quality over large period of time. The water quality data are reported in Water Quality Status Year Book.

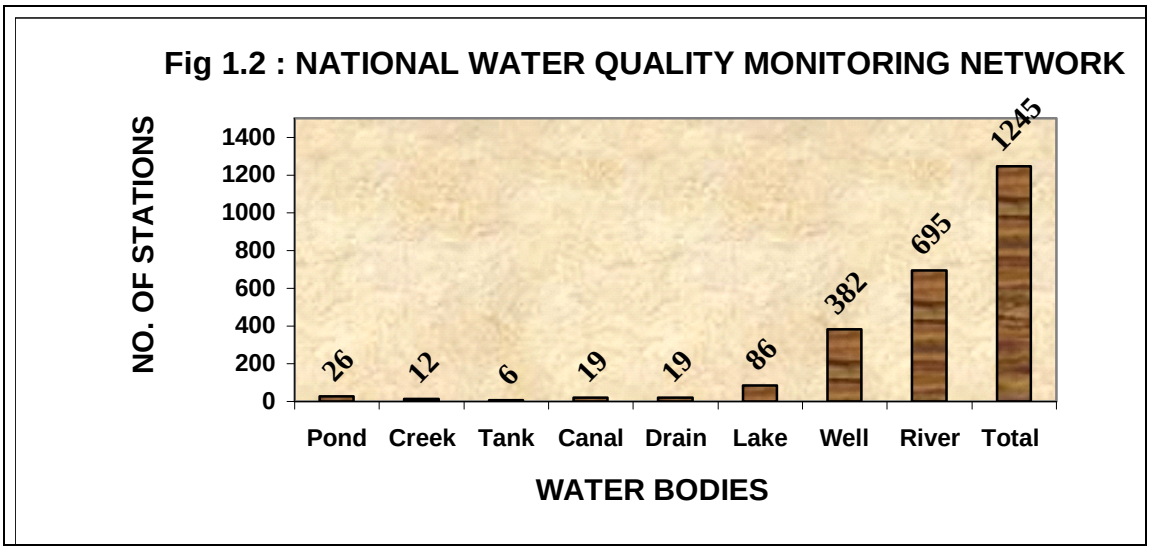


Table-1.2 State wise and water body wise Distribution of Water Quality Monitoring Stations

State	River	Lake	Tank	Pond	Canal	Creek/ Sea water	Drain	Well	Total
ANDHRA PRADESH	27	4	4	-	-	-	-	24	59
ASSAM	43	2	1	23	-	-	-	32	101
BIHAR	16	-	-	-	-	-	-	20	36
CHANDIGARH	-	1	-	-	-	-	3	7	11
CHHATISSGARH	23	-	-	-	-	-	-	4	27
DADRA AND NAGAR HAVELI	2	-	-	-	-	-	-	-	2
DAMAN & Diu(ZOV)	2	-	-	-	-	-	-	1	3
DELHI	4	-	-	-	2	-	9	-	15
GOA	17	2	-	-	3	1	-	6	29
GUJARAT	49	14	1	2	2	2	1	42	113
HARYANA	8	2	-	-	11	-	2	-	23
HIMACHAL PRADESH	31	3	-	-	-	-	-	20	54
JAMMU & KASHMIR	7	2	-	-	-	-	-	-	9

State	River	Lake	Tank	Pond	Canal	Creek/ Sea	Drain	Well	Total
JHARKHAND	9	-	-	-	-	-	-	-	9
KARNATAKA	43	2	-	-	-	-	-	-	45
KERALA	30	10	-	-	-	-	-	15	55
LAKSHDWEEP	-	-	-	1	-	-	-	15	16
MADHYA PRADESH	69	18	-	-	-	-	-	18	105
MAHARASHTRA	83	-	-	-	-	9	1	30	123
MANIPUR	11	4	-	-	-	-	-	5	20
MEGHALAYA	5	3	-	-	-	-	-	5	13
MIZORAM	4	-	-	-	-	-	-	2	6
NAGALAND	8	-	-	-	-	-	-	-	8
ORISSA	39	-	-	-	-	-	-	15	54
PONDICHERRY	1	2	-	-	-		-	13	16
PUNJAB	35	2	-	-	-	-	-	6	43
RAJASTHAN	7	7	-	-	-	-	-	37	51
SIKKIM	14	-	-	-	-	-	-	-	14
TAMIL NADU	27	3	-	-	-	-	-	2	32
TRIPURA	3	2	-	-	1	-	-	7	13
UTTAR PRADESH	44	1	-	-	-	-	3	25	73
UTTRANCHAL	14	1	-	-	-	-	-	1	16
WEST BENGAL	20	1	-	-	-	-	-	30	51
Total	**695**	**86**	**6**	**26**	**19**	**12**	**19**	**382**	**1245**

1.3.3 Parameters observed

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 1.3. In the present report data on core parameters is incorporated for interpretation and drawing of conclusion based on primary water quality criteria.

Table-1.3 List of Parameters under National Water Quality Monitoring Programme

Core Parameters (9)	**Field Observations (7)**
PH	Weather
Temperature	Depth of main stream/depth of water table
Conductivity, µmhos/cm	Colour and intensity
Dissolved Oxygen, mg/L	Odour
BOD, mg/L	Visible effluent discharge
Nitrate – N , mg/L	Human activities around station
Nitrite – N, mg/L	Station detail
Fecal Coliform, MPN/100 ml	**Trace Metals (9)**
Total Coliform, MPN/100 ml	Arsenic, µg/L
General Parameters (19)	Cadmium, µg/L
Turbidity, NTU	Copper, µg/L
Phenolphthalein Alkalinity, as $CaCO_3$	Lead, µg/L
Total Alkalinity, as $CaCO_3$	Chromium (Total) , µg/L
Chlorides, mg/L	Nickel, µg/L
COD, mg/L	Zinc, µg/L
Total Kjeldahl - N, as N mg/L	Mercury, µg/L
Ammonia - N, as N mg/L	Iron (Total) , µg/L
Hardness, as $CaCO_3$	**Pesticides (15)**
Calcium, as $CaCO_3$	Alpha BHC, µg/L
Sulphate, mg/L	Beta BHC, µg/L
Sodium, mg/L	Gama BHC (Lindane) , µg/L
Total Dissolved Solids, mg/L	O P DDT, µg/L
Total Fixed Dissolved Solids, mg/L	P P DDT, µg/L
Total suspended Solid, mg/L	Alpha Endosulphan, µg/L
Phosphate, mg/L	Beta Endosulphan, µg/L
Boron, mg/L	Aldrin, µg/L
Magnesium, as $CaCO_3$	Dieldrin, µg/L
Potassium, mg/L	Carboryl(Carbamate) , µg/L
Fluoride, mg/L	2-4 D, µg/L
Bio-Monitoring (3)	Malathian, µg/L
Saprobity Index	Methyl Parathian, µg/L
Diversity Index	Anilophos, µg/L
P/R Ratio	Chloropyriphos, µg/L

1.3.4 Frequency of monitoring

Frequency of monitoring station on surface water bodies such as rivers, lakes, ponds, canals and creeks is either monthly or quarterly whereas the groundwater monitoring

stations are monitored on half yearly basis. Three river stations in upper Ganga and Yamuna River are monitored on yearly basis. The frequency of monitoring stations in each State is given in Table 1.4.

Table-1.4 Frequency of Water Quality Monitoring Stations

State	Monthly	Half yearly	Quarterly	Yearly	Total
Andhra Pradesh	14	24	21	-	59
Assam	6	32	63	-	101
Bihar	8	20	8	-	36
Chandigarh	-	7	4	-	11
Chhattisgarh	7	4	16	-	27
Dadra and Nagar Haveli	1	-	1	-	2
Daman & Diu	2	1		-	3
Delhi	14	-	1	-	15
Goa	11	6	12	-	29
Gujarat	36	42	35	-	113
Haryana	5	-	18	-	23
Himachal Pradesh	-	20	33	1	54
Jammu & Kashmir	-	-	9	-	9
Jharkhand	1	-	8	-	9
Karnataka	23	-	22	-	45
Kerala	10	15	30	-	55
Lakshadweep	-	15	1	-	16
Madhya Pradesh	50	18	37	-	105
Maharashtra	72	30	21	-	123
Manipur	-	5	15	-	20
Meghalaya	-	5	8	-	13
Mizorzm		2	4	-	6
Nagaland	-	-	8	-	8
Orissa	14	15	25	-	54
Pondicherry	-	13	3	-	16
Punjab	-	6	37	-	43
Rajasthan	4	37	10	-	51
Sikkim	-	-	14	-	14
Tamil Nadu	20	2	10	-	32
Tripura	-	7	6	-	13
Uttar Pradesh	41	25	7	-	73
Uttaranchal	3	1	9	3	16
West Bengal	9	30	12	-	51
Total : -	**351**	**382**	**508**	**4**	**1245**

1.3.5 River basin wise distribution of Water Quality Monitoring Stations

The number of water quality monitoring stations on each river, its tributary, sub tributary, lake, ponds, tanks, canals, creeks and on groundwater are summarized in Table 1.5.

Table-1.5 River Basin wise distribution of Water Quality Monitoring Stations- 2007

River (main stream), Tributaries and Sub-Tributaries, Lake, Ponds, Tanks, Canals, Creeks and Groundwater Stations	Total Stations
Baitarni (5**)**	5
Brahmani (11) **Tributaries**-Karo (1), Koel (2), Sankh (1)	15
Brahmaputra (10) **Tributaries**-Burhidihing (3), Dhansiri (7), Disang (2), Jhanji (1), Subansiri (1), Bhogdoi (1), Bharalu (1), Borak (2), Deepar Bill (1), Digboi (1), Mora Bharali (1), Teesta (5), Dickhu (1), Maney (2), Ranichu (2), Rangit (5), Jai Bharali (1), Kathakal (1), Kharsang (1), Kolong (2), Manas(1), Pagldia (1), Chathe (1), Dzu (1), Kapili(1), Beki(1), Kundli(1), Kushiara(1), Panchnai(1), Sankosh(1), Sonai(1), Kohara(1), Ranga(1), Boginadi(1), Dikhow(1)	66
Cauvery (20) **Tributaries**-Arkavati (1), Amravati (1), Bhawani (5), Kabini (4), Laxmantirtha (1), Shimsa (2), Hemavati (1), Yagachi (1)	36
Ganga (34) **Tributaries**-Alakananda-Upper Ganga (4), Mandakini-Upper Ganga (1)**,** Barakar (1), Betwa (10), Chambal (8), Damodar (5), Gandak (1), Saryu-Ghaghra (3), Gomti (5), Hindon (3), Kali (West) (2), Kali Nadi(East) (2), Khan (3), Kshipra (3), Mahananda (1), Mandakini (Madhya Pradesh) (1), Parvati (2), Ramganga (1), Rapti (1), Rihand (2), Rupanarayan (1), Sai (1), Sone (5), Tons (Madhya Pradesh) (2), Yamuna (23), Sindh (1), Johila (1), Sankh(1), Gohad (1), Kolar (1), Churni (2), Tons (Himachal Pradesh) (1), Sikrana (1), Daha (1), Sirsa (1), Dhous (1), Farmer (1), Kalia sot(1), Bihar(1), Bichia(1),	141
Godavari (22) **Tributaries**- Manjara (Manjira) (3), Maner (2), Nira (1), Wainganga (8), Wardha (3), Kolar (1), Kanhan (3), Purna (2), Indravati (2), Sankhani (1),	48
Indus **Tributaries**-Beas (19), Chenab (1), Jhelum (3), Largi (1), Parvati (3), Ravi (3), Sutlej (21), Tawi (1), Gawkadal (1), Chuntkol (1), Sirsa (3), swan (1)	58
Krishna (22) **Tributaries**- Bhadra (3), Bhima (10), Ghataprabha (2), Malprabha (3), Muneru (1), Musi (2), Nira (2), Paleru (1), Tunga (1), Tungabhadra (6), Panchganga (4), Chandrabhaga (2), Kagina(1), Koyna(1), Mula(2), Mutha(1), Mula-Mutha(1), Venna(1), Pawana(1), Indrayani(1),	68
Mahi (9) **Tributaries**-Anas (1), Panam (1) , Jammer(1), Malei(1), Shivna(1), Chillar(1)	15
Mahanadi (18) **Tributaries**-Ib (4), Hasdeo (2), Kathajodi (1), Kharoon (4), Kuakhai (2), Sheonath (3), Birupa (1), Arpa (1), Kelo (2)	38
Narmada (21) **Tributaries**-Chhota Tawa (1), Gour(1), Katni(1), Kunda(1)	25
Pennar (5)	5
Sabarmati (9) **Tributaries**-Meswa (1), Shedhi (1), Khari (1)	12
Subarnerekha (6)	6
Tapi (14) **Tributaries**-Girna (2), Rangavali (1), Denwa(1), Kim(1),	19

River (main stream), Tributaries and Sub-Tributaries, Lake, Ponds, Tanks, Canals, Creeks and Groundwater Stations	Total Stations
Medium rivers Ambika (1), Ulhas (3), Ulhas-Bhatsa (1), Ulhas-Kalu (1), Imphal (4), Mandovi (2), Palar (1), Pamba (3), Pariyar (3), Rushikulya (2), Tambiraparani (7), Achankoil (2), Chalakudy (1), Damanganga (6), Ghaggar (19), Kallada (1), Kali-Karnataka (1), Manimala (2), Mindhola (1), Nagavalli (3), Amlakhadi (2), Chaliyar (2), Iril (2), Kharkhala (1), Karmana (1), Kolak (2), Kundalika (2), Meenachil (1), Muvattupuza (1), Patalganga (2), Umtrew (1), Vamanpuram(1), Zuari(2), Gumti(2), Kalna (1),Valvant (1), Madai (1), Khandepar (2), Asanora (1), Bhadar (1), Neyyar (1), Ithikkara (1), Kadalundy (1), Kuttiyady (1), Mahe (1), Kuppum (1), Neelsvaram (1), Karingoda (1), Chandergiri (1), Chitrapuzha (1), Nambul (2), Ganol (1), Simsang (1), Myntdu (1), Arasalar (1), Kodra (1), Haora (1), Khuga (1), Khujairok (1), Sekmai (1), Markanda (1), Sukna (1), Baleshwar Khadi (1), Netravati (1), Kumardhara (1), Purna (1), Kaveri (1), Dhadar (1), Tlawng (2), Tuirial (2), Talpona (1), Bhogavo(1), Triveni sangam(1), Mapusa(1), Bicholim(1), Chapora(1), Kushawati(1), Sal(2), Meethi(1), Savitri(1), Vashisti(1),	138
Lakes (86) Hussainsagar (1), Saroornagar (1), Himayatsagar (1), Pulicate (1), Salaulim (1), Kankoria (1), Chandola (1), Ajwah (1), Sursagar (1), Brahamsarovar (1), Sukhna (2), Govindsagar (1), Pongdam (1), Renuka (1), Wuller (1), Dal (1), Ulsoor (1), HebbalaValley (1), Oruvathikotta (1), Sasthamcotta (1), Ashthamudi (1), Paravur (1), Vembanad (1), Periyar (1), Kodumgallor (1), Kayamkula (1), Punnamadakayal (1), Pookotekayal (1), UpperLake (4), LowerLake (1), MultaiLake (1), Loktak (4), Umiam (1), Ward (1), Thadlaskena (1), Osteri (1), Bahour (1), Harike (2), Pichola (1), Udaisagar (1), Ramgarh Jaipur (1), Pushkar (1), Fatehsagar (1), Kalyana (1), Nakki (1), Udhagamadalam (1), Kodaikanal (1), Yercaud (1), Lakshminarayan Baridigh (1), Rudrasagar (1), Ramgarh-UttarPradesh (1), Naini (1), Rabindrasarovar (1), Nalsarovar (1), Bindusaraovar (1), Sahastrling Sarovar (1), Lakhota Talav (1), Narsimehta Talav (1), Nadiad city Lake (1), Ranjitnagar Talav (1), Ankleshwar reservoir(1), Kuwadava(1),Moticher lake(1), Mayem lake(1), Janunia talav(1), Yashwant sagar(1), Sirpur talav(1), Kali sindh reservoir(1), Periat tank(1), Shahpura (1), Madhav lake(1), Nagchun(1), Karwa dam(1), Khandari reservoir(1), Daloni Beel(1), Mer Beel(1), Govindgarh tank(1), Bilawali talav(1) **Tanks (6)** Dharamsagar (1), Bibinagar (1), Kistrapetrareddy (1), Goysagar (1), Thol (1), Gandigudem(1) **Ponds (26)** Elangabeel System (1), Lakshadweep (1), Olpad village pond (1),Bishnu Pushkar pukhuri(1), Bor Beel(1), Bor pukhuri(1), Botodriva pond(1), Chand dubi Beel(1), Deepar Beel(1), Dighali pukhuri(1), Dhudia talav(1), Baskandi pond(1), Galabeel(1), Ganga pukhuri(1), Gaurisagar(1), Gopur tank(1), Padum pukhuri(1), Hordai pukhuri(1), Jaipal pukhuri(1), Mahamaya mandir pukhuri(1), Rajadinia pukhuri(1), Raja pukhuri(1), Rajmaw pukhuri(1), Saranbeel(1), Sivasagar tank(1), Subhagya kund(1),	118
Creeks, Canals and Drains Creeks (8),Sea Water(4), Agra Canal (1), Gurgaon Canal (1), Western Yamuna Canal (11), Agartala Canal (1), Cuncolim canal(2),Panoli canal(1), Narmada canal(1), Cumbarjua canal(1), Drains (19)	50
Groundwater	382
Total	**1245**

G-GEMS - *Global Environmental Monitoring System*
M-MINARS - *Monitoring of Indian National Aquatic Resources*
YAP- - *Yamuna Action Plan*

1.4 Approach to Water Quality Management

The water quality management in India is performed 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. The Act does not define the level of wholesomeness to be maintained or restored in different water bodies of the country. The Central Pollution Control Board (CPCB) has tried to define the wholesomeness in terms of protection of human uses, and thus, taken human uses of water as base f or identification of water quality objectives for different water bodies in the country.

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 1.6.

Table-1.6 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	1. Total Coliforms OrganismMPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20^{o}C 2mg/l or less
Outdoor bathing (Organised)	B	1. Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20^{o}C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 to 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20^{o}C 3mg/l or less
Propagation of Wild life and Fisheries	D	1. pH between 6.5 to 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	1. pH between 6.0 to 8.5 2. Electrical Conductivity at 25^{o}C micro mhos/cm Max.2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/l

The entire water resources of the country were classified according to their designated best uses and a "Water Use Map" was prepared. For identification of 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.

CHAPTER II

Water Quality Trend in India

2.1 Water Quality Trend 2007

The water quality monitoring results obtained during 2007 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 the 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. This is mainly responsible for water borne diseases.

The monitoring results obtained during 2007 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 69% of the observations are having BOD less than 3 mg/l, 18% between 3-6 mg/l & 13% 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 66% observations are having Faecal Coliform less than MPN 500/100 ml.

2.2 Biochemical Oxygen Demand (BOD)

The numbers of observed BOD values less than 3 mg/l were between 57-69% during year 1995 to 2007. The maximum value of 69% was observed during 2007. This shows that there is improvement in the water quality.

The number of observed BOD values ranges from 3-6 mg/l was between 17-28% during year 1995 to 2007, the maximum value of 28% was observed in the year 1998. During 2007 the percent observations were 18. It was observed that there was a gradual decrease in number of observations having BOD between 3-6 mg/l which indicates there is gradual improvement in water quality.
The numbers of observed BOD value> 6 mg/l were between 13 and 19% during year 1995-2007 and the maximum value of 19% was observed in the year 2001 and 2002. It was observed that there was a gradual decrease to 14% in 2005 and increase to 18% in 2006 and subsequent decrease to 13% in 2007 in number of observations having BOD >6. . This shows that there is improvement in the water quality.

2.3 Total Coliform (TC)

The numbers of observed TC values < 500 MPN/100 ml were between 44-63% during 1995-2007, the value gradually increases to 63% in year 1999 which decreases to 45% in 2006 but subsequently increased to 50% during 2007.

The numbers of observed TC values ranges from 500-5000 were between 28-37% during year 1995-2007 the maximum value of 37% was observed in 1997 and this was gradually decreases to 33% in 2000 which further decreases to 31% in year 2006. During 2007 it was observed as 33%. It was also observed that there was a gradual decrease in number of observations having TC < 500 MPN/100 ml.

The numbers of observed TC values > 5000 were between 9-24% during year 1995-2007. The maximum value of 24% was observed in the year 2006. Minimum value of 9% was observed during the year 1999. During 2007 it was observed as 17% indicating decreasing trend.

2.4 Faecal Coliform (FC)

The numbers of observed FC values <500 MPN/100 ml was between 48-67% during year 1995-2007. The maximum value of 67% was observed in the year 1998 that gradually decreases to 48% in 1999, which again steadily rose to 53% in 2006 and 66% in 2007.

The numbers of observed FC values ranges from 500-5000 MPN/100 ml was between 22-35% during year 1995 to 2007. The maximum value of 35% was observed in the year 1999, which gradually decreases to 26% in the year 2006 and further decreased to 23% in 2007.

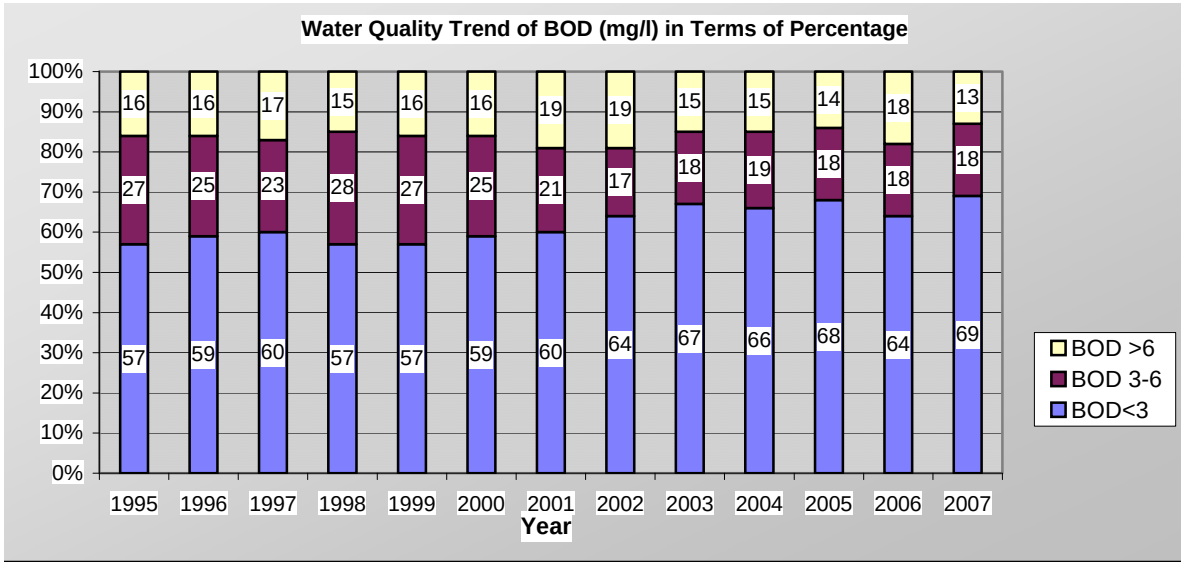
The numbers of observed FC values > 5000 MPN/100 ml was between 7-21% during year 1995-2007. The maximum value of 20% was observed in 2000 which gradually decreases to 12% in the year 2005 that increases to 21% in 2006 and then decrease to 11% in 2007 indicating improvement in quality.

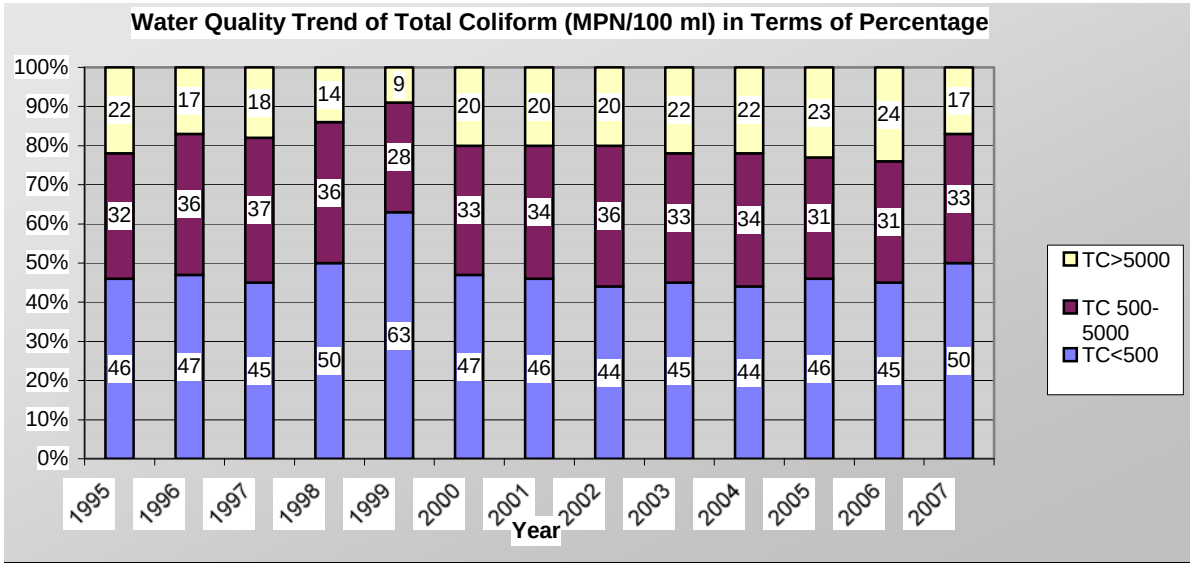
2.5 Water Quality Trend (1995 -2007)

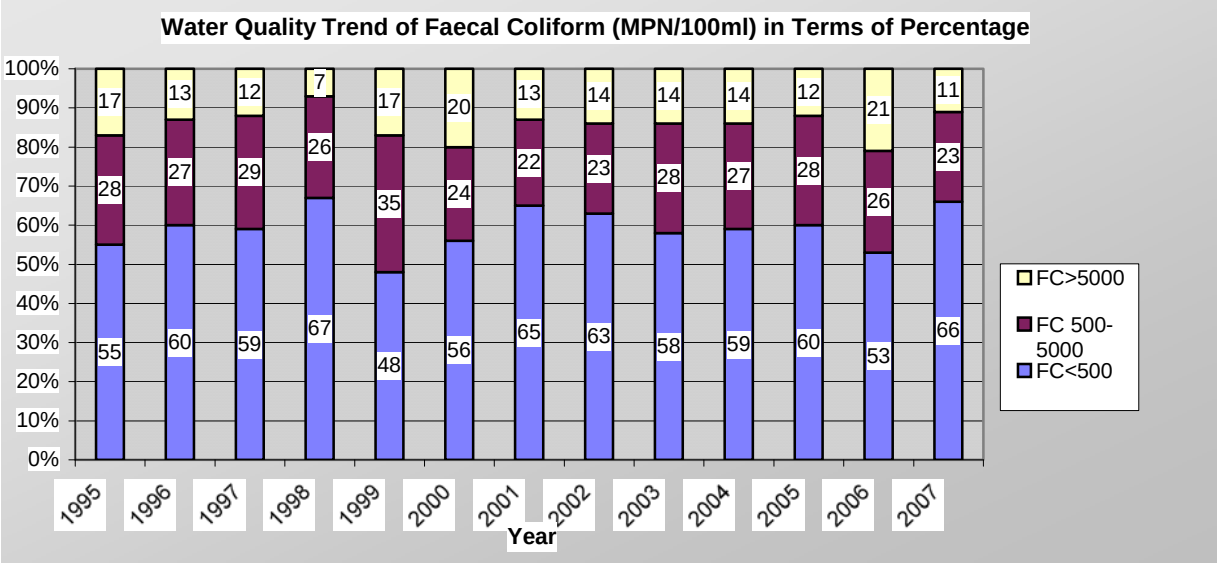
The water quality monitoring results obtained during 1995 to 2007 indicate that the organic and bacterial contamination are continued to be critical in water bodies. This is mainly due to discharge of domestic wastewater mostly in untreated form from the urban centres of the country. The municipal corporations 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. This is mainly responsible for water borne diseases.

The water quality monitoring results were analysed with respect to indicator of oxygen consuming substances (Bio-chemical demand) and indicator of pathogenic bacteria (Total Colliform and Faecal Coliform). The result of such analysis shows that there is gradual improvement in water quality. The number of observations having BOD and Coliform density has increased during 1995 to 2007. The water quality status for the period 1995 to 2007 in terms of number of observations in percentage having values of parameters in different ranges is given in the figure 2.1.

Figure 2.1: Water Quality Trend of BOD (mg/l), Total Coliform (MPN/100 ml) & Faecal Colliform (MPN/100 ml)







2.6 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, Subernarekha, Brahmaputra, Satluj, Beas, Pennar and Ghaggar depicting the data from 2002 to 2007 is presented in figure 2.2 to 2.19.

Figure 2.2: Water Quality Trend of BOD in River Ganga

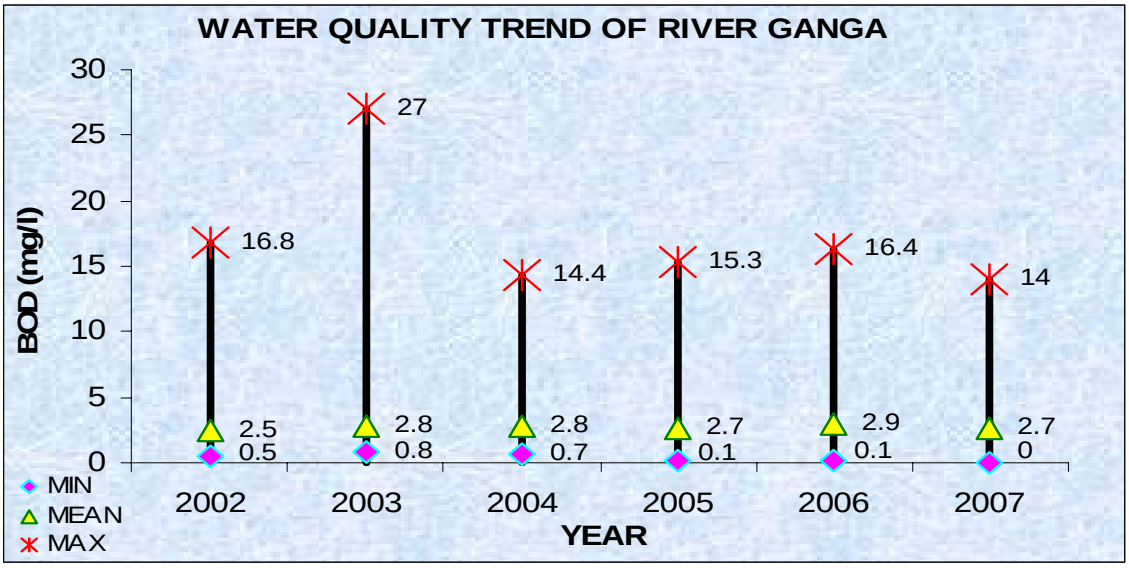


Figure 2.3 : Water Quality Trend of BOD in River Yamuna

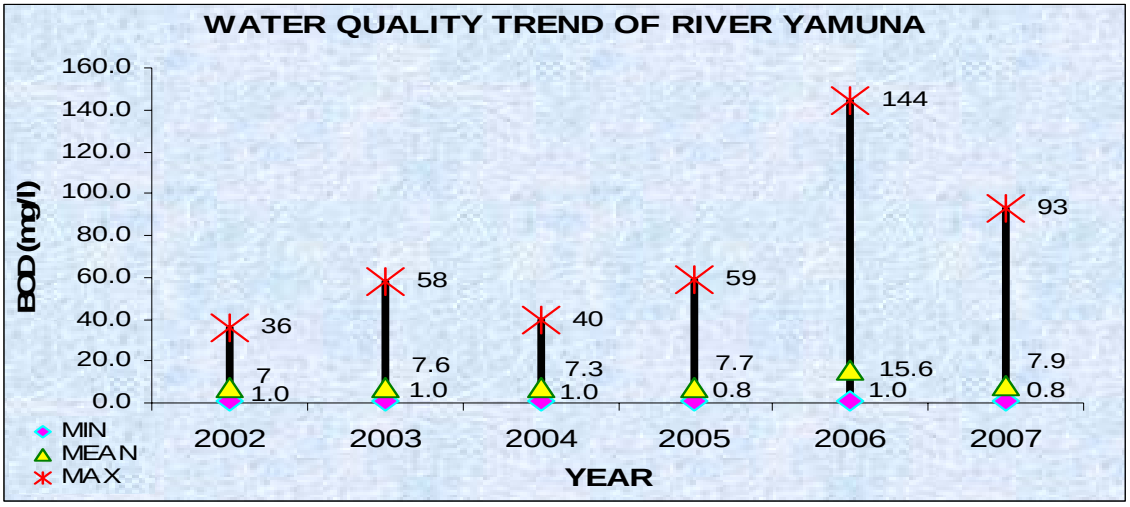


Figure 2.4 : Water Quality Trend of BOD in River Sabarmati

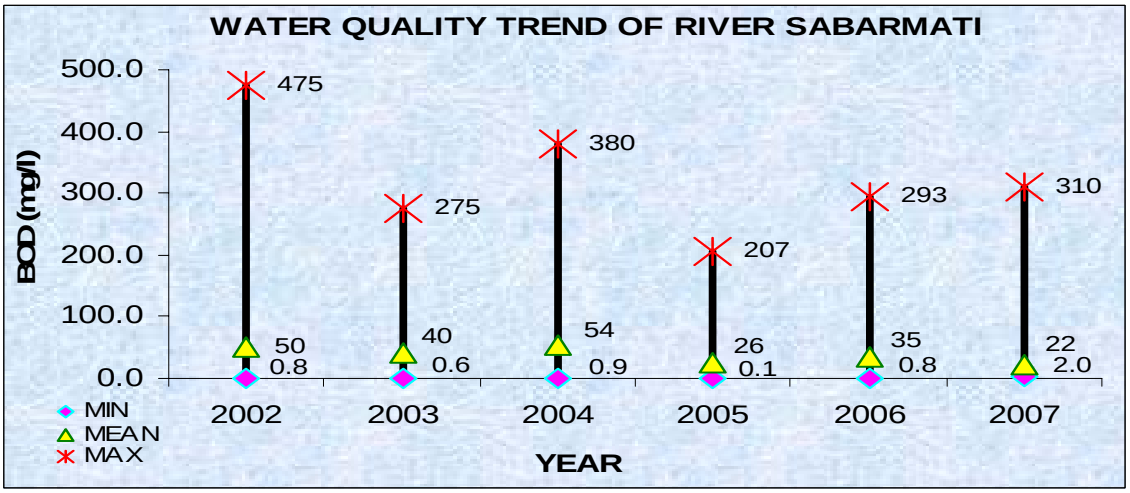


Figure2.5: Water Quality Trend of BOD in River Mahi

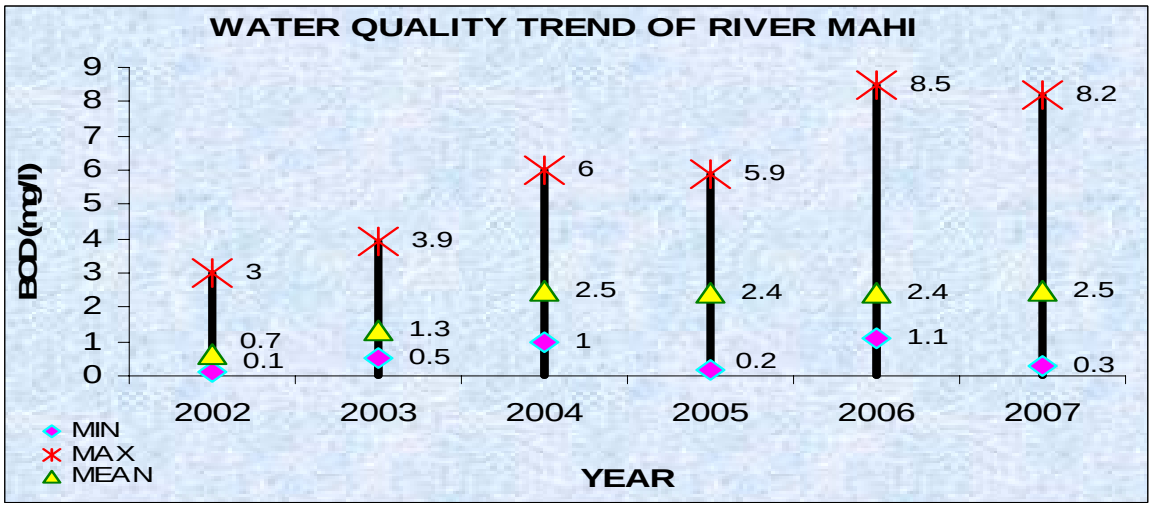


Figure 2.6 : Water Quality Trend of BOD in River Tapi

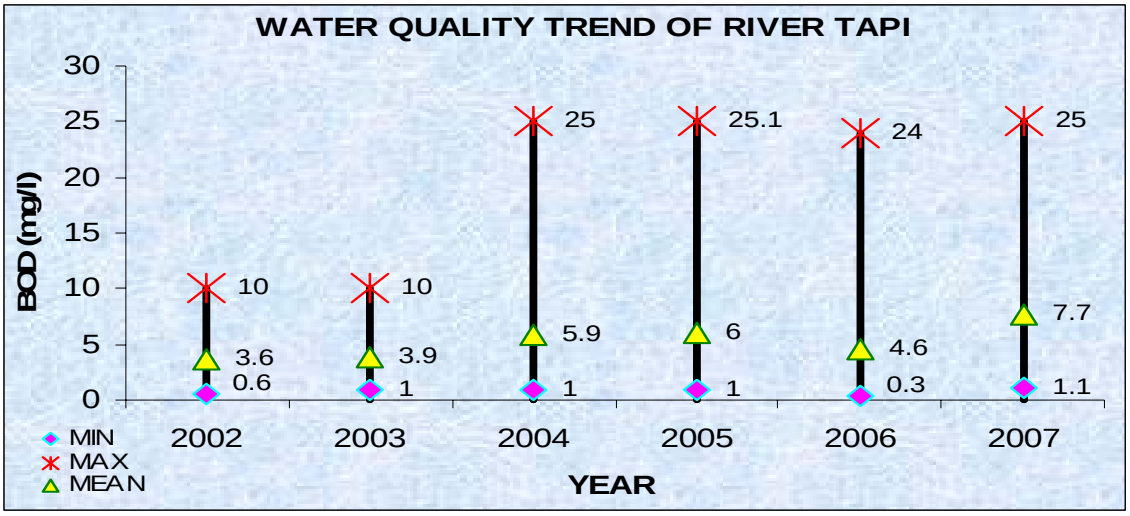


Figure 2.7 : Water Quality Trend of BOD in River Narmada

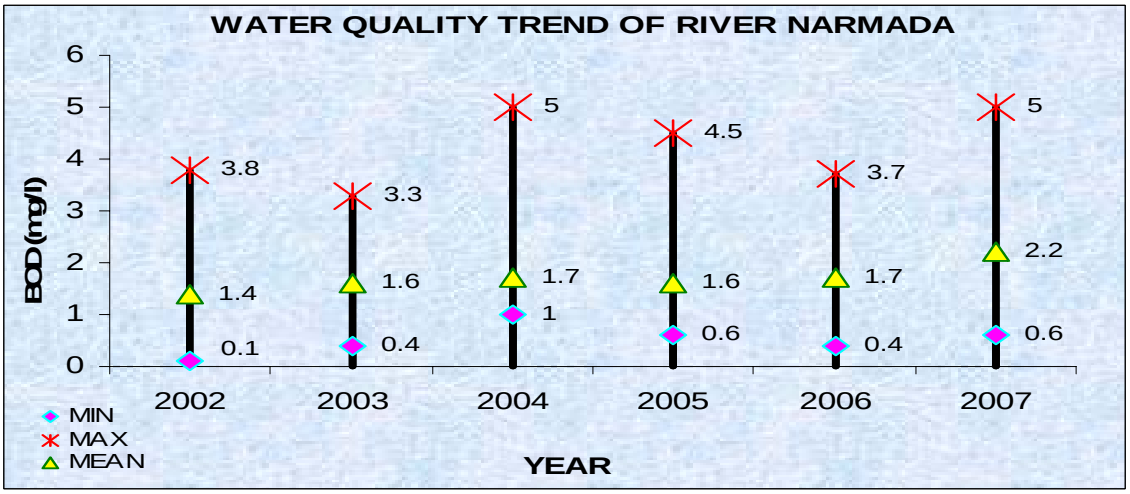


Figure 2.8: Water Quality Trend of BOD in River Godavari

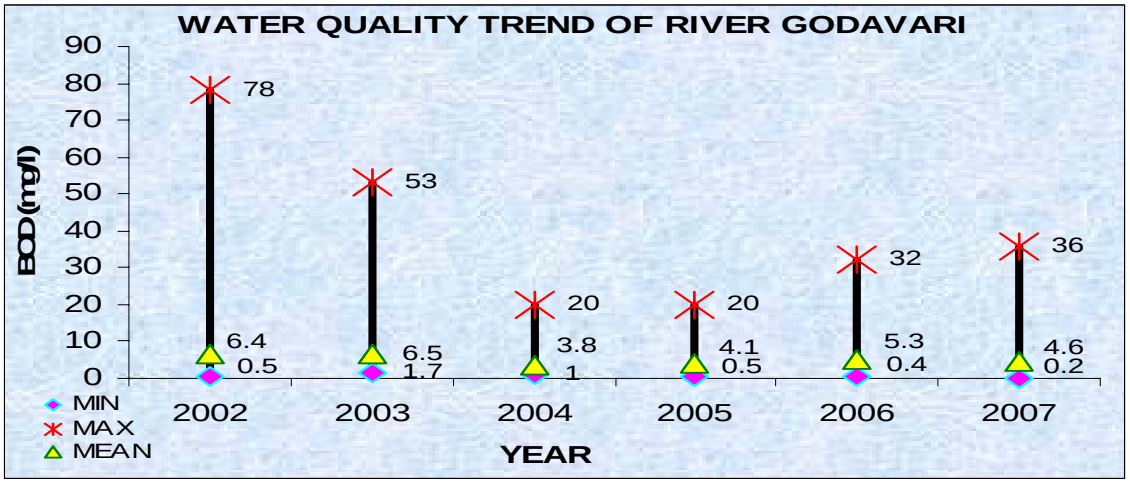


Figure 2.9: Water Quality Trend of BOD in River Krishna

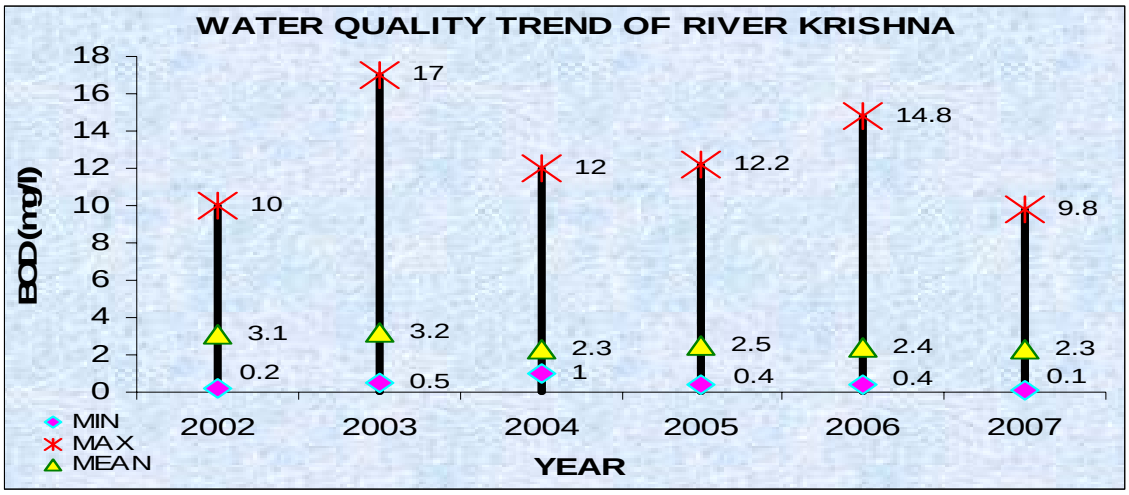


Figure 2.10: Water Quality Trend of BOD in River Cauvery

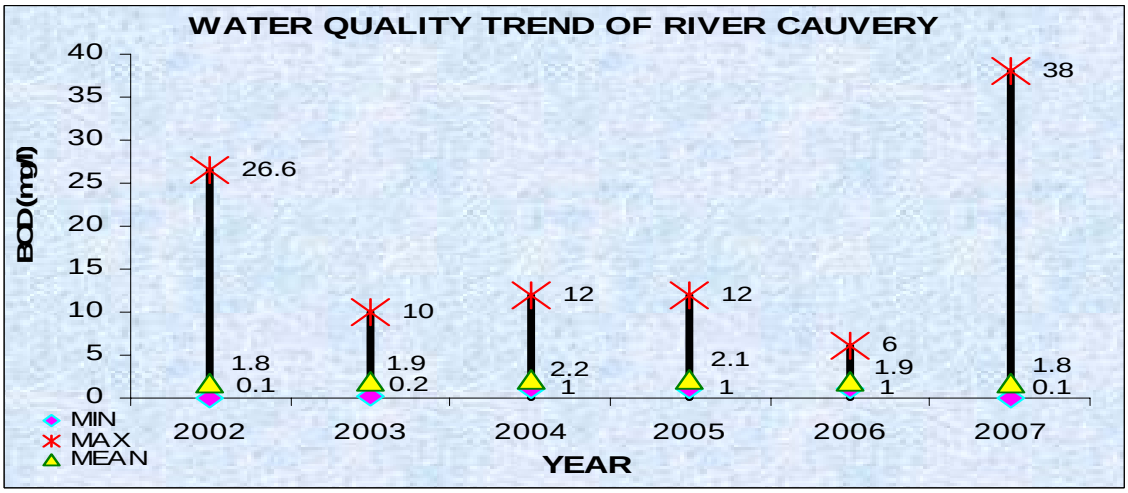


Figure 2.11: Water Quality Trend of BOD in River Mahanadi

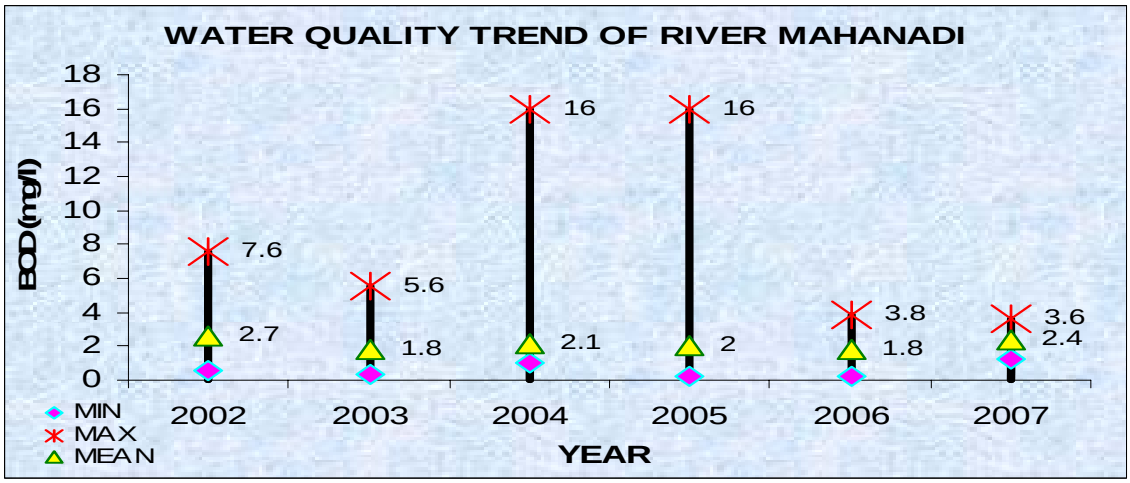


Figure 2.12: Water Quality Trend of BOD in River Brahmani

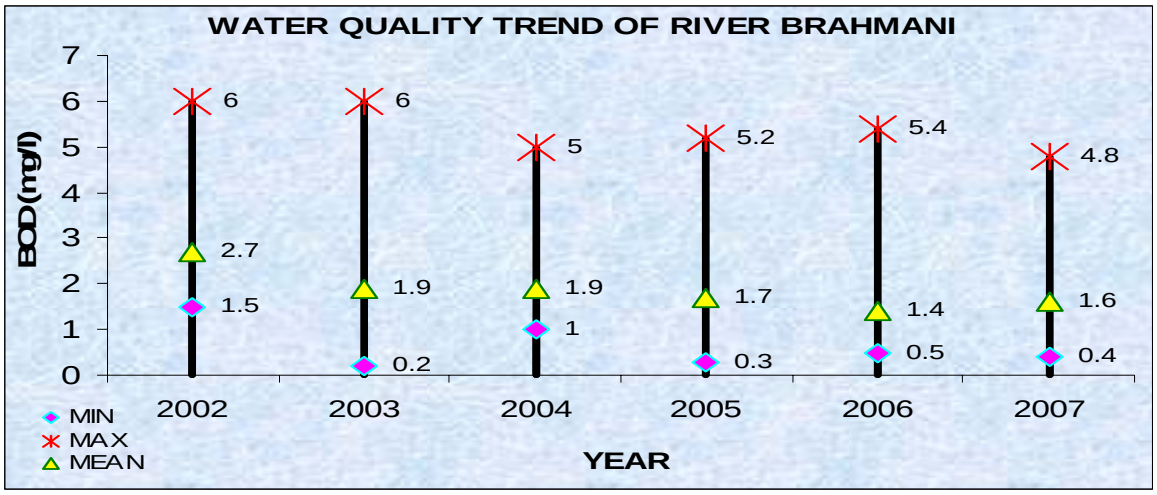


Figure 2.13: Water Quality Trend of BOD in River Baitarni

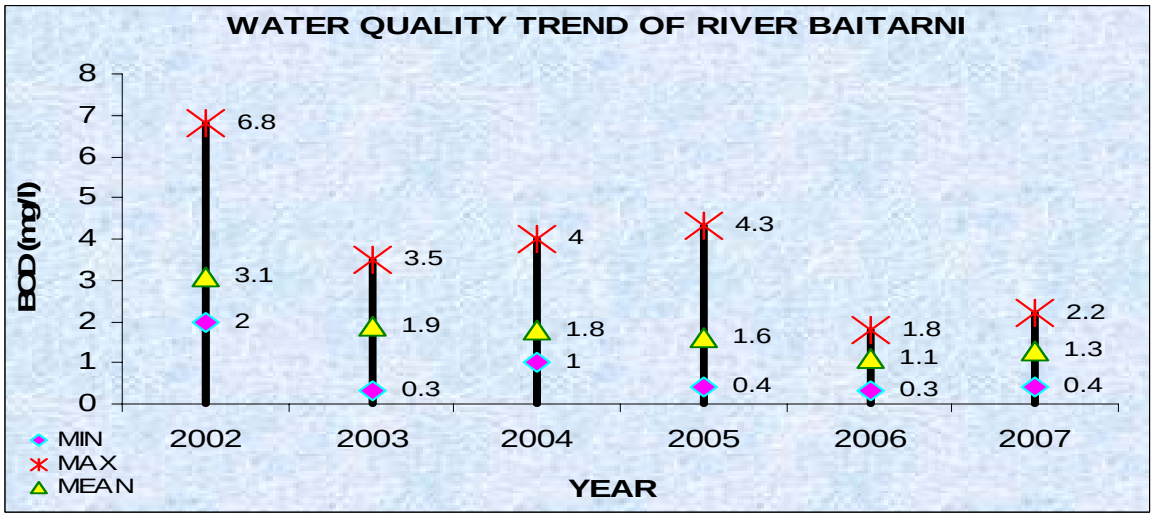


Figure 2.14: Water Quality Trend of BOD in River Subernarekha

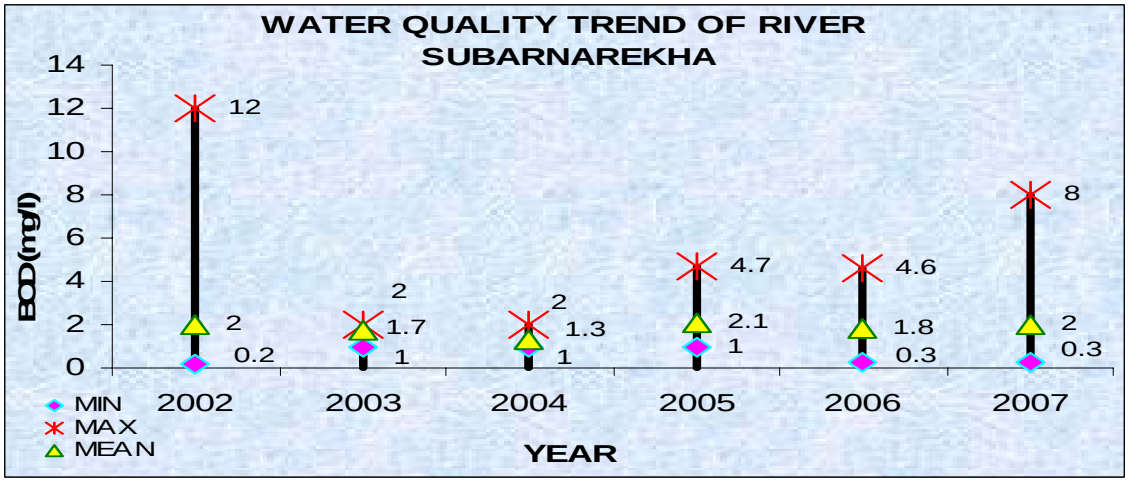


Figure 2.15: Water Quality Trend of BOD in River Brahmaputra

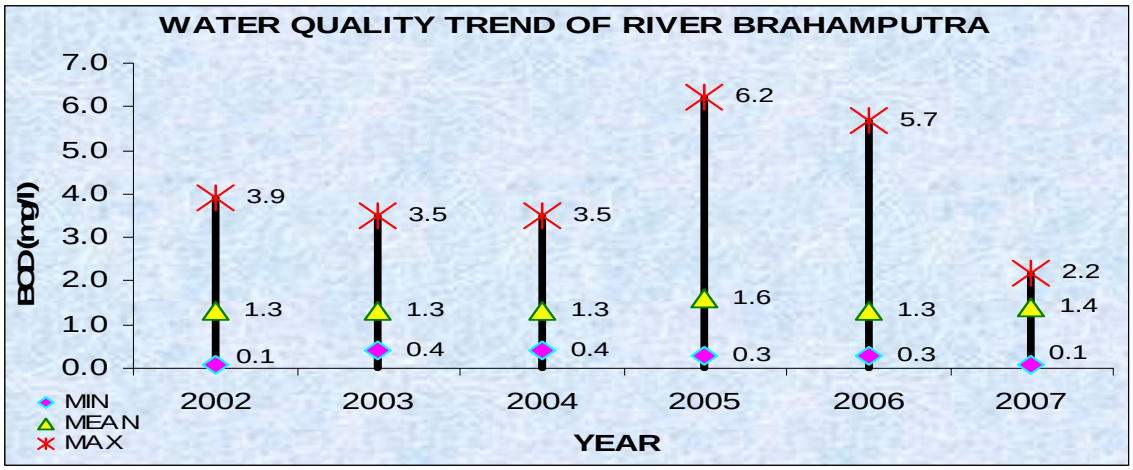


Figure 2.16: Water Quality Trend of BOD in River Satluj

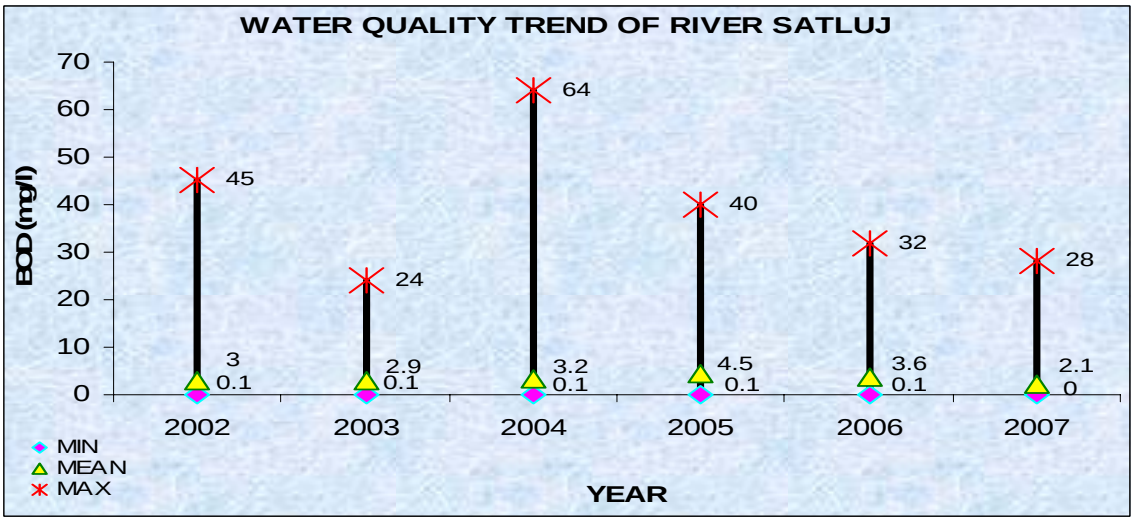


Figure 2.17: Water Quality Trend of BOD in River Beas

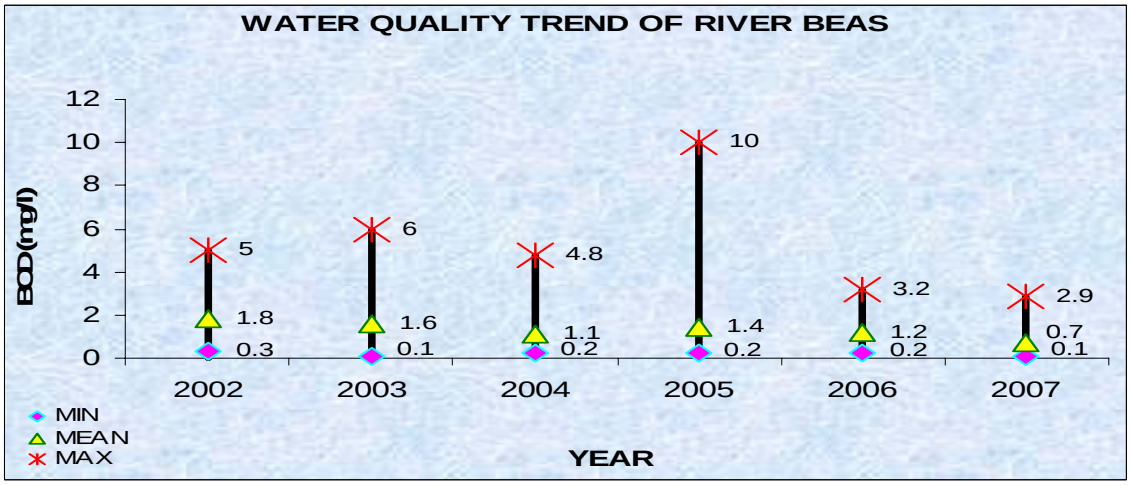


Figure 2.18: Water Quality Trend of BOD in River Pennar

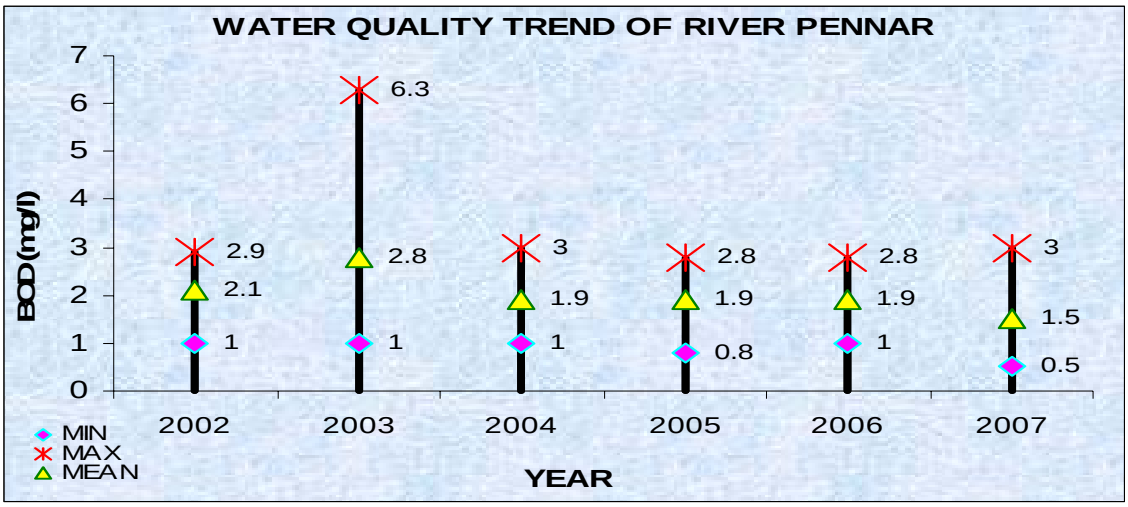
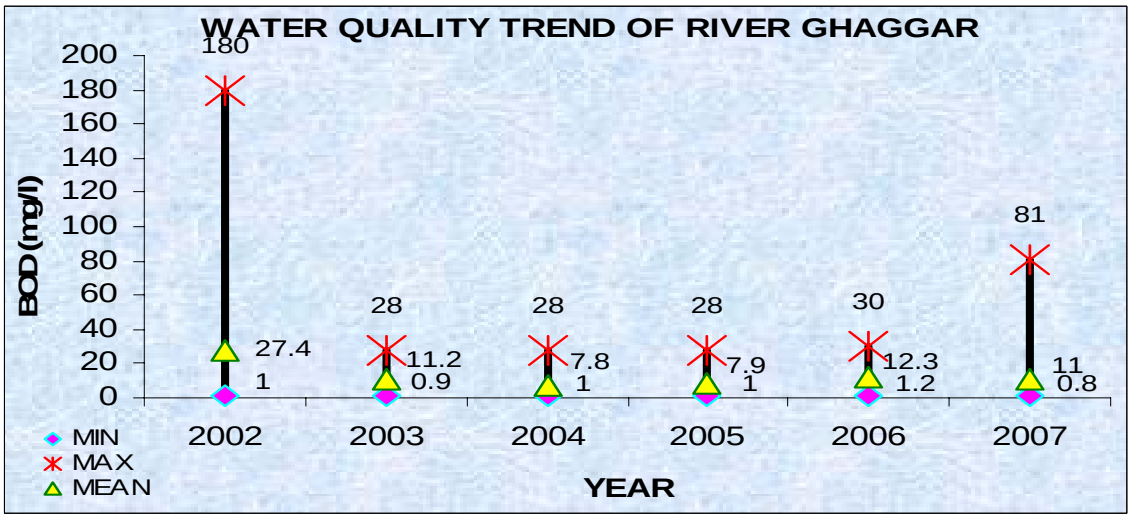


Figure 2.19: Water Quality Trend of BOD in River Ghaggar



CHAPTER III

Water Quality of Rivers at a Glance

3.1 Observed Water Quality

The monitoring results obtained during 2007 under National Water Quality Monitoring Programme reflect that organic matter & bacterial population of fecal 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 2007 along with summary for the year 2002, 2003, 2004, 2005 and 2006 is given in Table 3.1 for comparative assessment of water quality trend between the years. A brief overview of these pollution related parameters is provided below.

3.2 Organic and Pathogenic Pollution

The Organic pollution as measured through Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) is considerably high; water bodies are saprobic and eutrophicated near large urban centres due to the discharge of partly treated or untreated wastewater. This results in depletion of oxygen in these stretches of water bodies. The rivers and lakes in hilly part of the country are not affected significantly by such pollution, as there are no large urban centres. Although, high BOD is associated with low Dissolved Oxygen (DO), but many times the DO measurement does not reflect such conclusion due to the fact that the DO is measured during daytime when the photosynthetic effects are prominent. In such stretches of water bodies, the diurnal variation in dissolved oxygen is quite large. The dissolved oxygen during daytime increases to super saturation level (sometimes as high as 300% saturation) whereas at night at the same place the dissolved oxygen goes as low as zero mg/l. The pathogenic pollution is one of the major causes for water borne disease. The majority of surface water monitoring locations are found contaminated with high levels of Faecal Coliform bacteria, which are indicators of pathogenic pollution.

The water quality of major rivers varied widely with respect to DO, BOD, Total Coliform (TC) and Faecal Coliform (FC). The level of DO is observed more than 4 mg/l in river Narmada, Brahmaputra, Mahanadi, Brahamani, Baitarni, Subernarekha and Beas throughout the year to sustain aquatic life whereas, the values less than 4 mg/l are observed in stretches of river Satluj (3.2 mg/l), Ganga (1.4 mg/l), Yamuna (0.0 mg/l), Hindon (0.0 mg/l), Mahi (0.4 mg/l), Gomti (1.1 mg/l), Dhansiri (1.2 mg/l), Sabarmati (0.0 mg/l), Shedhi (3.7 mg/l), Godavari (3.2 mg/l), Tapi (3.7 mg/l), Krishna (3.0 mg/l), Bhima (1.7 mg/l), Panchaganga (2.3

mg/l), Musi (0.0 mg/l), Pennar (2.8 mg/l), Cauveri (0.0 mg/l), Damanganga (3.1 mg/l), Karamana (0.0 mg/l), Ghaggar (1.0 mg/l), Swan (2.4), H.P., Kali (E) (0.0), Kali (W) (0.0), Chambal (0.0), Bharalu (0.0), Sankh (1.9), Maner (2.9), Lakshmantirtha (0.0), Bhavani (2.8), Kolak (2.8), Mindhola (2.5), Periyar (2.7), Pamba (3.7), Manimala (0.6), Irumpanam (2.2), Markanda (1.0), Sukhna (3.0), Imphal (3.4), Khuga (3.8), Ganol (1.4), Simsang (2.0), Gumti (3.7), Sekmai (3.2) and at few locations downstream of urban settlements due to discharge of untreated/partially treated municipal wastewater, which is responsible for high oxygen demand.

Very high values of Biochemical Oxygen Demand (BOD) are observed in rivers Amlakhedi (522 mg/l), Sabarmati (310 mg/l), Markanda (218 mg/l), Khan (125 mg/l), Kalinadi (120 mg/l), Hindon (120 mg/l), Yamuna (93 mg/l), Ghaggar (81 mg/l), Musi (51 mg/l), N- Choe (50 mg/l), Patiala Ki Rao (50 mg/l), Sukhna Choe (50 mg/l), Birupa (42 mg/l), Cauvery (38 mg/l), Kharoon (38 mg/l), Sukhana (36 mg/l), Bharalu river (36 mg/l), Godavari (36 mg/l), Kuakhai (36 mg/l), Kathajodi (36 mg/l), Chambal (34 mg/l), Seonath (30 mg/l), Bhima (28.6 mg /l), Satluj (28 mg/l), Ib (25.2 mg/l), Tapi (25 mg/l), Kali-Hindon (24 mg/l), Girna (23 mg/l), Bhadra (22.5 mg/l), Khari (19 mg/l), Kolak (19 mg/l), Manjira (18 mg/l), Tunghabhadra (16.5 mg/l), Damanganga (16 mg/l), Kshipra (15 mg/l), Nambul (14.6 mg/l), Ganga (14 mg/l), Ramganga (14 mg/l), Tungha (13.5 mg/l), Karamana (13.2 mg/l), Gomti (12 mg/l), Nira (11.5 mg/l), Deepar Bill (11 mg/l), Chandrabhaga (10.2 mg/l), Laxmantirtha (10 mg/l) and Krishna (9.8 mg/l). The relatively low values of BOD are measured in river(s) Beas, Mahi, Narmada, Brahmaputra, Mahanadi, Pennar, Baitarni and Brahamani.

In respect of Total Coliform and Faecal Coliform Numbers, river Yamuna is leading with highest count of $32X10^7$ MPN/100 ml and $23X10^7$ MPN/100 ml respectively followed by Kali ($35X10^6$ MPN/100 ml and $16X10^4$ MPN/100 ml), Hindon ($35X10^6$ MPN/100 ml and $16X10^4$ MPN/100 ml), Chambal($87X10^5$ MPN/100 ml and $22X10^3$ MPN/100 ml), Damodar ($45X10^5$ MPN/100 ml and $25X10^5$ MPN/100 ml), Ghaggar ($35X10^5$ MPN/100 ml and $23X10^4$ MPN/100 ml), Ganga ($31X10^5$ MPN/100 ml and $7X10^5$ MPN/100 ml), Tons river ($131X10^4$ MPN/100 ml and 121 $X10^2$ MPN/100 ml), Rupnarayan ($7X10^5$ MPN/100 ml and $4X10^5$ MPN/100 ml), Kali Hindon ($27X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Brahmaputra ($24X10^4$ MPN/100 ml and $24X10^4$ MPN/100 ml), Bharalu ($24X10^4$ MPN/100 ml and $24X10^4$ MPN/100 ml), Bhogdoi ($24X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Satluj ($17X10^4$ MPN/100 ml and $9X10^4$ MPN/100 ml), Kathajodi ($16X10^4$ MPN/100 ml and $92X10^3$ MPN/100 ml), Gomti ($16X10^4$ MPN/100 ml and $9X10^4$ MPN/100 ml), Barakar ($16X10^4$ MPN/100 ml and $5X10^4$ MPN/100 ml), Mindhola ($11X10^4$ MPN/100 ml and $46X10^3$ MPN/100 ml), Borak ($11X10^4$ MPN/100 ml and $15X10^3$ MPN/100 ml), Sabarmati ($75X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Krishna ($716X10^2$ MPN/100 ml and 1600 MPN/100 ml), Brahmani ($54X10^3$ MPN/100 ml and $22X10^3$ MPN/100 ml), Tapi ($46X10^3$ MPN/100 ml and $15X10^3$ MPN/100 ml), Kathakal river ($46X10^3$ MPN/100 ml and $93X10^2$ MPN/100 ml), Baleshwar Khadi ($46X10^3$ MPN/100 ml

and 24X10^3 MPN/100 ml), Purna (46X10^3 MPN/100 ml and 24X10^3 MPN/100 ml), Karmana (39X10^3 MPN/100 ml and 31X10^3 MPN/100 ml), Godavari (36X10^3 MPN/100 ml and 2200 MPN/100 ml), Mahanadi (35X10^3 MPN/100 ml and 17X10^3 MPN/100 ml), Kuakhai (35X10^3 MPN/100 ml and 17X10^3 MPN/100 ml), Nagavalli (35X10^3 MPN/100 ml and 2600 MPN/100 ml), Cauvery (28X10^3 MPN/100 ml and 17X10^3 MPN/100 ml), Valvant (24X10^3 MPN/100 ml and 16X10^3 MPN/100 ml), Kaveri (24X10^3 MPN/100 ml and 15X10^3 MPN/100 ml), Mahananda (22X10^3 MPN/100 ml and 4X10^3 MPN/100 ml), Bhavani (22X10^3 MPN/100 ml and 3300 MPN/100 ml), Ambika (21X10^3 MPN/100 ml and 15X10^3 MPN/100 ml), Kalna (16X10^3 MPN/100 ml and 9200 MPN/100 ml), Khandepar (16X10^3 MPN/100 ml and 9200 MPN/100 ml) and Sikrana (16X10^3 MPN/100 ml and 9X10^3 MPN/100 ml) at certain locations. The river Mahi, Subernarekha, Pennar, Beas, Baitarni and Narmada are relatively clean rivers as the number of Total Coliform and Faecal Coliform count are relatively less than 4300 MPN/100 ml and 1700 MPN/100 ml respectively.

3.3 Other parameters

The results of conductivity, pH and temperature measurement revealed that conductivity is conforming to the irrigation requirement in most of the rivers except estuarine parts. The level of conductivity observed in the mainstream of major river basins ranging between 23-56500 μmhos/cm and the higher values are in the estuarine region due to tidal influence. The creeks in Mumbai region indicate the conductivity values as high as 61250 in Thane Creek and 60930 in Mahim Creek. The hardness varies between 6-1850 mg/L in most of the rivers in the freshwater zones. The river Chambal D/s Nagda carries the highest concentration due to effluent discharges from Rayon Industry. However, the stretch of river Hosdurg has values of hardness as high as 6000 mg/L in the estuarine reach. Total Alkalinity ranges between 4-640 mg/L and the highest value is observed in River Sabarmati. The observed range of Boron in surface waters is 0.001 – 6.4 mg/l with a highest value in river Palar in Tamil Nadu. The concentration of Fluoride observed is 0.01 – 3.97 mg/L during the year and the higher values are observed in river Dhansiri in Assam and Damodar in West Bengal.

3.4 Groundwater Quality

- **Andhra Pradesh** -Conductivity varies from 141 to 7380 μmhos/cm except few locations, conductivity is meeting the criteria limit for drinking as well as irrigation purposes. The highest value of nitrate is observed at B/W near M/S Andhra sugars Ltd., Kovvur, W.G. Distt. (45.8 mg/l).

- **Assam, Meghalaya, Mizoram and Tripura-** Conductivity varies from 48-1294 μmhos/cm and is meeting the criteria limit for drinking as well as irrigation purposes. The concentration of Nitrate (NO_3^-) is observed in the range of 0.03-12.0 mg/l

- **Chattisgarh and Madhya Pradesh-** Conductivity varies from 210-2225 µmhos/cm whereas the concentration of Nitrate (NO_3^-) is observed in the range of 0.10-8.50 mg/l.

- **Himachal Pradesh, Chandigarh and Punjab-** Conductivity varies from 304-1520 µmhos/cm and the level of Nitrate (NO_3^-) is observed in the range of 0.1- 6. 3 mg/l.

- **Kerala-** Conductivity varies from 90-700 µmhos/cm and is meeting the criteria limit for drinking as well as irrigation purposes. The concentration of Nitrate (NO_3^-) is observed in the range of 0.3-10.6 mg/l.

- **Orissa** Conductivity varies from 120-1606 µmhos/cm. The concentration of Nitrate (NO_3^-) is observed in the range of 0.25- 22 mg/l.

- **Pondicherry and Tamil Nadu-** Conductivity varies from 82-37,650 µmhos/cm and the higher values are due to sea water ingress in coastal tract. Nitrate is observed in the range of 0.08-2.90 mg/l.

- **Daman, Maharashtra and Gujarat**- Conductivity varies from 105-6424 µmhos/cm and higher values are attributed to draught conditions and concentrated industrial activities. The concentration of Nitrate is observed in the range of 0.08-35.0 mg/l.

- **Rajasthan** The conductivity varies from 200-16,900 µmhos/cm and the salinity is attributed to saline soils. The concentration of Nitrate (NO_3^-) is observed in the range of 0.14- 15.6 mg/l.

- **Uttar Pradesh and Uttaranchal- Conductivity** varies from 410-2439 µmhos/cm whereas the concentration of Nitrate (NO_3^-) is observed in the range of 0.2- 24.2 mg/l.

- **West Bengal- Conductivity** varies from 135-2590 µmhos/cm and the higher concentrations are in the vicinity of estuarine zone. The concentration of Nitrate (NO_3^-) is observed in the range of 0.1- 9.6 mg/l.

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

Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
Ganga	2525	34	2002	3-34	6.4-9.0	19-2720	2.7-11.5	0.5 – 16.8	1-30	300-25x10^5	20-11x10^5
		34	2003	4-34	6.8-8.9	49-1323	4-11	0.8-27	2-47.2	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	1.0-37.6	13-45x10^5	13-11x10^5
		39	2006	9-33	7.0-8.88	97-5620	2.2-11.9	0.1-16.4	4-38.4	1-25x10^5	17-11x10^5
		39	**2007**	4-33	6.1-8.8	23-5040	1.4-11	0-14	2.6-30	0-28x10^5	0-7 x10^5
Yamuna	1376	23	2002	3-34	6.7-9.8	56-1959	0.1-22.7	1.0 – 36	1-112	27-26.3x10^6	11-17.2x10^5
		23	2003	2-38	6.6-10	45-3500	0.3-22.8	1-58	1-187	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	1-180	14-307x10^6	11-52x10^5
		23	2006	4-34	7.14-9.5	220-1876	1.3-18.8	1.0-144	4-240	7-231x10^7	2-13x10^6
		23	**2007**	6.5-34	5-8.4	57-1940	0-17.7	0-93	1.0-407	0-32 x10^7	0-23 x10^6
Sabarmati	371	8	2002	12-32	2.9-8.6	269-13530	0.6-7.9	0.8 – 475	4-1794	210-28x10^5	28-28x10^5
		8	2003	22-33	5.6-8.5	278-7270	1.2-9.8	0.6-275	4-803	9-11x10^6	4-46X10^5
		8	2004	26-35	6.6-8.8	286-4090	0.7-10.2	0.9-380	-	28-46X10^4	20-24X10^4
		9	2005	24-33	6.4-8.5	154-4290	0.3-11.5	0.1-207	12-95	15-11x10^5	9-11x10^5
		9	2006	20-34	6.79-8.67	256-3970	0.2-14.7	0.8-293	9-825	9-110x10^5	4-11x10^5
		9	**2007**	23-29	4.0-7.56	292-2920	0-8.0	2-310	16-203	43-75 x10^3	15-15 x10^3
Mahi	583	7	2002	19-34	7.1-9.2	175-5720	0.2-8.5	0.1 – 3.0	9-163	3-2400	3-75
		7	2003	18-34	7-8.8	97-750	2.9-10.1	0.5-3.9	7-38	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	3-18	3-14x10^3	2-1x10^3

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Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		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	2.5-20	4-160	0-11
Tapi	724	10	2002	20-40	7.4-9.0	76-700	4.8-8.8	0.6 – 10.0	8-40	40-2100	2-210
		10	2003	18-36	3.1-9.2	119-1130	3.1-10.4	1-10	10-44	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	5-47	5-11X10^4	2-11X10^4
		14	**2007**	23-39	7.3-8.5	210-581	3.7-8.7	1.1-25	9-36	17-46 x10^3	7-15 x10^3
Narmada	1312	14	2002	-	6.9-9.3	102-1341	5.8-9.8	0.1 – 3.8	6-47	9-2400	2-64
		14	2003	12-31	7.1-8.5	95-441	4.5-9.5	0.4-3.3	7-29	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	12-18.3	3-2400	2-210
		15	2006	9-32	7.1-8.6	188-682	6.2-11	0.4-3.7	3-50	3-2400	0-39
		15	**2007**	19-31	7.5-8.8	244-1629	6.2-10.4	1.2-3.5	3.0-19. 3	7-1600	0-15
Godavari	1465	11	2002	22-35	7.0-9.0	118-1400	3.1-10.9	0.5 – 78.0	3-96	8-5260	2-3640
		11	2003	22-37	7.1-8.7	115-1350	3.2-9.3	1.7-53	5-188	70-68200	3-1400
		11	2004	21-35	6.5-9	86-1290	2.4-9.2	0.2-15	-	4-22X10^4	2-5X10^4
		18	2005	23-32	6.7-9.1	121-1300	0.8-8.7	0.5-20	4.0-80	2-33 X10^3	1-10 X10^3
		18	2006	19-34	6.65-9.11	75-691	1.1-9.6	1.2-32	3-36	2-31 X10^3	2-6 X10^3
		18	**2007**	20-37	5.9-8.9	126-918	3.2-7.5	0.2-36	2-16	5-36 x10^3	0-2200
Krishna	1401	17	2002	18-33	6.8-9.5	28-11050	2.9-10.9	0.2 – 10.0	3-88	17-33300	3-10000
		17	2003	18-35	6.7-8.9	36-40000	0.7-12.6	0.5-17	10.5-68	6-7X10^4	2-2X10^4
		17	2004	18-38	6.7- 9	71-44000	0.4-9.2	0.3-9	-	15-124X10^3	3-28X10^3

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Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		21	2005	24-37	6.5-9.9	69-43300	1.4-8.8	0.4-40	4-44	17-84 $X10^3$	1-34 $X10^3$
		19	2006	15-40	6.32-9.30	76-2580	3.0-8.5	0.4-14.8	4-32.4	4-86$X10^3$	1-6000
		19	**2007**	13-38	6.2-9.1	69-23400	3.0-10	0.1-9.8	4.0-48	0-71$x10^3$	0-1600
Cauvery	800	20	2002	21-37	2.0-9.2	31-53100	0.1-12.6	0.1 – 26.6	30	39-160000	2-28000
		20	2003	8-34	7-9.2	42-57200	2.1-13.5	0.2-10	16-128	4-22$X10^3$	2-4000
		20	2004	19- 35	6.6-9	35-39720	3.3-9.9	1-9	-	2-5$X10^4$	2-17$X10^3$
		20	2005	20-37	6.2-9.5	28-48700	0.3-9.8	1-12	16-96	2-9500	1-3000
		20	2006	20-34	7.0-9.3	26-1694	2.7-8.9	1-6	8-24	90-3500	3-1400
		20	**2007**	19-32	6.5-8.8	28-56500	0-12.4	0.1-38	8-45	40-28 $x10^3$	4-17 $x10^3$
Mahanadi	851	16	2002	18-38	7.3-8.9	114-15940	1.3-10.4	1.0 – 7.6	7-39	15-30000	50-17000
		16	2003	17-37	6.5-8.6	77-83600	4.7-10.1	0.3-5.6	10-70	4-35$X10^3$	50-28$X10^3$
		16	2004	17- 34	6.3-8.8	105-20700	4.4- 9.4	0.2-4	-	3-92$X10^3$	27-24$X10^3$
		21	2005	22-34	6.1-8.7	75-36279	4.5-10	0.2-16	4-150	3-92$X10^3$	78-54$X10^3$
		21	2006	20-32	6.97-8.9	113-34587	4.7-8.5	0.2-3.8	20-40	14-92$X10^3$	68-54$X10^3$
		21	**2007**	26-33	7.3-8.54	102-813	6.2-8.9	1.2-3.6	2.8-30	27-35 $x10^3$	700-17 $x10^3$
Brahamani	799	11	2002	20-38	7.0-8.4	81-376	5.2-9.8	1.5 – 6.0	8-13	80-90000	40-60000
		11	2003	17-35	6.6-8.4	69-501	6.1-10.2	0.2-6	4.2-4.2	90-24$x10^3$	60-14$x10^3$
		11	2004	16-28	6.3-8.4	47-402	6-9.6	0.2-7	-	490-28$x10^3$	22-13$x10^3$
		11	2005	16-34	6.3-8.7	65-850	5.1-13.8	0.3-5.2	4-32.6	490-16$x10^4$	330-16$x10^4$
		11	2006	18-32	6.9-8.4	102-380	4.6-8.9	0.3-5.4	8-20.2	940-5400	630-2400
		15	**2007**	20-40	6.7-8.5	91-582	1.9-8.9	0.3-4.9	5.1-64	210-54 $x10^3$	110-22 $x10^3$
Baitarni	-	5	2002	24-36	7.3-8.3	54-78400	6.8-9.3	2.0 – 6.8	7	900-22000	700-11000

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Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		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	12.9-20.4	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	6-20.9	330-5400	170-2200
Subernarekha	395	6	2002	18-36	6.5-8.0	113-355	5.2-8.5	0.2 – 12.0	4-96	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
		6	2005	20-36	6.8-8.3	130-405	5.5-8.6	1.0-4.7	4-38	110-1400	78-700
		6	2006	19-34	6.9-7.9	192-15013	5.8-8.2	0.3-4.6	8.0-68	2200	1300
		6	**2007**	19-37	6-8.1	134-740	4.6-8.7	0.9-8.0	4-100	540-2400	200-920
Brahmaputra	916	6	2002	15-32	6.5-9.0	104-684	1.1-10.5	0.1 – 3.9	6-11	360-240000	300-24000
		6	2003	14-32	6.4-8.4	77-570	1.2-11.5	0.4-3.5	4.8-27.4	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	3.0-47.2	1-24x10^4	300-24x10^4
		10	**2007**	18-32	5.9-7.9	76-645	5.1-10	0.1-3.4	3.1-15.4	0-24 x10^4	0-24 x10^4
Pennar	597	4	2002	-	7.5-8.7	364-978	6.0-9.3	1.0 – 2.9	14-16	-	-
		4	2004	23-33	7.6-8.4	401-1035	3.3-8.8	0.6-4.8	14-16	120-2400	3-3
		5	2005	27-30	7.8-8.8	447-2340	3.8-8	0.8-2.8	12-13.2	16-2790	2-35
		5	2006	20-30	6.9-8.2	438-1933	3.0-6.8	10-2.8	-	20-62x10^3	1-960
		5	**2007**	21-31	7-8.7	250-1916	2.8-7.8	0.5-3.0	10-12	14-50x10^3	2-110
Satluj	1078	20	2002	9-32	6.8-8.8	131-819	3.8-11.4	0.1 – 45.0	1-80	8-35000	2-3500

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Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		20	2003	5-30	6.9-8.9	164-1226	3.4-11.5	0.1-24	0.8-61	3-3x10^4	1-1300
		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	2.8-60	1-35x10^4	1-11x10^4
		21	2006	7-28	7.1-8.26	160-958	2.8-10.6	0.1-32	1.6-68	1-17x10^4	1-5x10^4
		21	**2007**	2-26	7-8.6	145-865	3.2-11.9	0-28	1.6-76	3-17 x10^4	0-9 x10^4
Beas	460	19	2002	3-32	7.1-8.7	53-517	5.2-11.5	0.3 – 5.0	1-13	2-2400	2-1600
		19	2003	4-29	7.3-8.9	76-559	7-12	0.1-6	1-18	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	1.8-22	2-11x10^3	2-1100
		19	2006	4-27	7.0-8.2	94-395	5.8-11.0	0.2-3.2	2-6.9	2-11x10^3	2-1100
		19	**2007**	2-22	6.2-8.9	86-470	5.9-12.8	0.1-2.9	1.2-38	0-2400	0-2400
Ghaggar	291	15	2002	11-33	7.0-9.5	320-1012	2.6-9.6	1-180	4-560	43-14000	9-2500
		15	2003	18-30	6.5-8.1	280-1477	3.5-7.9	0.9-28	9.6-251.2	28-6000	9-600
		15	2004	16-29	7.2-8.5	188-1390	0.8-8	0.5-28	-	500-17x10^4	28-9x10^4
		19	2005	14-29	7-9	21-2682	2.2-8.9	1-626	96-1600	43-15x10^4	14-5x10^4
		19	2006	14-22	7.1-7.9	230-1156	1.8-7.3	1.2-30	7.8-90	600-24x10^4	170-11x10^4
		19	**2007**	10-34	6.5-8.8	50-4260	0.3-8.6	0.2-218	4.6-200	7-35 x10^5	3-23 x10^4
Amlakhedi	-	1	2002	27-32	1.7-7.2	7160-16770	0-0	485 – 1561.6	1821-3860	28-1100	3-28
		1	2003	27-32	3.1-7.4	3070-3070	-	33-1463	-	3-3	3-3
		1	2004	20-32	2.2-7.4	7020-13400	0.4-0.4	247-947	-	9-93	2-4
		1	2005	27-27	2.4-7.5	300-11810	3.9-3.9	35-714	1548-1548	7-15	2-4

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Name of the River	Length (Km)	No of Monitoring locations	Year	Observed Range of Water Quality Parameters							
				Temp. (^{0}C)	pH	Conductivity (μmhos/cm)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Total Coliform (MPN/100 ml)	Faecal Coliform (MPN/100 ml)
		1	2006	27-29	6.83-7.60	14440-16720	-	281-582	1678-1678	7-9	6-7
		1	**2007**	26-28	7.3-7.9	316-9470	-	73-522	1750-1750	4-28	2-4
Kali East	-	2	2002	15-30	7.2-8.7	24-1930	6.7-11.9	1.9 – 67.0	66-421	2100-48x10^6	10 x10^4-36 x10^4
		2	2003	16-32	6.4-8.3	225-1590	4.9-8.6	2-149	357-552	2800-19x10^7	40-46x10^6
		2	2004	15-31	7-8.3	273-1704	0.1-7.9	1.8-165	-	2300-29x10^6	200-95x10^5
		2	2005	17-25	7.4-8.4	23-1730	1.7-10.6	2-136	48-492	7500-18x10^6	2300-122x10^4
		2	2006	15-23	7.48-8.90	236-1623	4.9-14.7	3.6-160	501-501	9300-26x10^5	7500-161x10^4
		2	**2007**	25-30	7.1-7.4	53-296	6.9-7.8	1-3	8.0-8.0	140-1800	80-550
Chambal	-	7	2003	2-36	7-9.3	181-8800	1-10.8	0.3-10	2-28	28-145x10^5	9-22x10^4
		7	2004	16-33	7-9.2	150-10900	4.3-11.1	0.7-24	-	28-39x10^4	11-41x10^3
		8	2005	16-39	6.9-9.5	170-10400	2.8-14.3	0.3-25	2-172.6	14-5x10^4	3-7100
		8	2006	16-28.5	7.6-8.8	290-9200	4.2-9.5	0.6-20	4-14	4-20x10^4	4-3x10^4
		8	**2007**	14-33	6.8-8.8	220-10680	0-13.3	0.2-34	1.7-64	4-87 x10^5	3-22 x10^3

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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, FirozpurCantt., Gurdaspur, Kapurthala, Khanna, KotKapura, Malerkotla, Malout, Mansa, Muktsar, Phagwara, Rajpura, S.A.S.Nagar, (Mohali), Sangrur, Nabha, Panchkula Urban Estate, Hanumangarh.

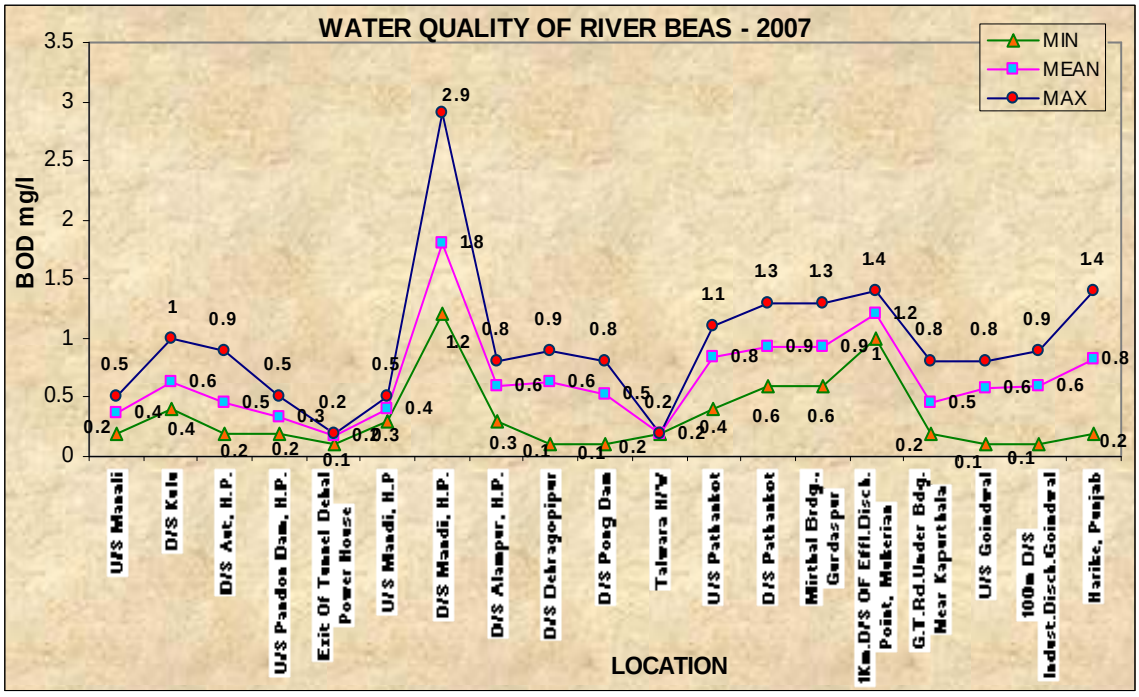
4.2 Water Quality Monitoring in Indus Basin

The State Pollution Control Boards of Himachal Pradesh, Punjab, Haryana and Rajasthan at 58 locations carry out the water quality monitoring of tributaries of River Indus in the basin. The ranges of water quality observed in rivers Beas, Satluj, Sirsa, Swan, Largi, Parvati and Ravi with respect to Temperature, pH, Conductivity, DO, BOD, COD, Nitrite, Nitrate, Ammonia-N, Total Coliforms (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 in River Beas. The BOD value ranges from 0.1-2.9 mg/l. The count of Faecal Coliforms ranges from Nil to 2400 MPN/100ml whereas Total Coliforms ranges from Nil-2400 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 is presented in Fig.4.1.

Figure 4.1: Water Quality of River Beas



4.2.2 Water Quality of river Satluj

The water quality of river Satluj is conforming to water quality criteria with respect to pH, conductivity and DO except at 100m D/s Budha Nala Confl., Ludhiana where DO is observed low than the desired criteria. The DO varies from 3.2 to 12.0 mg/l and. The BOD ranges from 0.0-28 mg/l. The maximum value 28 mg/l of BOD is observed at D/s Budhanala Confluence at Ludhiana. The other locations having high level of BOD are at Boat Bridge Dharmkotnakodar Road of Jalandhar (16 mg/l), D/s of East Bein (8 mg/l) and Bridge Harike at Amritsar (4.8 mg/l) in Punjab. The Faecal coliform value ranges from 0 to 90,000 MPN/100ml whereas the Total Coliform value ranges from 3 to 170,000 MPN/100ml. The Total Coliforms count are considerably high and does not meet the criteria at number of locations such as at D/s of Budhanala confl. in Ludhiana, Boat Bridge at Dharmkotnakodar in Jalandhar and D/s of East Bein, in Punjab. The Fecal Coliforms count is considerably high at D/s of Budhanala Confl. in Ludhiana and Dharmkotnakodar in Jalandhar. The concentration of Nitrate (NO_3^-) is observed in the range of 0.08-5.4 mg/l, whereas Ammonical Nitrogen (NH_4-N) is in the range of 0.2-2.2 mg/l. The water quality of river Satluj is given in Annexure–I (Table 4.2). The water quality status of river Satluj with respect to BOD is presented in Fig. 4.2 & 4.3.

Figure 4.2: Water Quality of River Satluj (Upper Stretch)

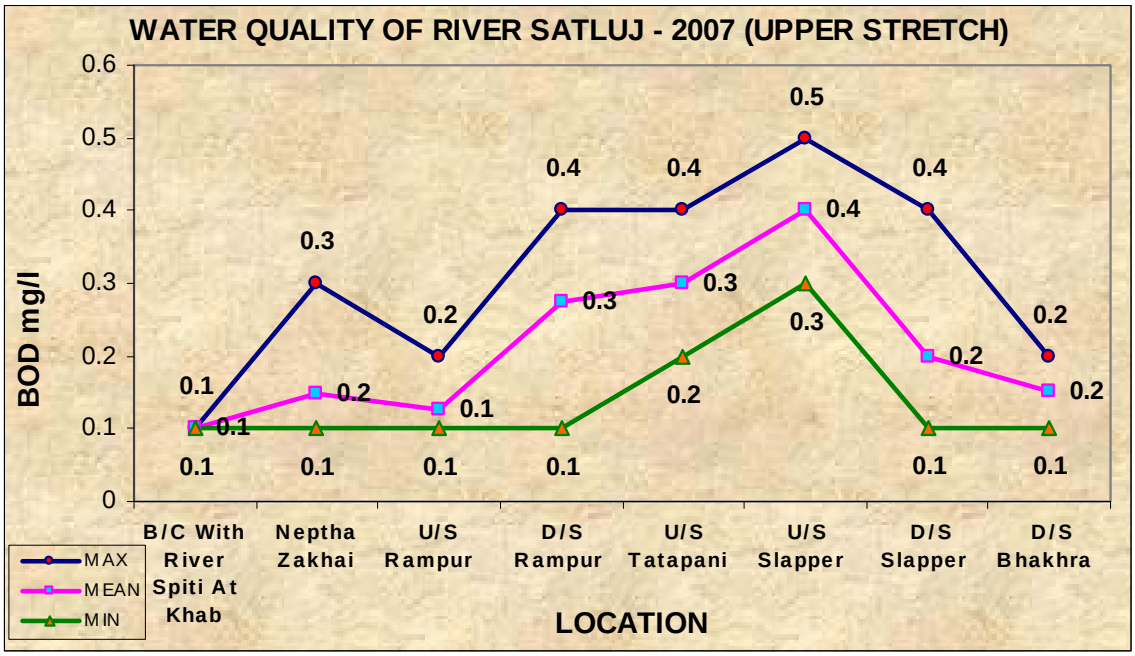
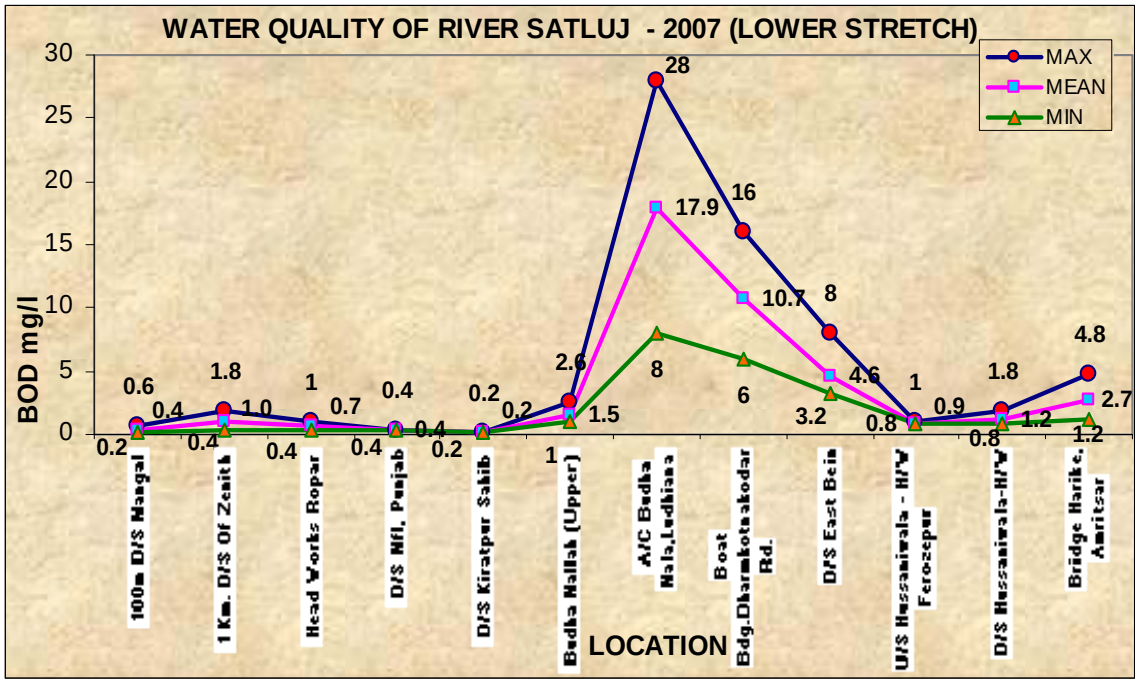


Figure 4.3: Water Quality of River Satluj (Lower Stretch)



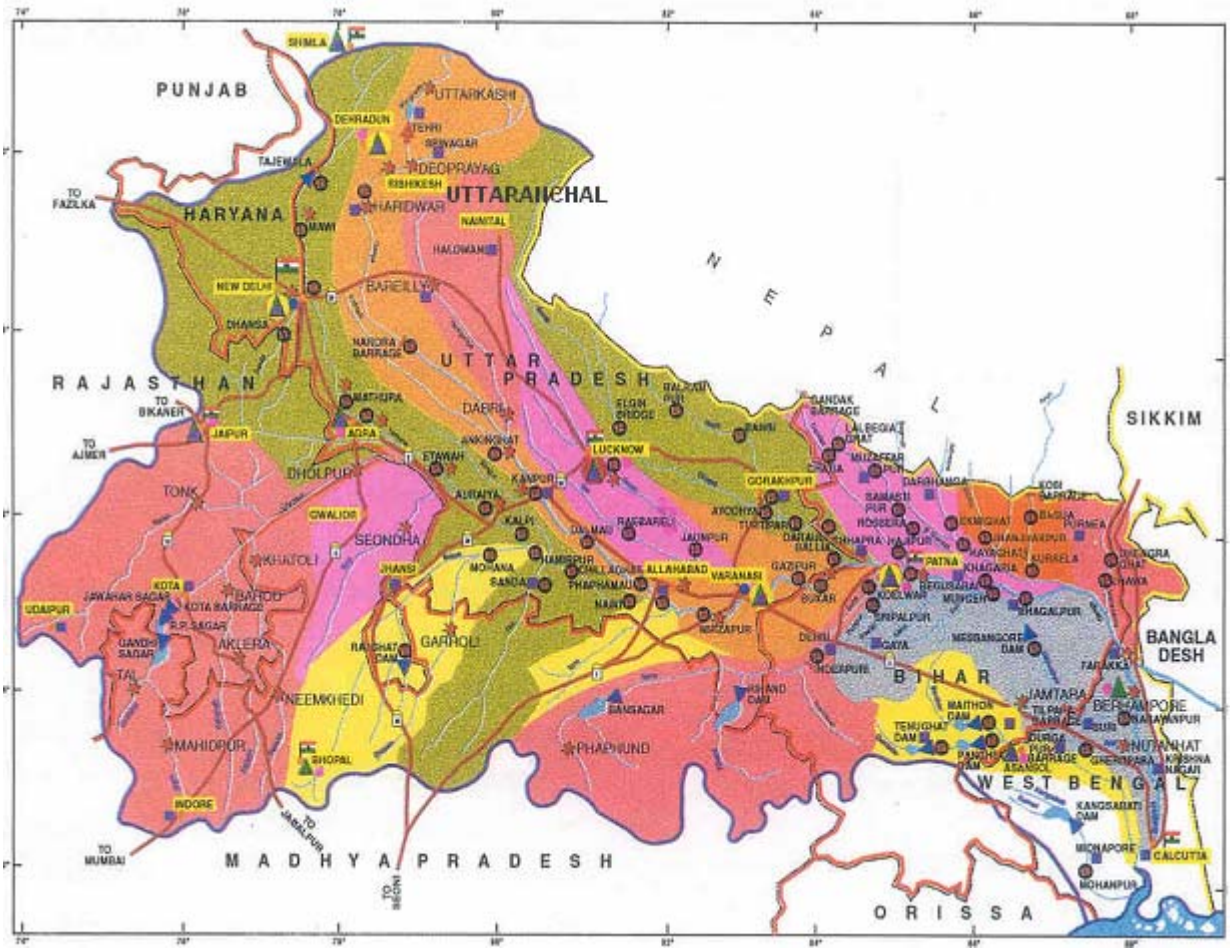
4.2.3 Water Quality of river Ravi, Parvati, Largi, Swan and Sirsa

The water quality of river Ravi, Parvati, Largi, Swan and Sirsa are meeting the water quality criteria for pH, DO, Conductivity, BOD and TC at all locations in the year during the period of monitoring except in river Swan at D/s Nangal and river Sirsa D/s Nalagarh Distt. Solan. River Swan is not meeting desired water quality quality criteria in respect of DO (2.4 mg/l) and BOD (4.8 mg/l). River Sirsa is receiving wastewater from industrial area of Barootiwala which cause increase in BOD (4.8 mg/l) level in the river. The Water Quality of river(s) Ravi, Parvati, Largi, Swan and Sirsa 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 Uttaranchal, 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 Uttaranchal, 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 Uttaranchal 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 Uttaranchal, Uttar Pradesh, Bihar, West Bengal, Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh and Central Pollution Control Board at 141 locations. The ranges of water quality observed in rivers in Ganga Basin with respect to pH, Conductivity, DO, BOD, Total Coliform and Faecal Coliform are calculated and 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. Dissolved Oxygen ranges from 1.4 to 11.0 mg/l. The lowest value of 1.4 mg/l DO is observed at Kanpur D/s (Jajmau Pumping Station) in Uttar Pradesh. High value of conductivity is observed at Diamond Harbour (5040 µmhos/cm) and Kanpur U/s (Ranighat) (4300 µmhos/cm).

The BOD value ranges from 0.0-14.4 mg/l. The highest value of 14.4 mg/l of BOD is observed at D/S of Varanasi (Malviya Bridge). The other locations observed with maximum BOD level exceeding the criteria are Haridwar D/s, Narora, Garhmukteshwar, Kannauj U/s and D/s, Bithoor, Kanpur U/s and D/s, Dalmau (Raibareilly), Allahabad (Rasoolabad) and D/s, Varanasi U/s, Ghazipur (Trighat), Beharampore, Dakshineshwar, Garden reach, Uluberia, Palta and Diamond Harbour.

The count of Faecal Coliforms (FC) ranges from 0 to 7, 00,000 MPN/100ml whereas Total Coliforms (TC) ranges from 0 to 31,00,000 MPN/100ml. The Total Coliforms (TC) is not meeting the water quality criteria at most of the locations. The highest value of Total Coliform is observed in Alkananda b/c to river Mandakini at Rudraprayag and of Faecal Coliform at Dakshineshwar and Garden Reach (7,00,000 MPN/100ml) in West Bengal. The concentration of Nitrate (NO_3^-) varies from 0.1-3.8 mg/l whereas Nitrite (NO_2^-) ranges from 0.01-3.3 mg/l and the Ammonical Nitrogen (NH_4-N) are observed in the range of 0.0-1.5 mg/l. The water quality of river Ganga with respect to pH, Conductivity, D.O, BOD, FC and TC, Nitrite, Nitrate and Ammonical Nitrogen is given in Annexure-I (Table 5.1). The water quality status of mainstream Ganga with respect to BOD is given in Figure 5.1 & 5.2.

Figure 5.1: Water Quality of River Ganga (Upper Stretch)

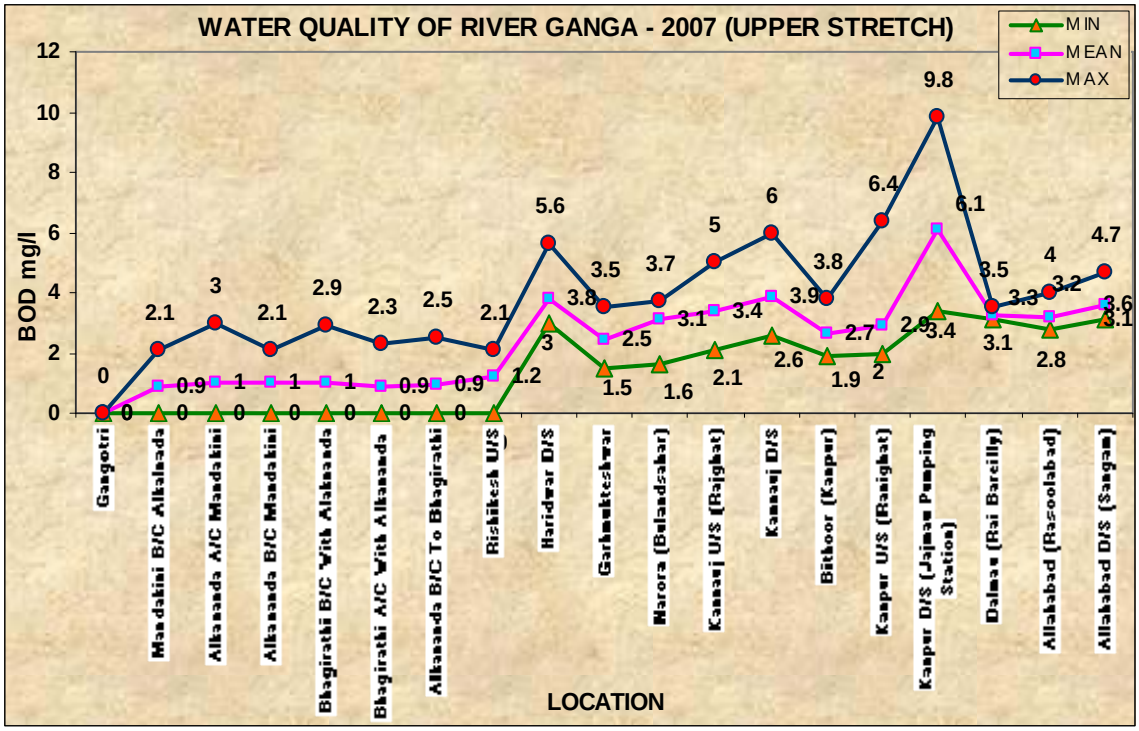
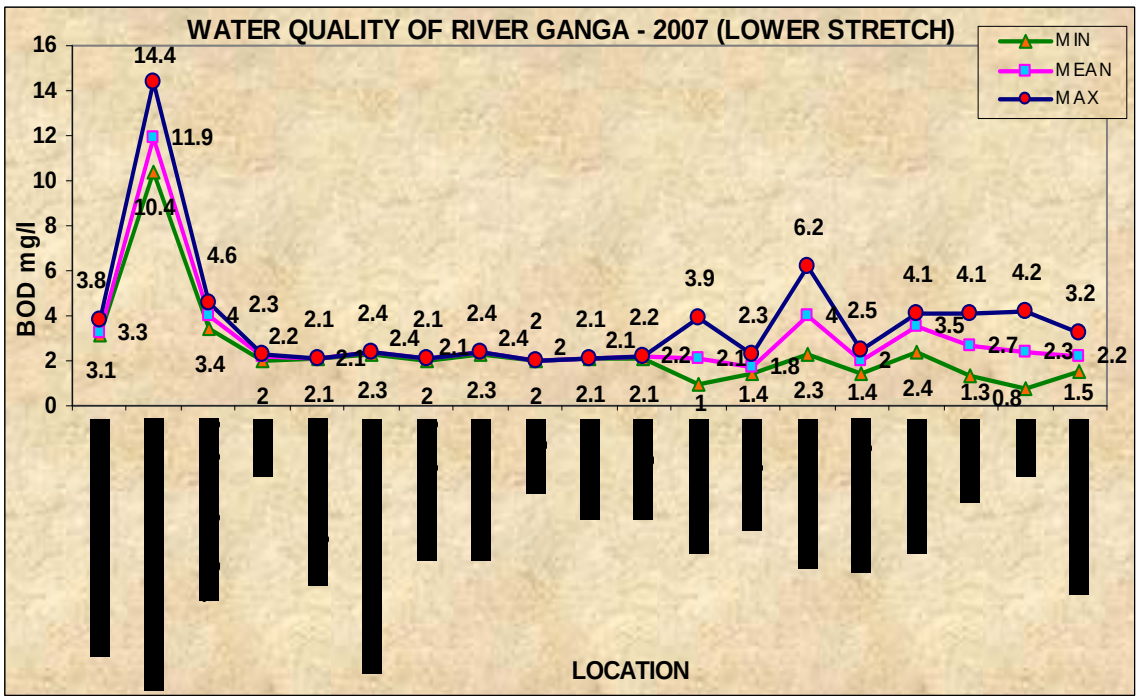


Figure 5.2: Water Quality of River Ganga (Lower Stretch)



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 Uttaranchal, 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 upstream 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 Yamuna River 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 downstream 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 downstream. 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 upstream 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 Chambal River 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 Yamuna River 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 is conforming to water quality criteria with respect to pH only throughout its length which ranges 5.0 to 8.4. The DO varies from 0.0 to 17.7 mg/l, which indicates that the river is highly septic or eutrophicated at a number of locations. The low values of DO are observed at Kalanaur, Nizamuddin Bridge, Okhla barrage after meeting Shahdara Drain, Mazawali, Agra U/s & D/s and Bateshwar.

The BOD ranges from 0.0-93.0 mg/l. The maximum value of 93 mg/l of BOD is observed at Okhla after meeting Shahdara drain. The other locations observed maximum BOD are at Nizamuddin (47 mg/l), Mazawali (37 mg/l), Agra D/s (33 mg/l), Mathura U/s (20 mg/l), Bateshwar (20 mg/l), Agra U/s (16 mg/l), Etawah (16 mg/l), Mathura D/s (15 mg/l), Juhika B/C with Chambal at Etawah (7 mg/l), Palla (6.0 mg/l), Sonepat D/s (5.0 mg/l), Kalanaur Yamuna Nagar (5.0 mg/l), Okhla Bridge-inlet of Agra canal (3.6 mg/l) and Allahabad D/s (3.1 mg/l).

Faecal Coliform value ranges from 0 to $23x10^6$ MPN/100ml whereas the Total Coliform value ranges from 0 to $32x10^7$ MPN/100ml. The Total and Faecal Coliforms count is considerably high and does not meet the criteria at number of locations in Delhi, downstream reach of Delhi upto Etawah downstream, Hathnikund, Mazawali, Poanta Sahib, Allahabad, Bateshwar, Kalanaur (Yamuna Nagar), Sonipat, and Palla. The concentration of Nitrate (NO_3^-) varies from 0.1-9.0 mg/l whereas Nitrite (NO_2^-) ranges from 0.01-1.02 mg/l and the Ammonical Nitrogen (NH_4-N) is observed in the range of 0.05-28.9 mg/l and does not meeting the criteria at number of locations in Delhi and downstream reach of Delhi upto Etawah downstream. The water quality of river Yamuna is presented in Annexure-I Table 5.2. The water quality status of mainstream Yamuna with respect to BOD is given in Figure 5.3 & 5.4.

Figure 5.3: Water Quality of River Yamuna (Upper Stretch)

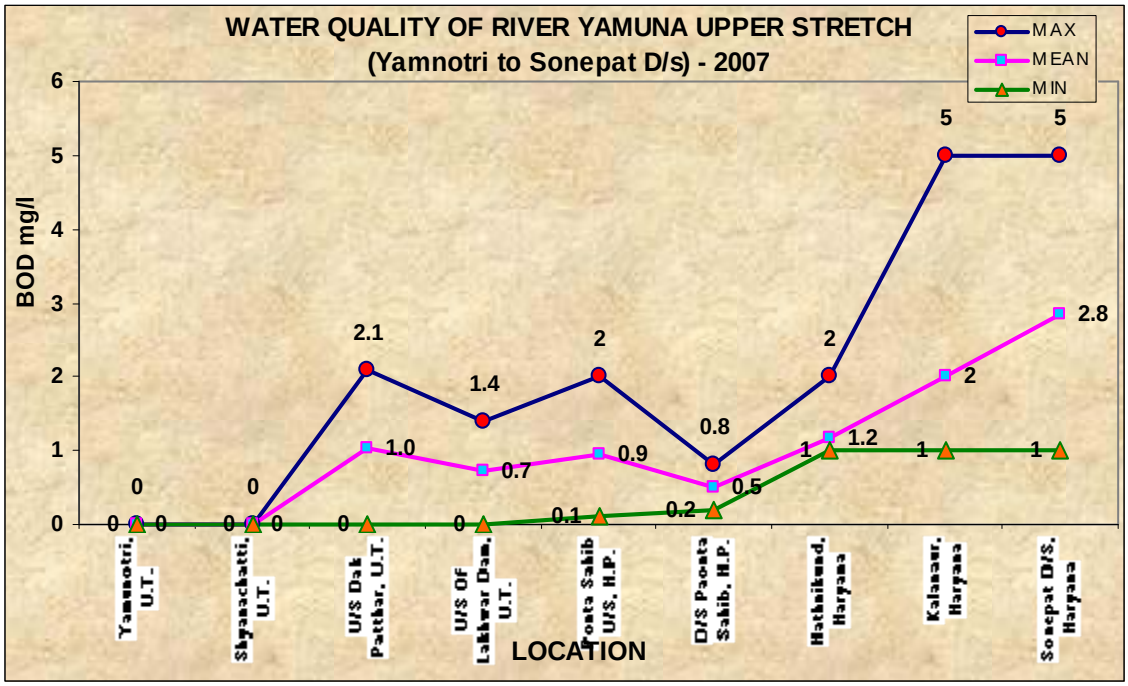
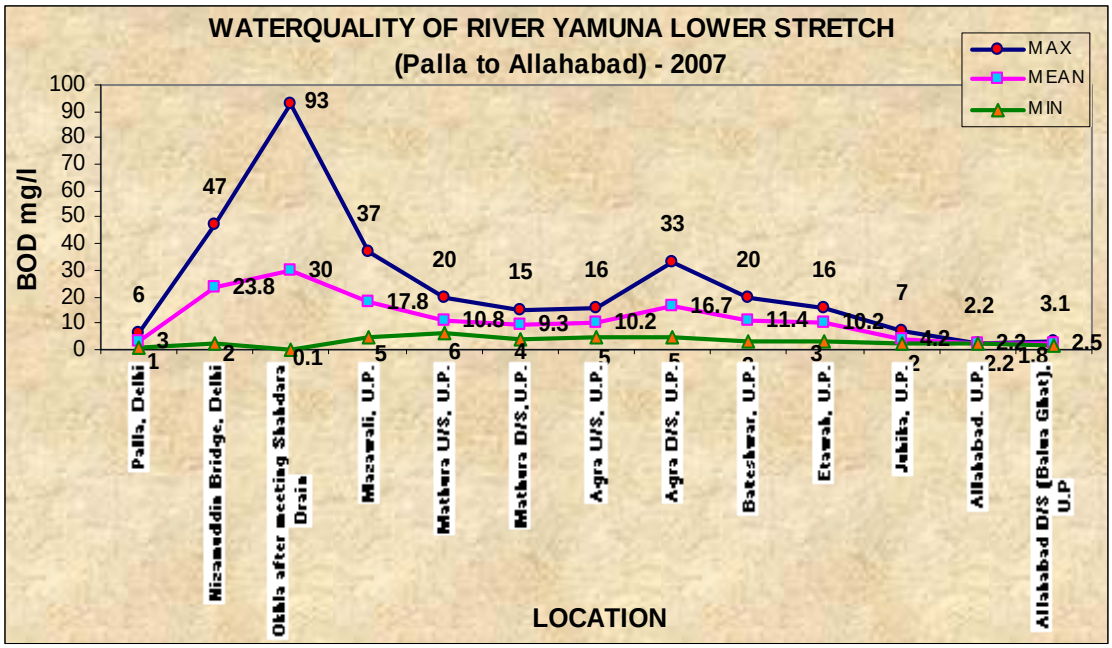


Figure 5.4: Water Quality of River Yamuna (Lower Stretch)



5.2.3 Water Quality of tributaries - Kalinadi (E), Ramganga, Gomti, Saryu, Ghaghara, Hindon, Kali-Hindon, Rihand, Rapti, Sikrana, Sai, Sirsa, Daha, Farmar and Gandak

The water quality of tributaries namely Kalinadi (E), Ramganga, Gomti, Saryu, Ghaghara, Hindon, Kali-Hindon, Rihand, Rapti, Sikrana, Sai, Sirsa, Daha, Farmar and Gandak is conforming to water quality criteria with respect to pH and conductivity throughout its length. The DO varies from 0.0 to 12.7 mg/l in mentioned rivers. The DO is observed Nil in following rivers Kali (E), Kali-Hindon and Hindon at various locations.

The BOD ranges from 1.0-120 mg/l in river Kali (E). The high BOD values were observed in Kalinadi (E) at Kannauj (120 mg/l), Hindon at Ghaziabad D/s (120 mg/l), Hindon at Puramahadev (34 mg/l), Kali (E) at Gulawati (34 mg/l), Hindon at Saharanpur downstream (24 mg/l), Kali (W) D/s Mujaffarnagar (24 mg/l), Ramganga at Kannauj (14 mg/l), Gomti at Jaunpur D/s (12 mg/l), Sikrana at Chanpatiya (8.0 mg/l), Gomti at Sitapur U/s at water intake pt. (4.2 mg/l), Kali (W) U/s Mujaffarnagar (4.1 mg/l), Gomti at Lucknow U/s (3.8 mg/l), Saryu at Ayodhya (3.2 mg/l), Gomti at Lucknow D/s (3.2 mg/l) and Rapti after confl. of R. Honin (3.1 mg/l).

The Faecal Coliform (FC) value ranges from 24 to $16x10^4$ MPN/100ml, whereas the Total Coliform (TC) value ranges from 18 to $35x10^6$ MPN/100ml. The highest count of TC is observed at Kali (E) at Gulawati. The other places having higher values for TC are Hindon at Pura Mahadev, Kali (E) at Kannuaj, Kalinadi (W) at U/s and D/s of Muzaffar Nagar, Hindon at Sharanpur D/s, Hindon at Ghaziabad D/s, Gomti at Lucknow U/s, Gomti at Jaunpur D/s, Gomti at Sitapur U/s, Sikrana at Chanpatiya and Saryu at

Ayodhya in Uttar Pradesh. The water quality of the tributaries Kalinadi (E), Ramganga, Gomti, Saryu, Ghaghara, Hindon, Kali-Hindon, Rihand, Rapti, Sikrana, Sai, Sirsa, Daha, Farmar and Gandak is presented in Annexure-I, Table 5.3.

5.2.4 Water Quality of tributaries - Chambal, Khan, Kshipra, Parvati, Betwa, Sind, Tons, Sone Johila, Sankh, Mandakini and Gohad.

The water quality of Chambal, Khan, Kshipra, Parvati, Betwa, Sind, Tons, Sone Johila, Sankh, Mandakini and Gohad tributary streams is conforming to water quality criteria with respect to pH, DO and conductivity at all the locations except Chambal at Nagda downstream and Khan at Kabit Khedi Near Indore in Madhya Pradesh where the high conductivity 10680 µmhos/cm and 2261 µmhos/cm respectively and DO of 0.0 mg/l is found. The low value of DO is also observed in River Chambal at Rameshwarghat near Sawaimadhopur (2.6 mg/l) and at Kota D/s (2 Km. from city) (3.7 mg/l) in Rajasthan.

The BOD ranges from 0.2-125 mg/l. The maximum value of 125 mg/l of BOD is observed in river Khan at Kabit Khedi near Indore. Other locations having high BOD are Chambal at Nagda D/s (34 mg/l), Kshipra at Ramghat at Ujjain (15 mg/l), Kshipra at Trivenisangam (1 Km. D/s of Sangam) (14 mg/l), Kshipra at Siddhawat (8 mg/l), Tons at Madhavgarh (8.0 mg/l), Chambal at Kota D/s (2 Km. from city) (5.3 mg/l), Mandakini at Chitrakoot (5.0 mg/l), Parvati near intake point Pillukhedi Distt. Rajgarh (4.5 mg/l) and Chambal at Rameshwarghat near Sawaimadhopur (4.3 mg/l).

The Faecal Coliform value ranges from 0-22,000 MPN/100ml, whereas the Total Coliform (TC) value ranges from 4 to 87,00,000 MPN/100ml. The highest values of Faecal Coliforms count and Total Coliforms are observed in Chambal at Etawah before confluence to river Yamuna. The other places having higher values for TC are Tons River in H.P., Sone at Koelwar, and Khan at Kabit Khedi near Indore. The concentration of Nitrate (NO_3^-) varies from 0.10-42.0 mg/l whereas Nitrite (NO_2^-) ranges from 0.01-7.8 mg/l. The maximum value of nitrate (42.0 mg/l) is observed in river Khan at Kabit Khedi near Indore. The Ammonical Nitrogen (NH_4-N) is observed in the range of 0.00-21.0 mg/l and does not meeting the criteria in river Betwa B/C Yamuna at Hamirrpur (21 mg/l) followed by River Khan at Kabit Khedi near Indore (15 mg/l), river Chambal at Gandhi Sagar Dam, at Rameshwarghat near Sawaimadhopur and Nagda D/s; Kshipra at Siddhawat D/s of Ujjain and Trivenisangam (1 Km. D/s of Sangam). The water quality of tributaries discussed above is presented in Annexure-I Table 5.4.

5.2.5 Water Quality of tributaries – Damodar, Barakar, Mahananda and Rupnarayan

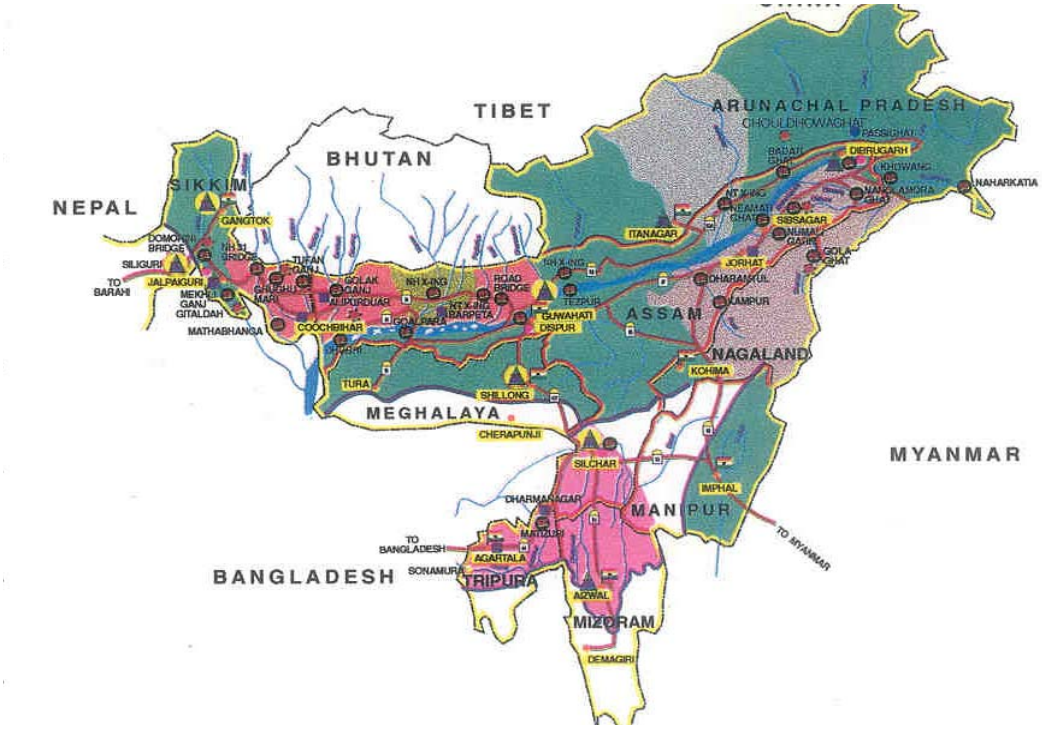
The water quality of the tributary streams Damodar and Rupnarayan with respect to pH, DO and Conductivity are meeting the water quality criteria, except Damodar at Haldia D/s where conductivity (13840 µmhos/cm) and pH 5.8 is observed. The BOD ranges from 0.6-4.9 mg/l. The highest value of

BOD (4.9 mg/L) is observed in Damodar near Mujher mana village A/c of Tamla Nallah and at Narainpur after Confl. of Nunia Nallah in West Bengal. The Faecal Coliform (FC) value ranges from 800 to $25x10^5$ MPN/100ml, whereas the Total Coliform (TC) value ranges from 1100 to $45x10^5$ MPN/100ml. The Total Coliforms values are above the criteria level at all the places. The nitrate (NO_3^-) values ranges from 0.10-2.8 mg/l. Ammonical Nitrogen (NH_4-N) values ranges from 0.0-13.0 mg/l. The highest concentration of ammonical nitrogen is observed at Damodar near Mujher mana village A/c of Tamla Nallah in West Bengal. 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).

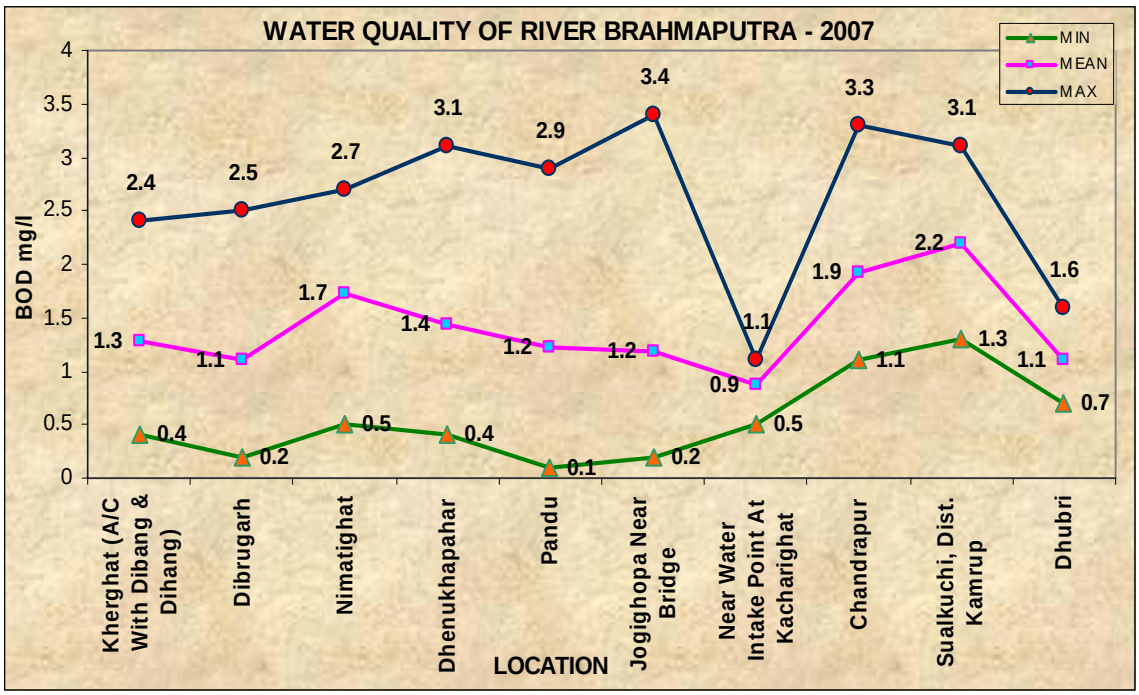
6.2 Water Quality Monitoring in Brahmaputra Basin

The State Pollution Control Boards of Assam, Nagaland and Sikkim at 66 locations 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 Subansiri, Kharsang, Buridihing, Pagladia, Digboi, Jaibharli, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Kathakal and Deepar Bill. The ranges of water quality observed in the mainstream and tributaries with respect to pH, Conductivity, DO, BOD, Nitrate, Nitrite, Ammonical Nitrogen, 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.

6.2.1 Water Quality of river Brahmaputra

The water quality of river Brahmaputra is conforming to water quality criteria with respect to pH, Conductivity and DO. The BOD value ranges from 0.1-3.4 mg/l. The highest value of 3.4 mg/l of BOD is observed at Jogijhoga near Bridge. The other locations having high value of BOD are at Chandrapur, Guwahati (3.3 mg/l), at Sualkuchi, Dist. Kamrup (3.1 mg/l) and at Dhenukhapahar (3.1 mg/l) in Assam. The count of Faecal Coliforms (FC) ranges from 0 to 2,40,000 MPN/100ml whereas the maximum number of Total Coliforms observed 2,40,001 MPN/100ml at Dhenukhapahar. The TC is not meeting the water quality criteria at many locations under monitoring programme. The water quality of Brahmaputra is presented in Annexure-I Table 6.1. The water quality status of river Godavari with respect to BOD is presented in Figure 6.1.

Figure 6.1: Water Quality of River Brahmaputra



6.2.2 Water Quality of tributary stream Dhansiri

The water quality of river Dhansiri is conforming to water quality criteria with respect to pH, Conductivity and DO at all the locations except Dhansiri at Nuton Basti in Nagaland, where the very low DO (1.2 mg/l) is found. The BOD ranges from 0.3-4.8 mg/l. The highest value of 4.8 mg/l of BOD is observed at Dhansiri at Nuton Basti, Nagaland. The BOD is not meeting the water quality criteria at all the locations under monitoring programme except at Bridge near Purana Bazar, Nagaland. The water quality of Dhansiri is presented in Annexure-I Table 6.2.

6.2.3 Water Quality of tributary stream Subansiri, Kharsang, Buridihing, Pagladia, Digboi, Jaibharli, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Kathakal and Deepar Bill

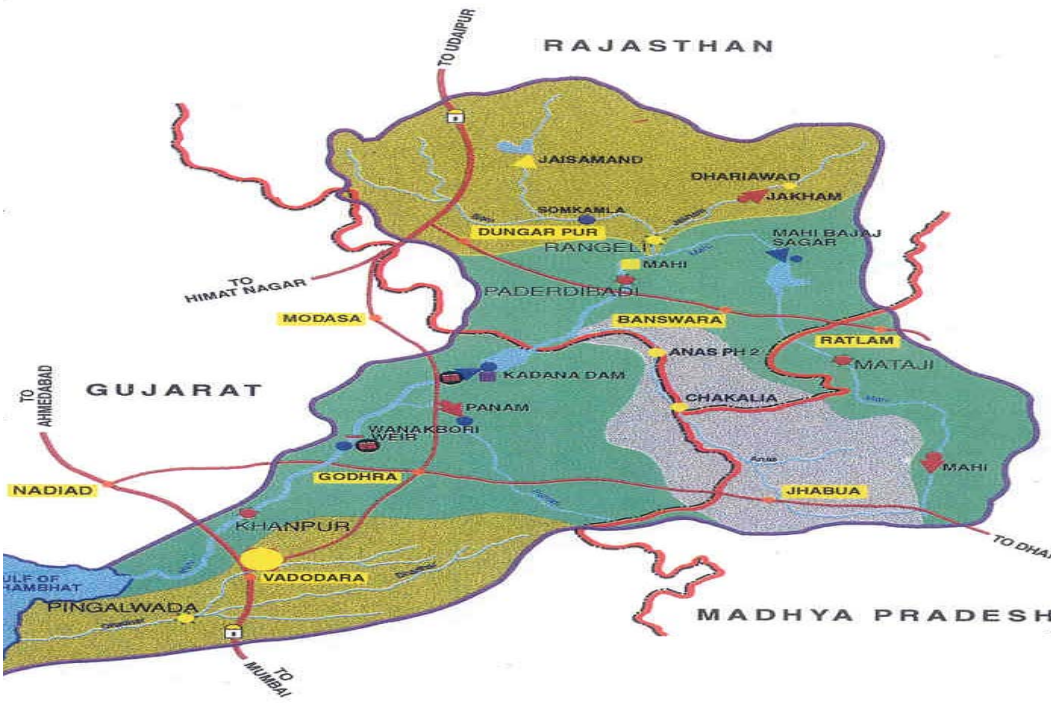
The Water quality of other tributary streams Subansiri, Kharsang, Buridihing, Pagladi, Digboi, Jaibharli, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Kathakal and Deepar Bill is meeting the desired criteria for pH, Fecal Coliform, Conductivity and DO except Bharalu River at Guwahati where DO is observed NIL. The highest value of BOD (36.0 mg/l) is observed in Bharalu River at Guwahati. High values of BOD are also observed at Deeparbill (11.0 mg/l), Burhidihing at Margherita (7.9 mg/l), Mora Bharali At Tezpur (4.5 mg/l), Digboi River at Lakhipathe, Reserve Forest, Digboi (4.4 mg/l), at Borak at Panchgram (3.5 mg/l) and Kolong River at Marigaon (3.9 mg/l) in Assam. The Total Coliform count varies from 0- 2, 40,000 MPN/100 ml. The Faecal Coliform count varies from 0–2, 40,001 MPN/100 ml. The Total Coliform is observed higher than the criteria in

Subansiri, Kharsang, Pagladia, Digboi, Disang, Bhogdoi, Borak, Bharalu, Deeparbill and Kathakal. Water quality of Subansiri, Kharsang, Buridihing, Pagladi, Digboi, Jaibharli, Kolong, Manas, Disang, Jhanji, Bhogdoi, Mora Bharali, Borak, Bharalu, Kathakal and Deepar Bill is presented in Annexure-I Table 6.3.

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 15 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 (9) and tributaries- Anas (1),Panam (1), Jammer(1), Malei(1), Shivna(1) and Chillar(1). The ranges of water quality observed in rivers Mahi, Panam and Anas with respect to pH, Conductivity, DO, BOD, 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.

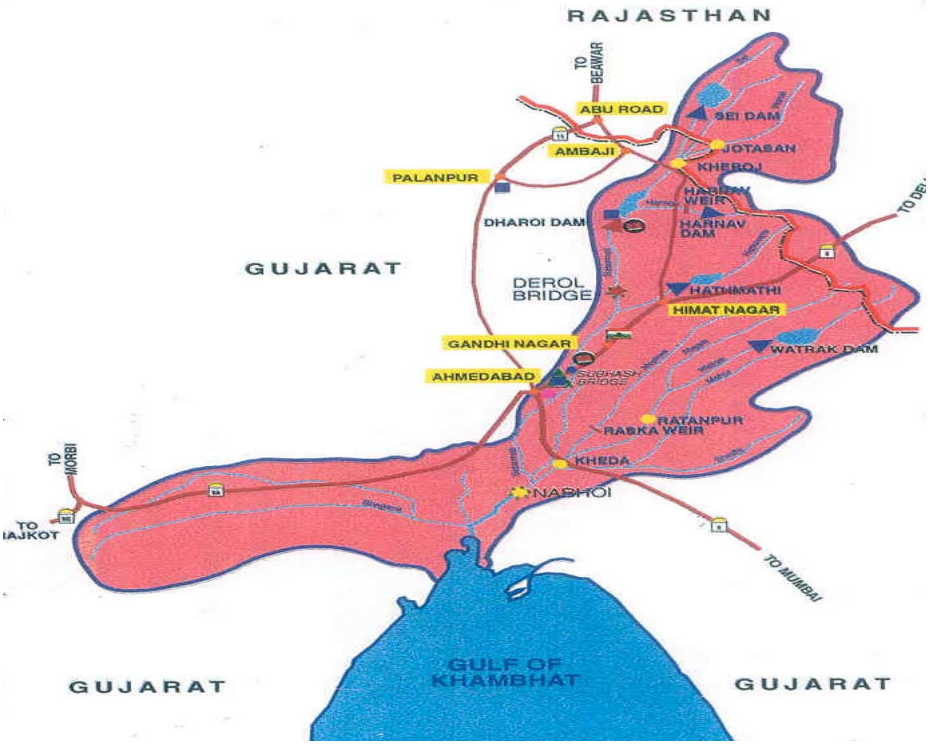
7.2.1 Water Quality of river Mahi and Tributaries Panam and Anas

The water quality of river Mahi with respect to pH, Conductivity, DO, BOD, Total Coliforms and Faecal Coliforms is meeting the desired criteria. Mahi River indicates pH ranges from 7.6-8.89. The Conductivity lies in the range of 234-3720 µmhos/cm. The DO lies in the range of 0.4-10.7 mg/l. The BOD was observed in the range of 0.3-5.7 mg/l with maximum at Mujpur in Gujarat. The Faecal Coliforms range from 0-11 MPN/100ml and the Total Coliforms are in the range of 4-160 MPN/100ml. TC found in the desired range at all the places. The water quality data of river Mahi and its tributaries is presented in Annexure-I Table 7.1.

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 downstream (d/s) of Sabarmati Ashram whereas thermal power plant is discharging upstream (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.

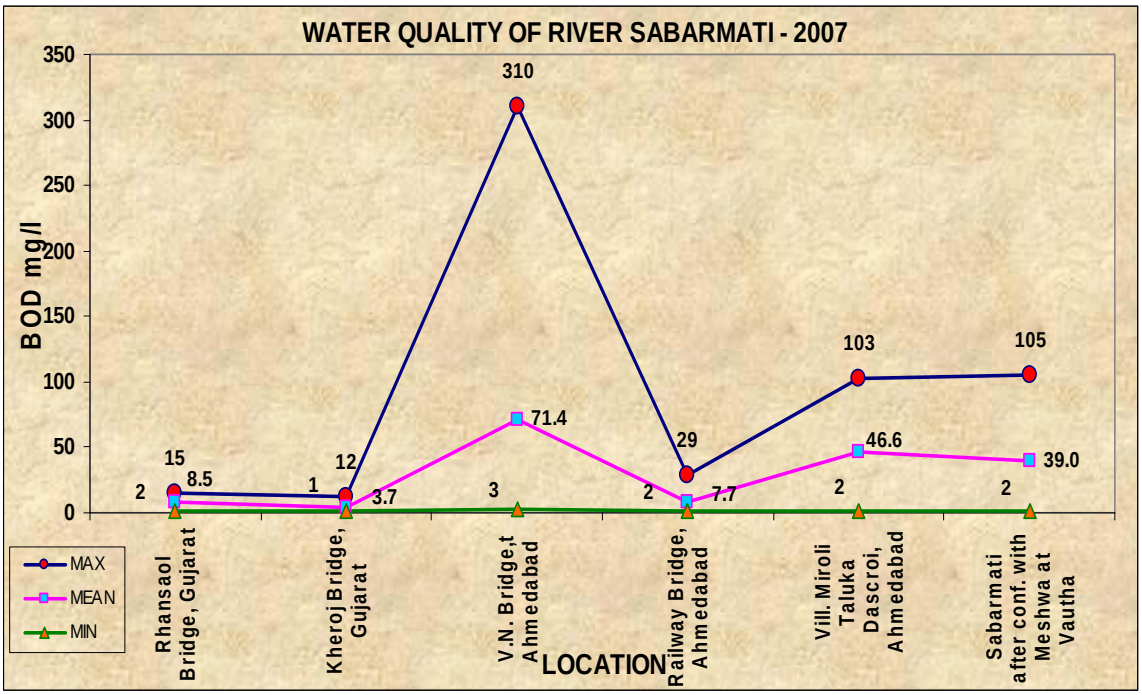
8.2 Water Quality Monitoring in Sabarmati Basin

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-Shedi and Khari. The ranges of water quality observed in Sabarmati Basin with respect to pH, Conductivity, DO, BOD, COD, 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 pH at all locations except Dharoi Dam, where pH is observed 4.0. The Dissolved Oxygen ranges from 2.4-6.7 mg/l. The low value of DO is observed at Kheroj Bridge (2.4 mg/l) in Gujarat. The value of conductivity ranges from 292-2920 µmho/cm and exceeds the limit even for irrigation at Village Miroli Taluka (2920 µmho/cm), after confluence with Meshwa at Vautha (2700µmho/cm) and V.N.Bridge (2270 µmho/cm). The BOD is ranges from 12-310 mg/l and its not meeting the criteria at all locations. The high values of BOD were observed at Ahmedabad at V.N.Bridge (310 mg/l), Vill.Miroli Taluka Dascroi (103 mg/l), A/c with Meshwa at Vautha (105 mg/l), Railway Bridge at Ahemdabad (29 mg/l), Hansol Bridge (15 mg/l) and Kheroj Bridge at Ahmedabad (12 mg/l) in Gujarat. The high concentration of BOD is attributed to the discharge of untreated wastewater into the river. The Total Coliform count in the river ranges from 2000–75,000 MPN/100ml whereas the Faecal Coliform count varies from 1500–15,000 MPN/100ml. The highest count of Total Coliform was observed at Kheroj Bridge. The Ammonical-Nitrogen lies in the range of 0.56-31.86 mg/l. The water quality of river Sabarmati is given in Annexure-I Table 8.1. The water quality status of river Sabarmati with respect to BOD is given in figure 8.1.

Figure 8.1: Water Quality of River Sabarmati



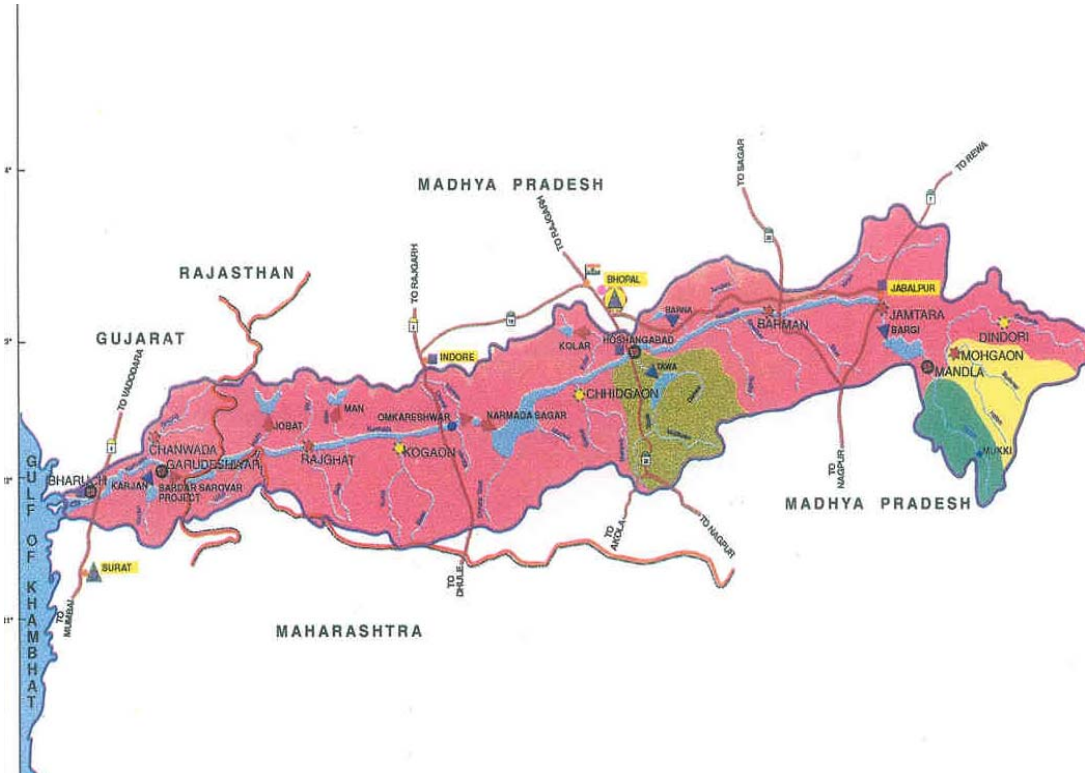
8.2.2 Water Quality of Tributary Streams Shedi and Khari

The water quality of tributary streams Shedi and Khari meets the water quality criteria with respect to pH and conductivity. The dissolved oxygen in river Shedi does not meet the criteria and varies from (3.7-8.0 mg/l). BOD varies from 2.0-4.0 in river Shedi and 7.0-19.0 mg/l in river Khari. The Total Coliform and Faecal Coliform count range from 43-7500 and 15-2100 MPN/100ml in river Shedi, whereas the Total Coliforms and Faecal Coliforms count range from 1500–15,000 MPN/100ml and 200-9300 MPN/100 ml respectively in river Khari. The water quality status of river Shedi and Khari 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 21 locations and its tributary streams Chhota Tawa , Gour, Katni, Kunda at one location each. The ranges of water quality observed in river Narmada and Tributary Chota Tawa with respect to pH, Conductivity, DO, BOD, COD, 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.

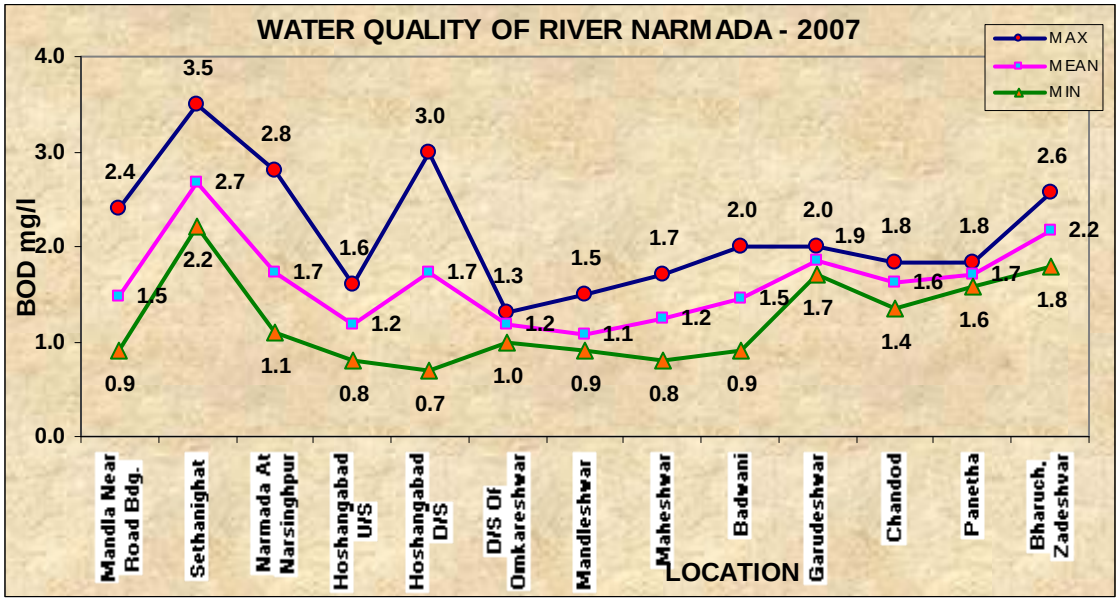
9.2.1 Water Quality of river Narmada and Tributary Chota Tawa

The water quality of mainstream of Narmada with respect to pH ranges from 7.5-8.8. The conductivity ranges from 244-1629 µmho/cm. The DO varies from 6.2-10.4 mg/l. The BOD ranges from 1.2-3.5 mg/l that indicates about the relatively clean stretch of entire length of the river. The Total Coliform count in the river ranges from 7-1600 MPN/100ml whereas the Faecal Coliform count varies from Nil-15 MPN/100ml indicates relatively low level of pollution from human waste. The water quality of river Narmada is broadly meeting the criteria for beneficial uses.

The Water Quality of the tributary Chota Tawa with respect to DO is observed as 6.8 – 8.0 mg/l, pH as 7.5-7.6, Conductivity as 352-641 µmhos/cm and BOD 1.2-1.4 mg/l. The number of Total Coliforms and Faecal Coliforms are observed as 140-200 MPN/100ml and Nil respectively.

The water quality observations indicate that all the parameters are by and large meeting the water quality criteria at all locations. The ranges of water quality observed in rivers Narmada and its tributary Chota Tawa with respect to pH, Conductivity, DO, BOD, COD, Total Coliform and Faecal Coliform is given in Annexure-I Table 9.1. The water quality status of river Narmada with respect to BOD is presented in figure 9.1.

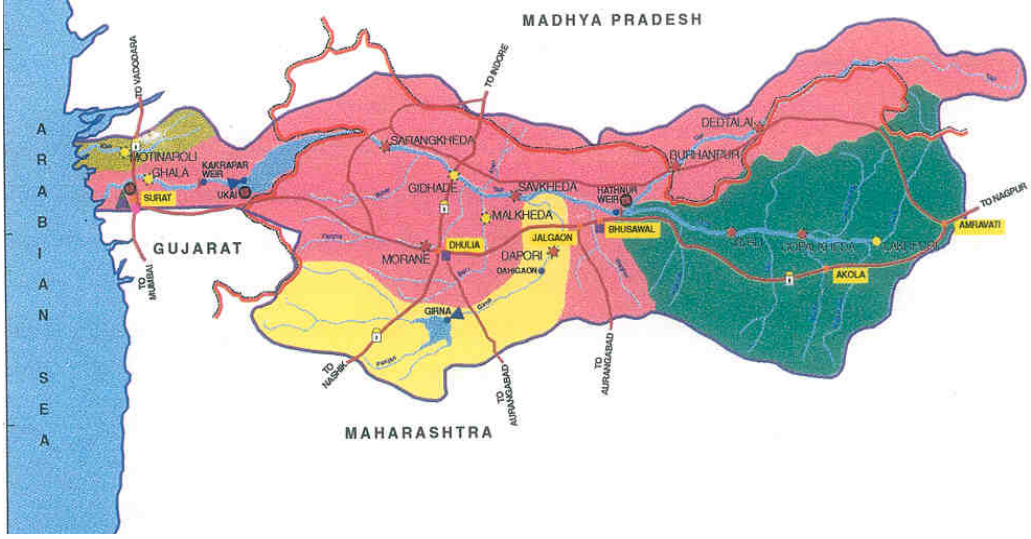
Figure 9.1: Water Quality of River Narmada



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, AchalpurAkot 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 stream Girna and Rangavali 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 stream Girna with respect to pH, Conductivity, DO, BOD, COD, Total Coliform and Faecal Coliform 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, Tributary Girna and Rangavali

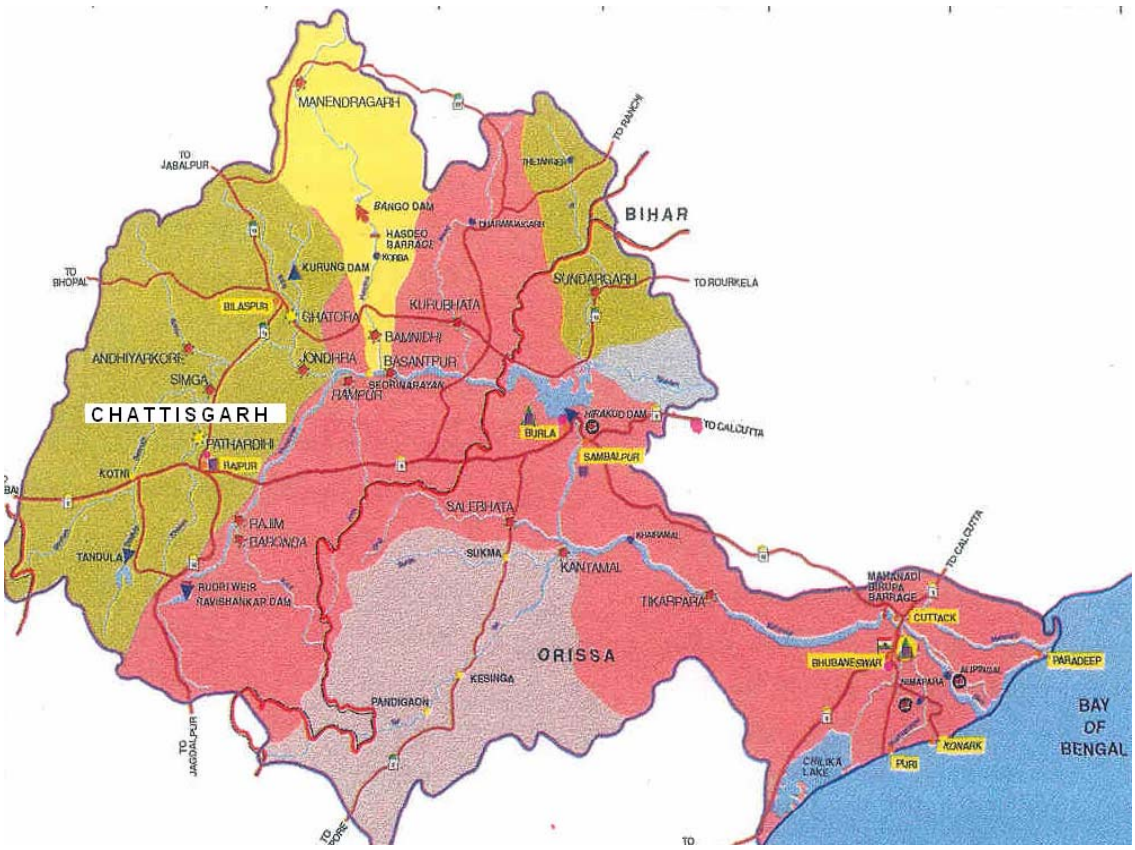
The water quality of mainstream of Tapi with respect to pH ranges from 7.3-8.5. The conductivity varies from 210-587 μmhos/cm. The DO ranges from 3.7-8.7 mg/l. The lowest value of DO (3.7 mg/l) is observed at Ajnand Village in Maharashtra. The BOD varies from 1.1-25 mg/l and the values higher than the desired criteria are observed at Ajnand Village (25.0 mg/l), Uphad village (22.0 mg/l), Bhusawal U/s (18.0 mg/l) in Mharashtra; at Ukai, Sherula Bridge (3.7 mg/l) and Kathore, (Nh-8 Bridge) (3.2 mg/l) in Gujarat. The Total Coliform count in the river ranges from Nil-46,000 MPN/100ml whereas the Faecal Coliform count varies from Nil–15,000 MPN/100ml.
The water quality of tributary stream Girna with respect to pH, Conductivity, DO and Total Coliform is meeting the desired criteria. The BOD is in the range of 2.0-16 mg/l, which indicate that the river is considerably polluted at Malegaon (Manmad) (23 mg/l), Jalgaon (16.0 mg/l) and at Jalgaon (10mg/l) with respect to BOD. River Rangavali downstream of Navapur is also meeting the desired criteria in respect of pH, Conductivity, DO, Total Coliform and Faecal Coliform. In River Rangavali The value of BOD is 9.0 mg/l which is not meeting the water quality criteria.

The ranges of water quality observed in rivers Tapi and its tributary stream Girna and Rangavali with respect to pH, Conductivity, DO, BOD, COD, Total Coliform and Faecal Coliform is given in Annexure-I Table 10.1.

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 downstream portion of river Ib at Brajrajnagar, downstream 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 defection. 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 downstream 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 lb 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

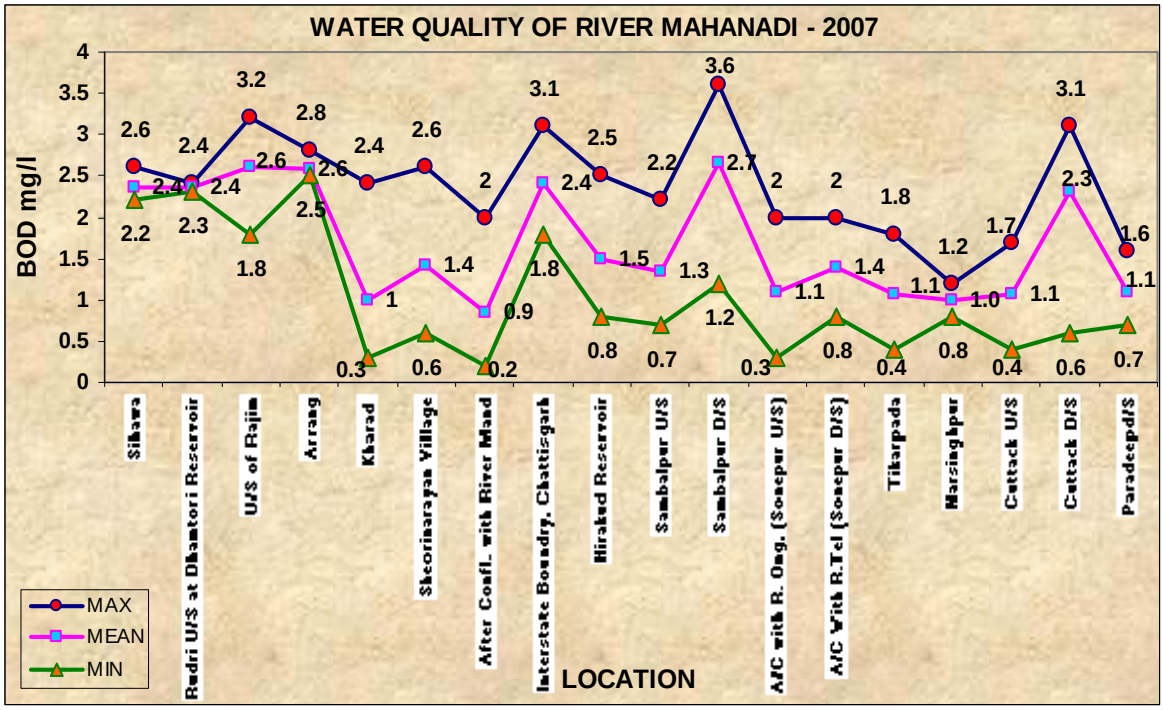
The State Pollution Control Boards of Chhatissgarh and Orissa at 38 locations are doing the water quality monitoring of the river Mahanadi and its several tributaries in the basin. The ranges of water quality observed in rivers Mahanadi and Tributary streams Seonath, Kharoon, Hasdeo, Ib, Kuakhai, Kathajodi Birupa, Arpa and Kelo with respect to pH, Conductivity, DO, BOD, COD, Total Coliform and Faecal Coliform 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 status observed in rivers Mahanadi with respect to pH, Conductivity, DO, BOD, COD Faecal Coliform count and Total Coliform count is given in Annexure-I Table 11.1.

The water quality of mainstream of Mahanadi with respect to pH ranges from 7.3–8.7. The value of conductivity ranges from 102 µmhos/cm at Cuttack upstream in Orissa to 813 µmhos/cm at Paradeep downstream in Orissa. The DO value varies from 6.2 -8.9 mg/l. The BOD ranges from 1.2 – 3.6 mg/l and the higher value were observed at Sambalpur D/s (3.6 mg/l) in Orissa, U/s of Rajim (3.2 mg/l) in Chattisgarh, Cuttack D/s (3.1 mg/l) in Orissa and Inter state boundary (3.1 mg/l) in Chattisgarh. The highest value of Faecal Coliform count (17,000 MPN/100 ml) is observed at Cuttack downstream and at Sambalpur downstream (13,000 MPN/100 ml); whereas the maximum Total Coliform count (35,000 MPN/100 ml) is observed at Cuttack downstream & Sambalpur downstream. The concentration of Nitrate (NO_3^-) ranges from 0.11-1.89 mg/l, while the highest concentration of nitrate is recorded at Sheorinarayan village, Chattisgarh. The water quality status observed in river Mahanadi with respect to pH, Conductivity, DO, BOD, COD, Faecal Coliform count and Total Coliform count is given in Annexure-I Table 11.1.The water quality status of river Mahanandi with respect to BOD is given in figure 11.1.

Figure 11.1: Water Quality of River Mahanadi



11.2.2 Water Quality of tributaries - Seonath, Kharoon, Hasdeo, Arpa, Kelo, IB, Kuakhai, Kathajodi and Birupa

The Water Quality of tributary stream Seonath with respect to DO varies from 7.1-8.2 mg/l and Conductivity range from 198-352 µmhos/cm. The number of Total Coliforms is observed in the range of 23-460 MPN/100ml. The BOD is observed as in the range of 0.8-7.1 mg/l. River Kharoon, a tributary of Seonath is also a clean river as the BOD is observed in the range of 1.0-3.0 mg/l with highest BOD at River Bundri, Raipur in Chattisgarh and Total Coliform count is in the range of 21-1100 MPN/100 ml with maximum at Kharoon River B/c and A/c Khapri Drain.

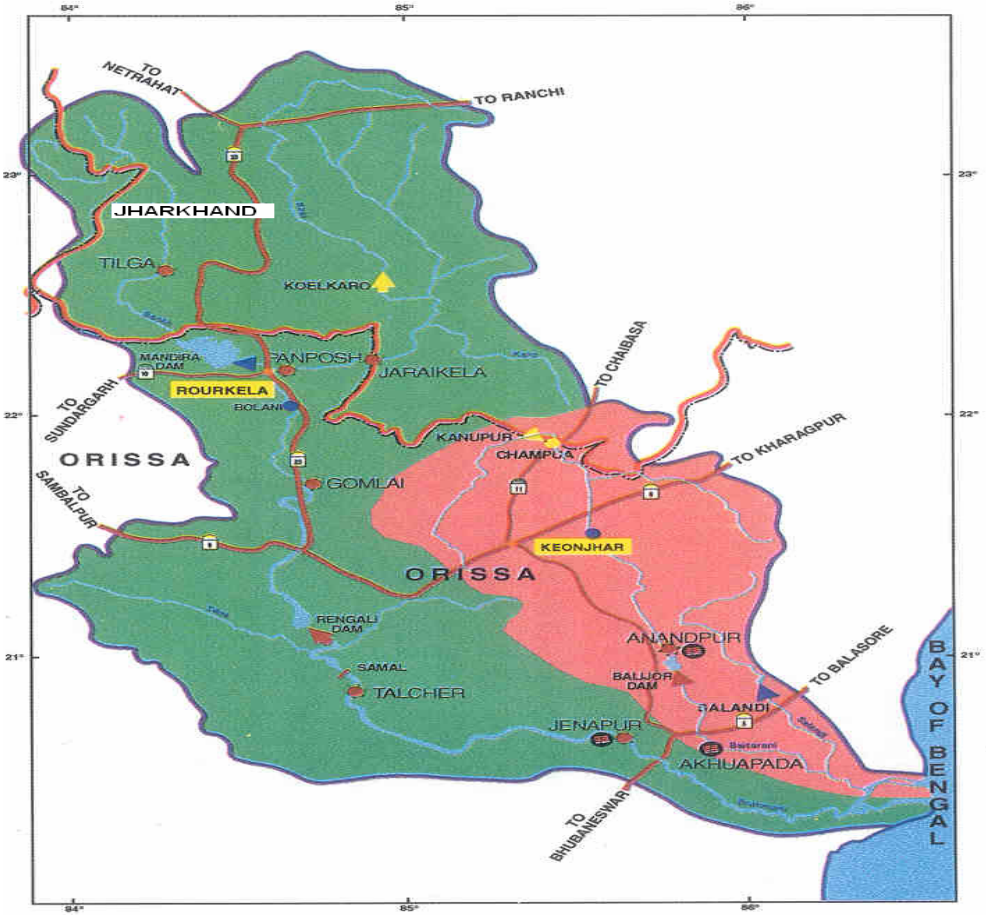
The tributary stream Hasdeo is flowing along Korba and Champa townships. Total Coliform number does not exceed 270 MPN/100 ml indicates that due to enough dilution in river, impact of wastewater discharged from Korba does not affect its quality. Another tributary stream Ib is meeting the desired water quality criteria in respect of all parameters and maintains adequate level of DO in the range of 5.8-9.4 mg/l and BOD is observed in the range of 0.3-2.3 mg/l. The Total Coliform and Faecal Coliform numbers are varying from 390-7900 MPN/100ml and 230-2700 MPN/100ml respectively.
The five tributaries of Mahanadi i.e Kuakhai, Kathjodi, Birupa, Arpa and Kelo are meeting the water quality criteria with respect to pH, conductivity and Dissolved Oxygen (D.O) except having conductivity in the range of 1289-32,800 µmhos/cm in Orissa. The BOD higher than the desired criteria is observed in Arpa River D/s of Bilaspur (7.0mg/l) in Chattisgarh; Kathajodi at Cuttak downstream (4.2 mg/l): Kuakhai at Bhubaneshwar D/s and Birupa at Choudwar (4.0 mg/l) in Orissa. The Total Coliform and Faecal Coliform are

varying from 8-1, 60,000 MPN/100ml and 8-92,000 MPN/100ml respectively in these tributaries. The highest value of Total Coliform and Faecal Coliform is observed at Kathajodi at Cuttak downstream in Orissa. The water quality status observed in rivers Seonath, Kharoon, Hasdeo, IB, Kuakhai, Kathajodi, Arpa, Kelo and Birupa with respect to pH, Conductivity, DO, BOD, COD, Faecal coliform count and Total Coliform count 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 wasteweaters generated form 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, the State Pollution Control Boards of Jharkhand and Orissa at 20 locations are doing Baitarni and tributaries in the basin. There are eleven (11) monitoring locations on the main stream of river Brahmani, five on tributary Baitarni, one on tributaries Karo & Sankh and two on tributary Koel. The ranges of water quality observed in rivers Brahmani and its tributaries; with respect to pH, Conductivity, DO, BOD, COD, Total Coliform and Faecal Coliform 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

The water quality of mainstream of Brahmani with respect to pH, DO and conductivity are meeting the desired criteria. The BOD varies from 0.3 to 4.9 mg/l. The higher values of BOD are observed at Koel at Basia Dam U/s (4.9 mg/l) in Jharkhand and Brahmani at D/s Panposh (4.8 mg/l) in Orissa. The Fecal Coliform (FC) counts ranges from 110-22,000 MPN/100ml whereas the Total Coliform (TC) count ranges from 210-54,000 MPN/100ml. The water quality of mainstream of Brahmani during the period is given in Annexure-I Table 12.1

12.4 Water Quality of River Baitarni

The water quality of river Baitarni observed at 5 locations is meeting the water quality criteria for pH, DO, conductivity, BOD, TC and FC however, the high values of conductivity are observed at Dhamra (19,450 µmhos/cm) due to estuarine region of the river. BOD values are observed in the range of 0.4-2.2 mg/l. The Faecal Coliform (FC) counts ranges from 170 to 2200 MPN/100ml whereas the Total Coliform (TC) count ranges from 330 to 5400 MPN/100ml. Nitrate (NO_3^-) values ranges from 0.11-2.11 mg/l. The water quality of river Baitarni is given in Annexure-I Table 12.2.

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 Subarnerekha 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 are being done in the basin by the State Pollution Control Boards of Jharkhand and Orissa at 6 locations. The monitoring locations are on mainstream of river Subarnerekha. The ranges of water quality observed in river Subarnarekha with respect to pH, Conductivity, DO, BOD, COD, 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.

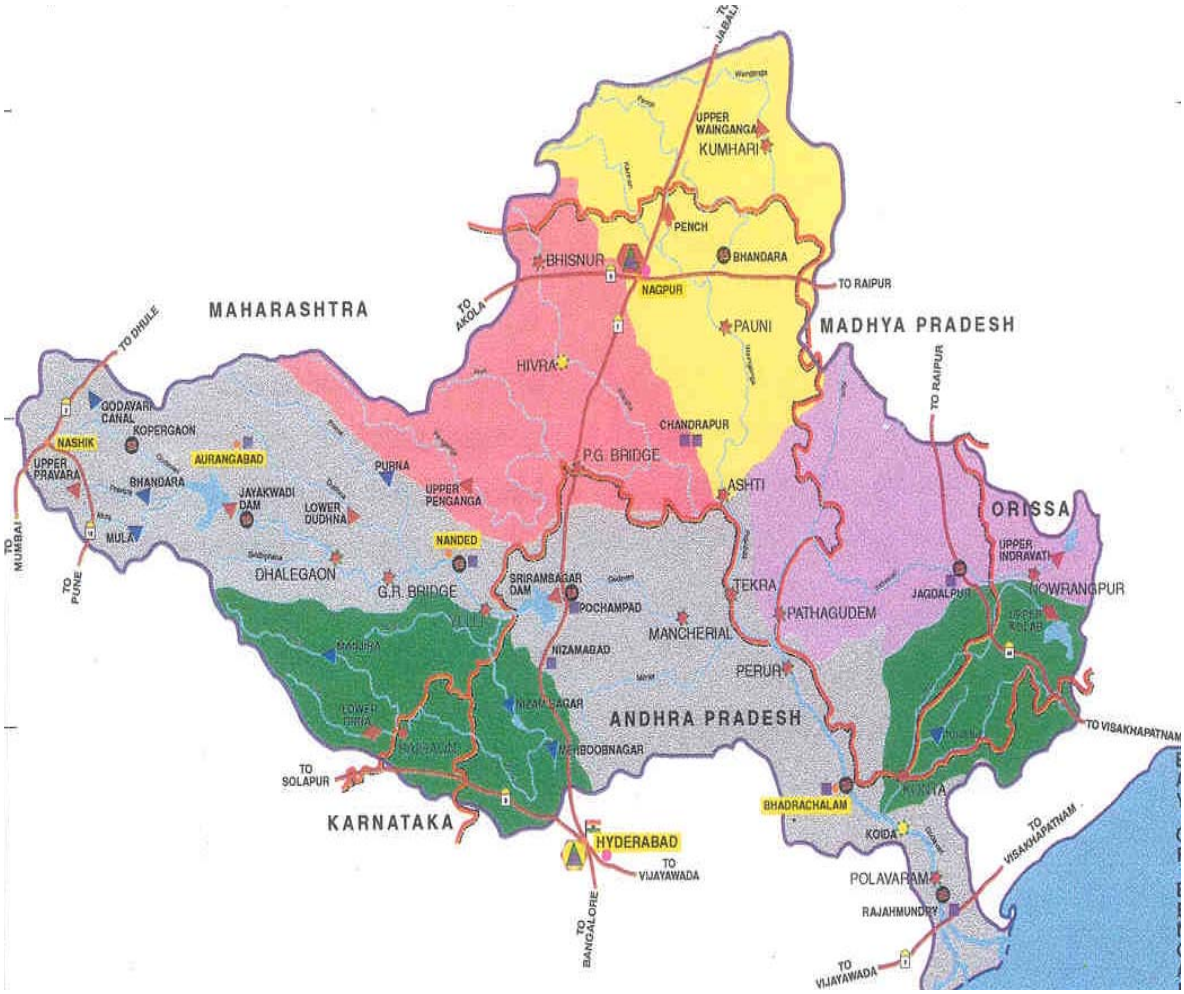
13.3 Water Quality of River Subarnarekha

The water quality of Subarnarekha River with respect to pH, DO, Total Coliform and Conductivity during the year indicates that it is meeting the desired water quality criteria at all the locations. DO is observed in the range of 4.6-8.7 mg/l. The higher value of BOD is observed at Ranchi Tatisilwai (8.0 mg/l) in Jharkhand. The water quality of the river Subarnarekha during the period is given in Annexure-I Table 13.1

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, Chattisgarh 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 Chhitisgarh 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 Distt. 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 Chattisgarh and Burganpad 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 Chhatisgarh, 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 at 48 locations. The monitoring locations are on main stream of river Godavari (22) and tributaries Manjeera(3), Maner(2), Nira(1), Wainganga(8), Kolar(1), Kanhan(3), Purna(2), Indravati(2), Shankhni(1) and Wardha (3). The ranges of water quality observed in Godavari basin with respect to pH, Conductivity, DO, BOD, COD, 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.

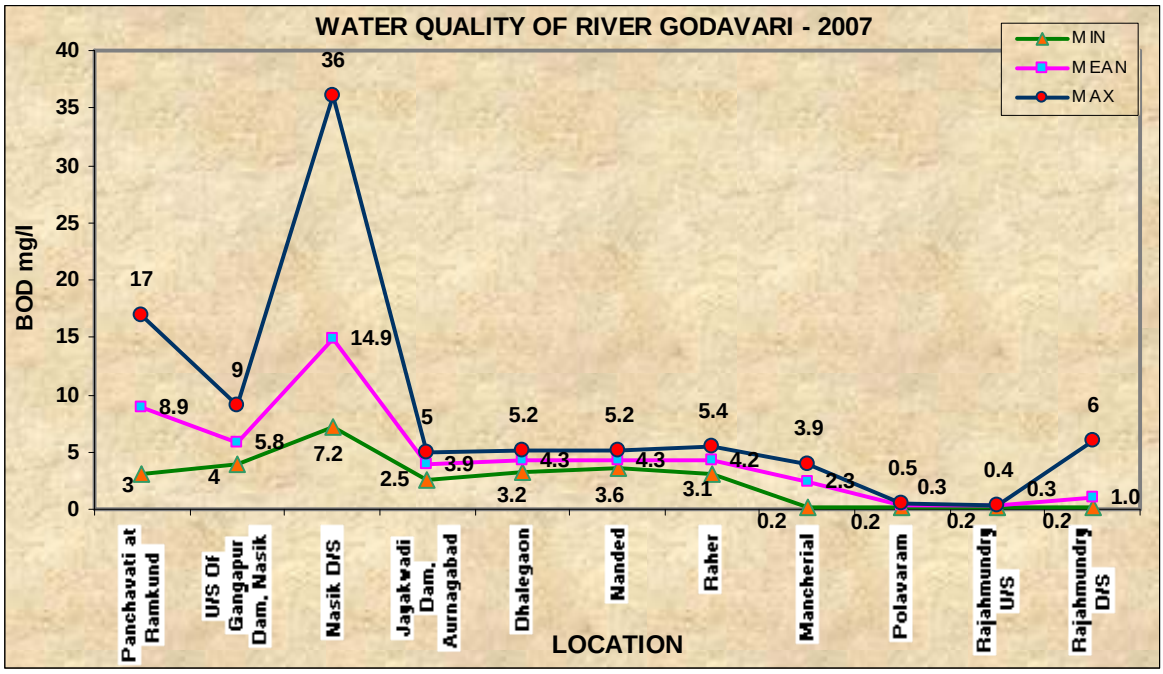
14.2.1 Water Quality of River Godavari

The river Godavari from downstream of Nashik to Nanded and Nanded city limits in Maharashtra and upstream of Bhadrachalam at Mancheral and Ramgundam in A.P. have been identified as the polluted river stretches. The major sources of pollution in the polluted stretches are from domestic and industrial wastewater generated from the Nashik and Nanded cities in Maharashtra and Mancherial, Ramgundam and Bhadrachalam cities in Andhra Pradesh. Depletion of dissolved oxygen has been reported due to addition of high organic load into the river besides bacteriological pollution has also been reported. To maintain the desired water quality uses of the Godavari River 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.

The water quality of river Godavari indicates that the DO value ranges from 3.2-12 mg/l. The minimum value of 3.2 mg/l of DO is observed at Nasik D/s in Maharashtra. The BOD values ranges from 0.2-36 mg/l and the higher values are observed at Nasik downstream (36 mg/l), Panchavati at Ramkund (17 mg/l) and U/s of Gangapur Dam at Nasik (9 mg/l) in Maharashtra. The Faecal Coliforms ranges from Nil-2200 MPN/100ml whereas the Total Coliform ranges from 5-36,000 MPN/100 ml. The maximum number of Total Coliform is observed at Rajahmundry D/s in Andhra Pradesh which can be attributed to the proximity of large city. Water quality of Godavari is presented in Annexure-I Table 14.1. The water quality status of river Godavari with respect to BOD is presented in Figure 14.1.

Figure 14.1: Water Quality of River Godavari



14.2.2 Water Quality in tributaries streams Indravati, Shankni, Manjra, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna and Nira

The Water Quality of tributaries streams Indravati, Shankni, Manjra, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna and Nira indicates that except BOD other parameters like pH, DO, Conductivity, Fecal Coliform and Total Coliform are meeting the desired water quality criteria. The DO ranges from 2.9-10.5 mg/l, the lower values of DO are found in Maner at Warangal U/s in Andhra Pradesh.

BOD ranges from 0-18 mg/l. The higher values of BOD than the desired criteria are observed in Manjira river near Ganapathi Sugars, Medak Dist (18.0 mg/l), Nira at Pulgaon Cotton Mill, Wardha (11.5 mg/l), Kolar before confluence to Kanhan at Kamptee (9.6 mg/l),Wainganga at Ashti (9.2 mg/l),

Kanhan D/s of Nagpur (9.0 mg/l), Wainganga after confluence with Kanhan (8.5 mg/l), River Wardha at Rajura Bridge and Purna at Dupeshwar (6.9 mg/l).

The Total Coliform number ranges from 7-2500 MPN/100ml, whereas the Faecal Coliform is observed from Nil-900 MPN/100ml. The water quality status of tributaries streams Indravati, Shankni, Manjra, Maner, Wardha, Wainganga, Kolar, Kanhan, Purna, Nira 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 Aggomeration in A.P. Pune

aggomeration 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

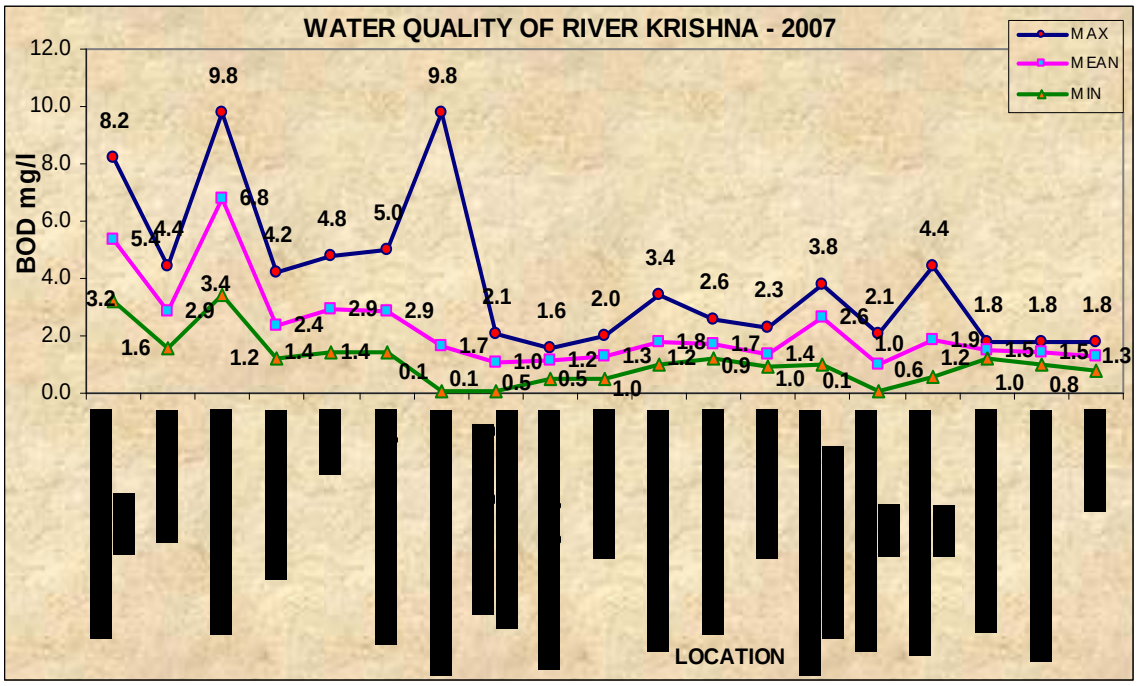
The water quality monitoring of the river Krishna are being done in the basin by the State Pollution Control Boards of Maharashtra, Karnataka and Andhra Pradesh at 68 locations. The monitoring locations are on mainstream of river Krishna (22) and tributaries Bhadra (3), Bhima (10), Ghataprabha (2), Malprabha (3), Muneru (1), Musi (2), Nira (2), Paleru (1), Tunga (1), Tungabhadra (6), Panchganga (4), Kagina(1), Chandrabhaga (2) and Koyna(1), Mula(2), Mutha(1), Mula-Mutha(1), Venna(1), Pawana(1), Indrayani(1). The ranges of water quality observed in river Krishna and it's tributaries with respect to pH, Conductivity, DO, BOD, COD, 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 indicates that pH, Conductivity and DO are largely meeting the water quality criteria at all the locations however DO does not meet the desired limits at upstream of Ugarkhurd Barrage (3.0 mg/l) in Karnataka, at Sangli (3.2 mg/l) in Maharashtra, at Kurundwad in Kolhapur (3.8 mg/l) in Maharashtra and at Vedadri, Guntur (3.8mg/l) in A.P. and conductivity does not meet the desired limits at Hamsala Deevi, Guntur Dist. (23,400 μmhos/cm) and at Sangli (3166 μmhos/cm). The BOD ranges from 0.1 to 9.8 mg/l. The maximum value of BOD (9.8mg/l) is observed at Krishna Bridge, Karad in Maharashtra and U/s of Ugarkhurd Barrage in Karnataka. Other locations having high BOD are at Mahabaleshwar Dhom dam near

Koina dam (8.2 mg/l), Rajapur Weir (4.4 mg/l), at Kurunwad in Kolhapur (5.0 mg/l), at Sangli (4.8 mg/l) in Maharashtra and at Hamsala Devi, Guntur (4.4 mg/l), in Andhra Pradesh. The Faecal Coliform ranges from 0–1600 MPN/100ml whereas the Total Coliforms ranges from 0–71,600 MPN/100ml. The maximum count of TC is observed in river Krishna at Sangameshwaram, A/c with Tungabhadra in A.P. The water quality status of river Krishna is given in Annexure-I Table 15.1. The water quality status of mainstream Krishna with respect to BOD is given in Figure 15.1.

Figure 15.1: Water Quality of River Krishna



15.2.2 Water quality of tributary streams Panchganga and Bhima

The water quality of tributary streams Panchganga and Bhima indicates that pH ranges from 6.3-8.8. The conductivity ranges from 73 to 4515 µmhos/cm. The higher values of conductivity are observed in River Bhima at Narsinghpur D/s after confluence with River Nira (4515 µmhos/cm) in Maharashtra. DO vary from 1.7 to 7.6 mg/l. The minimum value of DO is observed in river Bhima (1.7 mg/l) downstream of Bundgarden at Pune in Maharashtra. The BOD value ranges from 1.0 to 28.6 mg/l. The maximum value of BOD (28.6 mg/l) is observed in river Bhima downstream of Bundgarden at Pune. The other locations Bhima at Pargaon after confluence with Mula- Martha (16.8 mg/l), Bhima at Pune U/s Vithalwadi (16.4 mg/l), Bhima at Narsinghpur D/S after confluence with river Nira (10.4 mg/l), Bhima at Takli (10.4 mg/l), Bhima after confluence with daunt (8.8 mg/l), Panchganga D/s of Kolhapur town (6.4 mg/l), Panchganga at Ichalkaranji (3.6 mg/l) in Maharashtra; and river Bhima at D/s of Road Bridge at Gangapur village (3.4 mg/l) in Karnataka, are potentially polluted locations having higher BOD levels. The Faecal Coliforms range from 0–1600 MPN/100ml whereas the Total Coliform number ranges from 10-1700 MPN/100ml. The maximum number of Total

Coliform (1700 MPN/100ml) and Faecal Coliform (1600 MPN/100ml) is observed at Bhima at d/s of Bridge near Yadgir in Karnataka. The water quality of tributaries streams Panchganga and Bhima during the year is given in Annexure-I Table.15.2.

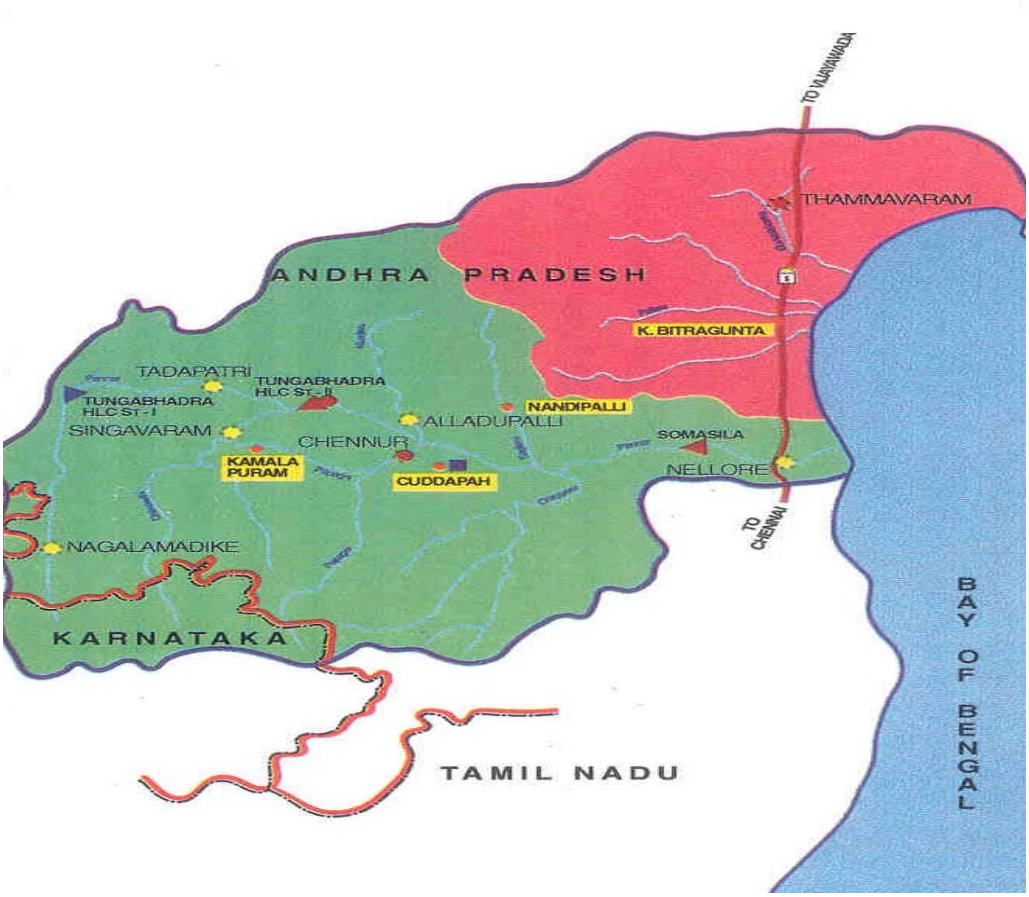
15.2.3 Water quality of tributary streams Chandrabhaga, Kagina, Ghatprabha, Malprabha, Nira, Tungbhadra, Tunga, Bhadra, Musi, Palleru, and Muneru

The water quality of tributary streams Chandrabhaga, Kagina, Ghatprabha, Malprabha, Tungbhadra, Tunga, Bhadra, Musi, Palleru, and Muneru indicates that pH ranges from 6.2- 9.7. The conductivity ranges from 48 to 1586 μmhos/cm. The higher values of conductivity are observed in river Tunghabhadra at Kurnool U/s, Bavapuram (1586 μmhos/cm) in Andhra Pradesh. DO vary from 4.0- 10.0 mg/l. The minimum value of DO is observed in river Palleru (4.0 mg/l) before confluence with Krishna, Jaggayyapet in Andhra Pradesh. The BOD value ranges from 0.2 to 51 mg/l. The maximum value of BOD (51 mg/l) is observed in river Musi downstream at Hyderabad in Andhra Pradesh. The other locations on river Bhadra at downstream of Bhadravathi (22.5 mg/l), River Tunghabhadra at honnali Bridge (16.5 mg/l), Tungha at downstream of Shimoga Town (13.5 mg/l), Bhadra at downstream of KIOCL Road Bridge near Holehunnur (13.5 mg/l) in Karnataka; Chandrabhaga downstream of Pandharpur Town(10.2 mg/l), Chandrabhaga upstream of Pandharpur Town (9.6 mg/l) in Andhra Pradesh; Nira at Sarole bridge on Pune-Bangalore Highway(9.6 mg/l) in Maharashtra, Tunghabhadra at Haralahalli Bridge (6.0 mg/l), Tunghabhadra at Ullanur (3.8 mg/l) in Karnataka, and Tunghabhadra at Mantralayam, Kurnool Dist. (3.3 mg/l) in Andhra Pradesh; are potentially polluted locations having higher BOD levels. The Faecal Coliforms range from 0–1600 MPN/100ml whereas the Total Coliform number ranges from 27-9000 MPN/100ml. The maximum number of Total Coliform (9000 MPN/100ml) and Faecal Coliform (1600 MPN/100ml) is observed at Tunghabhadra at Mantralayam, Kurnool Dist. in Andhra Pradesh and Tunghabhadra at Ullanur in Karnataka respectively. The water quality of tributaries streams of river Krishna during the year is given in Annexure-I Table.15.3.

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 and the Sagilery from the left and the Chitravati, the Papagni and the Cheyyeru from the 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 R.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, Dharmavarm, 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 pH, Conductivity, DO, BOD, COD, 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, Conductivity and BOD are meeting the desired water quality criteria at all locations. DO observe in the range of 2.8-7.8 mg/l, whereas the BOD varies from 0.5-3.0 mg/l. The Total Coliform number varies from 14-5000 MPN/100ml. However, the lower values of DO are observed at all locations. The conductivity of river water ranges from 250-1916 μmhos/cm. The water quality status of the river Penneru is given in Annexure-I Table 16.1.

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 Pondichery; Valparai, Tamilnadu, Pollachi, Coimbatore, Erode, Thanjavur, Karur, Tiruchirappalli, Salem, Kumbakonam, Bhavani, Chidambaram,Coonoor, Devershola, Mannargudi, Mayiladuthurai, Mettuppalaiyam Nagappattinam, Pattukkottai, Pudukkottai, Tiruchengodu, Udhagamandalam, Udumalaippettai, 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.

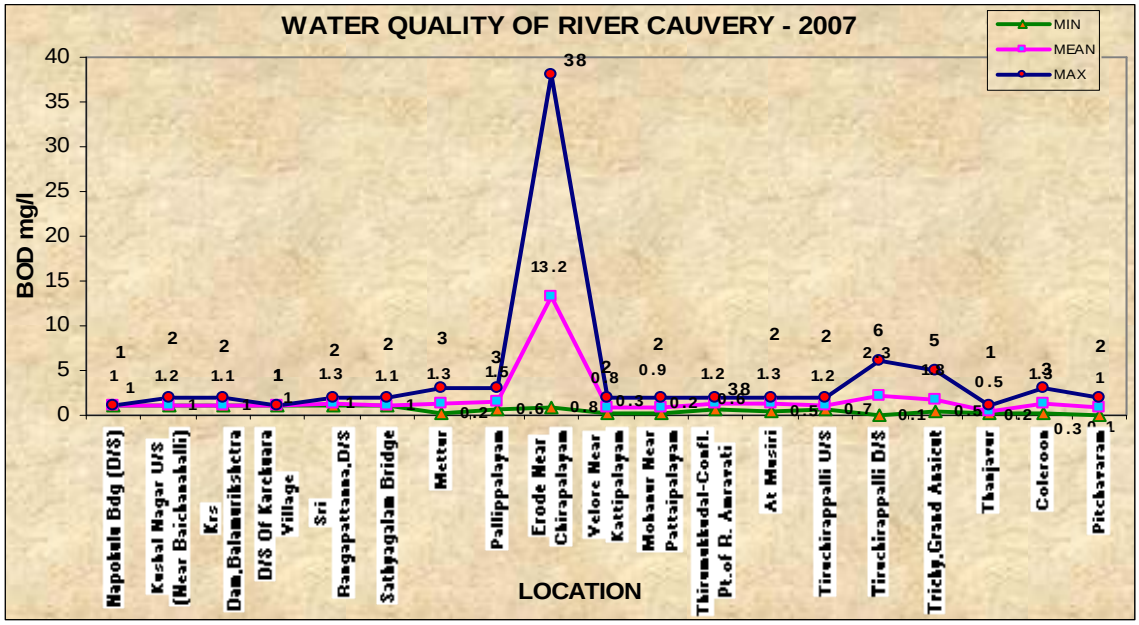
17.2 Water Quality Monitoring in Cauvery Basin

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 at 36 locations. The monitoring locations are on mainstream of river Cauvery (20) and on tributaries are- Arkavati (1), Amravati (1), Bhawani (5), Kabini (4), Laxmantirtha (1), Shimsa (2), Hemavati (1) and Yagichi (1). The ranges of water quality observed in Cauvery basin with respect to pH, Conductivity, DO, BOD, COD, 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 Cauvery river at twenty locations indicates that DO is in the range of Nil-14.0 mg/l and the minimum value is observed at Erode near Chirapalayam in Tamil Nadu. The water quality of Cauvery river is meeting the desired water quality criteria at all locations in respect of conductivity, pH, Total Coliform bacteria and BOD except at Coleroon, Erode near Chirapalayam and Pitchavaram in Tamil Nadu. Conductivity in the river varies from 28-56,500 µmhos/cm. The high values of Conductivity are observed in at Coleroon (56,500 µmhos/cm) and Pitchavaram (55,500 µmhos/cm). The water quality of river Cauvery is presented in Annexure-I Table 17.1. The water quality status of river Cauveri with respect to BOD is given in Figure 17.1.

Figure 17.1: Water Quality of River Cauvery



17.2.2 Water Quality of tributary streams Yagachi, Hemavati, Shimsa, Arkavati, Lakshmantirtha, Kabbani, Bhavani and Amravati

The water quality of tributary steams Yagachi, Hemavati, Shimsa, Arkavati, Lakshmantirtha, Kabbani, Bhavani and Amravati indicate that pH, Conductivity, DO and BOD is meeting the water quality criteria at all the locations except in Lakshmantirtha at D/s of Hunsur Town in Karnataka where the concentration of DO is observed as nil and BOD 10.0 mg/l. The Faecal Coliforms ranges from 12-3300 MPN/100ml whereas the Total Coliforms ranges from 40-22,000 MPN/100ml. The Total Coliforms are observed higher than the desired criteria in River Bhavani at Bhavani in Tamilnadu, followed by Bhavani at Bhavani Sagar, Bhavani at Sirumugai in Tamilnadu. The water quality of tributaries of river Cauvery 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 square kilometres are categorized as medium and minor rivers. There are 99 medium and minor rivers in India. The medium and minor rivers are mainly confined to the coastal tract of India and are flowing in the State's of Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Orissa, Andhra Pradesh, Haryana, Himachal Pradesh, Punjab; and Union Territory of Chandigarh and Daman and Diu.

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

The water quality monitoring of river Damanganga, Baleshwar Khadi, Purna, Kaveri, Dhadar, Ambika, Kolak, Amlakheri and Mindhola in Gujarat & Daman is carried out by the State Pollution Control Boards at 12 locations. In River Damanganga DO varies from 3.1 mg/l to 7.2 mg/l and BOD observed in the range of 0.3 mg/l to 16 mg/l. The level of BOD observed in river Amlakhadi in the range of 73 to 522 mg/l after confluence of wastewater from Ankleshwar. The level of BOD observed in river Kolak (max. 19 mg/l), Baleshwar (max. 4.7 mg/l), River Purna (max. 3.9 mg/l), river Kaveri (max. 3.6 mg/l), River Dhadar (max. 6.3 mg/l), Mindhola (max. 5.3 mg/l) and Ambika (max. 4.7 mg/l) does not meet the water quality criteria. The Conductivity is found very high in river Kolak at railway bridge in Vapi (29,920 µmhos/cm), Damanganga at Kachigaon D/s (20,360 µmhos/cm), River Kolak at Patalia Bridge (14,426 µmhos/cm), river Kaveri on bridge at Billimora in Valsad road (14,111 µmhos/cm) and Amlakhadi after confluence of wastewater from Ankleshwar (5414 µmhos/cm). The Total Coliform observed higher than the desired criteria in River Mindhola at state Highway Bridge, Sachin (1,10,000 MPN/100ml), River Purna on bridge at Surat-Navsari Highway & Balehwar Khadi at N.H. No. 8 (36,000 MPN/100ml), River Kaveri at Bilimora-Valsad road (24,000 MPN/100ml) and Ambika at Bilimora (21,000 MPN/100ml). The Faecal Coliform is found very high in River Mindhola at State Highway Bridge, Sachin (46,000 MPN/100ml), Balehwar Khadi at N.H. No. 8 & River Purna on bridge at Surat-Navsari Highway (24,000 MPN/100ml), river Kaveri on bridge at Billimora in valsad road (15,000 MPN/100ml) and Ambika at Bilimora (15,000 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 and Assonora. The water quality of all the mentioned rivers in Goa is

meeting the desired water quality criteria in respect of DO, Conductivity, pH at most of the locations except Conductivity in river Zuari at D/s of Point where Kumbarjria canal joins (2609 µmhos/cm), Mandovi at Tonca (2821 µmhos/cm) and river Zuari at Panchawadi (1005 µmhos/cm). Total Coliform and BOD is not meeting the desired water quality criteria at all the location except in River Madai at Dabos-Valpoi.

The water quality monitoring of river Ulhas, Bhatsa, Kalu, Patalganga and Kundalika is carried out by the State Pollution Control Board of Maharashtra. All the Rivers are meeting the desired water quality criteria in respect of DO, pH, Conductivity and Total Coliform except Conductivity in River Kalu at Atale village (1269 µmhos/cm). BOD observed in the range of 3.0 mg/l to 7.5 mg/l and the higher levels are observed in river Kalu at Atale village (max. 7.5 mg/l), river Ulhas at U/s of NRC Bund at Mohane (max. 6.0 mg/l), river Ulhas at U/s of Badlapur, Patalganga at Shilphata & near intake of MIDC Water works, Kundalika at Roha city (max. 5.0 mg/l) and Bhatsa at D/s of Pise Dam (max. 4.2 mg/l). The number of Total Coliform are 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 Periyar, Chaliyar, Kallada, Muvattapuzha, Chalakudy, Karmana, Pamba, Meenachil, Manimala, Achenkoil, Vamanapuram, Amaravila, Ayur, Thirurangady, Kuttiyady, Valayum, Kuppam, Hosdurg, Kakkadavu, Padiyathadka & Irupanam in Kerala is carried out by the State Pollution Control Board of Kerala at 28 locations. The DO does not meet the criteria in river Karmana at Moonnattumukku (0.0 mg/l), Irupanamn (2.2 mg/l), Manimala at Kalloopara (0.6 mg/l), Periyar near Alwaye-Eloor (2.7 mg/l) and Pamba Down (3.7 mg/l). BOD varies from 0.1 mg/l to 13.2 mg/l. All the monitoring locations in Kerala on Medium and Minor River are having 3 mg/l BOD or less except Karmana at Moonnattumukku (13.2 mg/l), Amaravila (3.5 mg/l), Irupanamn (3.6 mg/l) and Muvattapuzha (3.6 mg/l) that indicates about the relatively low level of concentration of organic matter in water bodies. The Total and Faecal Coliform numbers were observed in the range of 40-39,000 MPN/100ml and Nil-31,000 MPN/100ml with maximum at Karmana at Moonnattumukku. The conductivity observed high in river Hosdurg (37,600 µmhos/cm), Chaliyar at Chungapally (36,000 µmhos/cm), Kuppam at Thaliparamba (34,300 µmhos/cm), Karmana at Moonnattumukku (9300 µmhos/cm), Periyar at Alwaye (4000 µmhos/cm) and Irupanamn (3100 µmhos/cm) due to estuarine zone of these rivers on these locations. 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, Orissa, Pondicherry, Tamilnadu and Karnataka

The water quality monitoring of river Nagavalli, Rushikulya, Arasalar, Tambiraparani, Palar, Nethravati, Kumardhara and Kali in Andhra Pradesh, Orissa, Pondicherry, Tamilnadu and Karnataka respectively is carried out by

the respective State Pollution Control Boards. The pH, Conductivity and DO is meeting the criteria all locations except conductivity in river Rushikulya at Ganjam D/s (42,900 µmhos/cm) in Orissa. BOD varies from 0.0-7.0 mg/l. BOD observed more than criteria limit in Arasalar, Karaikal Region (7.0 mg/l) in Pondicherry; Tambiraparani at Rail Bridge near Ambasanudam (6.0 mg/l), Tambiraparani at Arumuganeri (4.7 mg/l), Palar at Vaniyambadi Water Supply Headworks (4.0 mg/l), Tambiraparani at Murappanadu (3.4 mg/l), Tambiraparani at Tirunelveli Collectorate (3.3 mg/l) in Tamilnadu. The Total and Faecal Coliform are observed in the range of 2-35,000 MPN/100ml and Nil-2600 MPN/100 ml respectively. The critical location with respect to Coliform levels is river Nagavalli at Thotapalli Regulator in Andhra Pradesh. The water quality status of rivers in Andhra Pradesh, Orissa, Pondicherry, Tamilnadu and Karnataka is presented in Annexure-I Table 18.4.

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

The water quality monitoring of river Ghaggar, Markanda, Kala Amb, Sukhana, Kodra Dam, N-Choe, Patiala ki Rao and Sukhna Choe in Punjab, Haryana, Chandigarh, Himachal Pradesh and Rajasthan is carried out by the respective State Pollution Control Boards. In river Ghaggar DO varies from 1-8 mg/l. The low value of DO observed at road bridge Sirsa, Debwali road (1.0 mg/l) and at Chandrapur Syphon (3.0 mg/l) in Haryana. BOD observed in the range of 0.8 mg/l to 81 mg/l. All the locations in river Ghaggar are grossly polluted. Locations having very high BOD in River Ghaggar are ottu weir (81 mg/l), at road Brdg. Sirsa, Debwali road (68 mg/l), GH-2 at Chandrapur Syphon (42 mg/l) in Haryana; D/s Sardulgarh(20 mg/l), U/s of Sardulgarh and U/s Dhakansu Nallah(18 mg/l), at D/s of Jharmal nadi (16mg/l), at Moonak (14 mg/l), 100m D/s after confluence with river Saraswati, Patiala and near Bankarpur, Dera Bassi (12 mg/l), at Ratanheri D/s of Patiala Nadi after confluence (10 mg/l), D/s of Chhatbir (4.8 mg/l), U/s of Jharmal nadi (4.2 mg/l) and at Mubarakpur Rest House (Patiala) (3.4 mg/l) in Punjab. The number of Total and Fecal Coliform were in the range of 7-35,00,000 MPN/100ml and 3-2,30,000 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 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 BOD in River Markanda ranges from 0.2 to 218 mg/l and conductivity from 128 to 4260 µmhos/cm. River Sukhana does not meet the criteria limit as the BOD is in the range of 6.8-36 mg/l. The water quality of river Kodra is meeting water quality criteria in respect of all parameters except BOD. The tributary streams N-Choe, Patiala ki Rao and Sukhna Choe are having high concentration of BOD which is in the range of 49-50 mg/l. The water quality status of medium and minor rivers in Punjab, Haryana, Himachal Pradesh and Rajasthan is presented in Annexure-I Table 18.5.

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

The water quality monitoring of river Imphal, Kiyamgio, Minuthong, Iril, Lilong, Tlawing, Tuirial, Umtrew, Kharkhla, Myntdu, Ganol, Khuga, Khujairok, Simsang, Gumti, Nambul, Haora and Sekmai in the states Manipur, Meghalaya, Mizoram and Tripura is carried out by the respective State Pollution Control Boards. The DO meets the criteria at all the locations except in River Ganol, Tura (1.4 mg/l), River Simsang, William Nagar(2.0 mg/l) in Meghalaya; Hump Bridge (2.1 mg/l) and Heirangoithong (3.1 mg/l), Imphal at Mahabali (3.4 mg/l) and Koirengei (3.9 mg/l), Khuga River, Churachandpur Dist.(3.8 mg/l) in Manipur; Gumti at D/s South Tripura (3.7 mg/l) and Sekmai river, Kakching (3.2 mg/l) in Tripura. The pH is meeting the desired criteria at all the locations except at Kharkhla near Sutanga Khlieriat, Jaintia Hills District in Meghalaya, where it observed in acidic range (2.90). BOD varies from 0.1 to 14.6 mg/l. The locations having high BOD are river Nambul at Hump Bridge (14.6 mg/l) and at Heirangoithong (12 mg/l) in Manipur; River Umtrew at Byrnihat East (7.7 mg/l), at Kharkhla near Sutnga Khlieriat, Jaintia Hills Dt. (7.0 mg/l) in Meghalaya; Haora River Chandrapur, Agartala D/s (3.9 mg/l) in Tripura and Imphal River at Minuthong (3.3 mg/l) in Manipur. River Tlawing and Tuirial in Mizoram are meeting the water quality criteria in respect of pH, DO and BOD at all monitoring locations. The Total and Faecal Coliform are meeting the criteria at all the locations on the rivers monitored in North Eastern States. 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 and Canals

The monitoring locations on creeks are one each on Thane, Mahim and Bassein in the vicinity of Mumbai, Maharashtra. Gurgaon Canal, Western Yamuna Canal and Katakha Canal are monitored in Haryana and Tripura.

18.8.1 Water Quality of Creeks

The water quality of the creeks Thane, Mahim and Bassein, with respect to pH, Conductivity, DO, BOD, Total Coliform (TC), Faecal Coliform (FC), Nitrite, Nitrate and Ammonical Nitrogen are presented as minimum, maximum and mean value to assess the extent of water quality variation throughout the year. DO varies from 1.1 mg/l to 5.8 mg/l. BOD observed in the range of 7.8 mg/l to 19 mg/l and however the maximum value was observed in Mahim Creek at Mahim Bay. Conductivity is observed very high due to marine water insurgence and it ranges from 16,000–61,250 µmhos/cm. The Nitrate (NO_3^-) concentrations are in the range of 0.60 – 3.40 mg/l. The highest concentration of Nitrate (3.40 mg/l) is observed in Mahim Creek. The number of Total and Faecal Coliform are meeting the criteria limit due to proximity of monitoring locations to sea. The water quality status of the creeks Thane, Mahim and Bassein is presented in Annexure-I Table 18.7.

18.8.2 Water Quality of Canals

The water quality of Western Yamuna Canal and Katakhal (Agartala) Canal with respect to pH, Conductivity, DO, BOD, Total Coliform (TC), Faecal Coliform (FC), Nitrite, Nitrate and Ammonical Nitrogen 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 vary from 0.2 mg/l to 6.8 mg/l and BOD observed in the range of 0.6 mg/l to 396 mg/l with maximum at Damla (Yamuna Nagar) on Western Yamuna Canal 100 m D/s after receiving Industrial & Municipal Sewage. The Total and Fecal Coliform observed at Haiderpur Water Works does not meet the criteria as the value of Total Coliform varies from 11,000–5,20,000 MPN/100ml and Faecal Coliform from 7500–19,000 MPN/100ml.

Katakhal Canal in Tripura does not meet the water quality criteria. The maximum DO observed in Katakhal Canal in Tripura is 6.11 mg/l and BOD is 12.2 mg/l, however Total Coliform is meeting the criteria. The water quality status of canals 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 Hussainsagar (1), Saroornagar (1), Himayatsagar (1), Pulicate (1), Salaulim (1), Kankoria (1), Chandola (1), Ajwah (1), Sursagar (1), Brahamsarovar (1), Sukhna (2), Govindsagar (1), Pongdam (1), Renuka (1), Wuller (1), Dal (1), Ulsoor (1), HebbalaValley (1), Oruvathikotta (1), Sasthamcotta (1), Ashthamudi (1), Paravur (1), Vembanad (1), Periyar (1), Kodumgallor (1), Kayamkula (1), Punnamadakayal (1), Pookotekayal (1), UpperLake (1), LowerLake (1), MultaiLake (1), Loktak (4), Umiam (1), Ward (1), Thadlaskena (1), Osteri (1), Bahour (1), Harike (2), Pichola (1), Udaisagar (1), Ramgarh Jaipur (1), Pushkar (1), Fatehsagar (1), Kalyana (1), Nakki (1), Udhagamadalam (1), Kodaikanal (1), Yercaud (1), Lakshminarayan Baridigh (1), Rudrasagar (1), Ramgarh-UttarPradesh (1), Naini (1), Rabindrasarovar (1), Nalsarovar (1), Bindusaraovar (1), Sahastrling Sarovar (1), Lakhota Talav (1), Narsimehta Talav (1), Nadiad city Lake (1), Ranjitnagar Talav (1) Ankleshwar reservoir(1), Dharoi dam(1), Kuwadava(1),Moticher lake(1), Mayem lake(1), Janunia talav(1), Yashwant sagar(1), Sirpur talav(1), Kali sindh reservoir(1), Periat tank(1), Shahpura (1), Madhav lake(1), Nagchun(1), Karwa dam(1), Khandari reservoir(1), Daloni Beel(1), Mer Beel(1), Govindgarh tank(1), Bilawali talav(1).

The tanks and ponds being monitoring are Dharamsagar(1), Bibinagar(1), Kistrapetrareddy(1), Goysagar(1), Thol Tank (1), Gandigudem(1) and the ponds are Elangabeel System(1), Olpad, Village Pond, Olpad, Surat (1), Lakshadweep Pond near Juma Masjid (1), Bishnu Pushkar pukhuri(1), Bor Beel(1), Bor pukhuri(1), Botodriva pond(1), Chand dubi Beel(1), Deepar Beel(1), Dighali pukhuri(1), Dhudia talav(1), Baskandi pond(1), Galabeel(1), Ganga pukhuri(1), Gaurisagar(1), Gopur tank(1), Padum pukhuri(1), Hordai pukhuri(1), Jaipal pukhuri(1), Mahamaya mandir pukhuri(1), Rajadinia pukhuri(1), Raja pukhuri(1), Rajmaw pukhuri(1), Saranbeel(1), Sivasagar tank(1) and Subhagya kund(1). The number of monitoring locations on each lake is given in parenthesis.

19.2 Lakes, Tanks and Ponds in Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Pondicherry and Goa.

The respective State Pollution Control Boards and PWD in Lakshadweep carry out the water quality monitoring of Lakes, Tanks and Pond in Andhra Pradesh, Karnataka, Kerala, Tamilnadu and union territory of Pondicherry.

The ranges of water quality observed in these rivers with respect to pH, Conductivity, DO, BOD, 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. DO varies from 0.0 mg/l to 10.0 mg/l. Lakes and Tanks having very low DO and does not meet the water quality criteria limits are Heballa Valley Lake, Mandya in Karnataka; Pulicate lake, Hussain Sagar lake and Saroornagar in A.P.; Ashthamudi Lake at Quilon and Kayamkulam in Kerala. and BOD observed in the range of 0.0 mg/l to 24 mg/l.

Lakes and Tanks with high conductivity and does not meet the water quality criteria are Pulicate lake, Kistareddypet Tank (Medak Dist.) and Gandigudem (Medak Dist.), in AP; Kayamkulam Lake, Oruvathilkotta Lake, Alappuzha lake, Ashthamudi Lake at Quilon, Paravur Lake, Kodungalloor, and Kochi (Oil Tanker Jetty) in Kerala.

Lakes and Tanks with high concentration of organic matter and does not comply to the standard limits for BOD are Saroornagar lake (24 mg/l), Hussain Sagar lake (16 mg/l), Dharmsagar Tank near Warangal (8 mg/l), Bibinagar Tank (4.8 mg/l) and Pulicate lake (4.8 mg/l) in AP; Heballa Valley Lake (18 mg/l) and Ulsoor lake (9 mg/l) in Karnataka; Bahour Lake (14 mg/l) and Osteri Lake (12 mg/l) in Pondicherry; Udhagamandalam lake (21 mg/l) and Kodai Kanal Lake (5.2 mg/l) in Tamil Nadu; Oruvathilkotta Lake (12.2 mg/l), Kayamkulam (5.0 mg/l), Alappuzha lake (4.5 mg/l) and Kochi (Oil Tanker Jetty) (3.7 mg/l) in Kerala.

The water quality of Lakes and tanks in respective states is meeting the water quality criteria with respect to Total Coliform and Fecal Coliform except in Oruva Thilkotta Lake in Kerala where TC was observed higher than the desired criteria (17800 MPN/100ml). The Ammonical Nitrogen (NH_4-N) is observed in the range of 0.0-15.0 mg/l.The higher concentration is observed at Saroornagar (15.0 mg/l) and Bibinagar Tank (4.20 mg/l) in AP & Kodaikanal Lake (5.0 mg/l) and Udhagamandalam Lake (5.0 mg/l) in Tamil Nadu. The water quality status of Lakes and tanks in Andhra Pradesh, Karnataka, Kerala, Tamilnadu, Goa and union Territory of Pondicherry is presented in Annexure-I Table 19.1.

19.3 Lakes in Gujarat, Madhya Pradesh and Rajasthan

The water quality monitoring of Lakes, Tanks and Pond in Gujarat, Madhya Pradesh and Rajasthan is carried out by the respective State Pollution Control Boards. The ranges of water quality observed in these Lakes with respect to pH, Conductivity, DO, BOD, 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. DO varies from 1.0 mg/l to 12.8 mg/l with minimum at Kheta Talav, Nadiad (2.2 mg/l) and Kankori Lake at Ahemdabad (3.5 mg/l) in Gujarat; Udaisagar Lake at Udaipur (1.0 mg/l), Pushkar Lake (1.2 mg/l), Fateh Sagar Tank, Udaipur (2.8 mg/l), Nakki Lake, Mt. Abu (3.1 mg/l) and Pichola Lake at Udaipur (3.6 mg/l) in Rajasthan. Conductivity observed higher than the water quality criteria at Nalsarovar

Lake (Sanand), Dist.Ahmedabad (3670 µmhos/cm) in Gujarat. BOD observed in the range of 0.3 mg/l to 13.3 mg/l with maximum at Pushkar Lake (13.3 mg/l). Other Lakes and Tanks having high BOD and does not comply to the standard limits for BOD are Bindusarovar, Siddhpur (Dist.Patan) (12 mg/l), Sursagar Lake (11.1 mg/l), Thol Tank (Kalol) (Dist. Mehasana) (10 mg/l), Kheta Talav, Nadiad (8 mg/l), Narsimehta Talav- Junagadh (7.4 mg/l), Kankoria lake (6 mg/l), Nalsarovar Lake (5 mg/l), Lakhota Talav, Jamnagar (4.9 mg/l) and Olpad Village Pond (3.1 mg/l) in Gujarat; Udaisagar lake (10.8 mg/l), Nakki lake at Mt.Abu (6.1 mg/l), Kayalana Jheel at Jodhpur (4.1 mg/l) and Fateh Sagar Lake at Udaipur intake point of PHED (3.3 mg/l) in Rajasthan; Lower lake Bhopal (4.8 mg/l) in MP. The water quality of Lakes and tanks in respective states is meeting the water quality criteria with respect to Total Coliform except in Olpad village Pond, Nalsarovar Lake, Sahstraling Sarovar in Gujarat which is not complying with the criteria limit of Total Coliform. The water quality status of Lakes in Gujarat, Madhya Pradesh and Rajasthan is presented in Annexure-I Table 19.2.

19.4 Lakes in Haryana, Himachal Pradesh, Punjab, Chandigarh, Uttar Pradesh, Uttaranchal and West Bengal

The water quality monitoring of Lakes, Tanks and Pond in Haryana, Chandigarh, Himachal Pradesh, Punjab, Uttar Pradesh and West Bengal is carried out by the respective State Pollution Control Boards. The ranges of water quality observed in these rivers with respect to pH, Conductivity, DO, BOD, 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. All the lakes monitored are meeting the required level of water quality criteria in respect of DO, pH, TC and conductivity at most of the locations. DO vary from 0.2 mg/l to 9.8 mg/l. Lakes and Tanks having very low DO and does not meet the water quality criteria limits are Renuka Lake in HP and Naini Lake, Nainital in Uttranchal. BOD observed in the range of 0.2 mg/l to 5.2 mg/l. Lakes and Tanks having BOD more than criteria limit are Ramgarh Lake-U.P (5.2 mg/l), Rabindra Sarobar Lake-WB (4.8 mg/l) and Naini Lake, Nainital-UT (3.8 mg/l). The Total Coliform and Faecal Coliform varies from 9 -55,000 MPN/100ml and 0-35,000 MPN/100ml respectively. Lake having TC more than the desired criteria is Rabindra Sarobar Lake, WB (55,000 MPN/100ml). The water quality status of Lakes and tanks in Haryana, Himachal Pradesh, Punjab, Chandigarh, Uttar Pradesh, Uttaranchal and West Bengal is presented in Annexure-I Table 19.3.

19.5 Lakes, Tanks and Ponds in Assam, Manipur, Meghalaya and Tripura.

The water quality monitoring of Lakes, Tanks and Pond in Assam, Manipur, Meghalaya and Tripura is carried out by the respective State Pollution Control Boards. The ranges of water quality observed in these rivers with respect to pH, Conductivity, DO, BOD, 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. DO varies from 0.0 mg/l to 9.8 mg/l. DO observed lower than the desired criteria are Elangabeel system pond in Assam; Loktak Lake at Thana, Loktak Lake at Bishnupur and Karang

Island (Loktak Lake) in Manipur and Rudrasagar in Tripura whereas all other locations monitored are meeting the required level of DO. Conductivity observed higher than the water quality criteria at Elangabeel system pond in Assam (3770 µmhos/cm). BOD observed in the range of 0.1 mg/l to 174 mg/l. Lakes and Tanks observed having BOD more than criteria are Elangabeel System Pond (174 mg/l) and Goysagar Tank, Sibsagar (3.5 mg/l) in Assam; Umiam lake at Barapani (9.7 mg/l) in Manipur; Loktak lake at Sendra (3.5 mg/l) and Ward Lake at Shillong (8.6 mg/l) in Meghalaya; Laxmi Narayan Bari Palace Compound, Tripura (5.2 mg/l). The water quality of Lakes, Tanks and Ponds in respective states is meeting the water quality criteria with respect to Total Coliform except Elangabeel system pond in Assam where maximum count observed 46,000 MPN/100ml. The water quality status of Lakes, Tanks and Ponds in Assam, Manipur, Meghalaya and Tripura is presented in Annexure-I Table 19.4.

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 dependant on 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 382 locations. The Statewise number of groundwater monitoring locations is given below.

Table 20.1: State wise Distribution of Groundwater Monitoring Stations

State/water body	No. of wells
ANDHRA PRADESH	24
ASSAM	32
BIHAR	20
CHANDIGARH	7
CHHATISSGARH	4
DAMAN & Diu(ZOV)	1
GOA	6
GUJARAT	42
HIMACHAL PRADESH	20
KERALA	15
LAKSHDWEEP	15
MADHYA PRADESH	18
MAHARASHTRA	30
MANIPUR	5
MEGHALAYA	5
MIZORAM	2
ORISSA	15
PONDICHERRY	13
PUNJAB	6
RAJASTHAN	37
TAMIL NADU	2
TRIPURA	7
UTTAR PRADESH	25
UTTRANCHAL	1
WEST BENGAL	30
Total	**382**

The ranges of water quality observed in groundwater with respect to pH, Conductivity, BOD, 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 Boards. pH of groundwater was in the range of 6.3-8.6 and the low pH was observed at B/W -Near Ckm College , Enumamula (V), Warangal. Conductivity varies from 141 to 7380 µmhos/cm except few locations, conductivity is meeting the criteria limit for drinking as well as irrigation purposes. Very high level of conductivity is observed in Near Rama Temple, Visakhapatnam (7380 µmhos/cm), in Panchayat Office, in Bolaram (5720 µmhos/cm), Near Ckm College, Enumamula (V), Warangal Dist.,(3590 µmhos/cm), Open well near Pratap Nagar bridge, Kakinada (3120 µmhos/cm), Nagiri, Chittoor Dist. (2350 µmhos/cm), Open well, Peddanuyyi-Vizianagaram (2350 µmhos/cm) and Swarnamukhi River, Srikalahasti, Chittoor Dist. (2330 µmhos/cm). BOD is meeting the criteria in well at all locations except at B/W – East of Saichevuru, Paidipally (V), Warangal Distt., A.P. (4.8 mg/l) and at Open well- Bhoomaiah near Ashponds of NTPC, Kundanpally (V), Ramagundam, Karimnagar (4.0 mg/l). Total Coliforms are meeting the desired criteria at all the locations except at Open well near Pratap Nagar bridge, Kakinada (12000 MPN/100ml), B/W near M/S Andhra sugars Ltd., Kovvur, W.G. Distt. (10000 MPN/100ml) and Open well Peddanuyyi-Vizianagaram (8000 MPN/100ml).The concentration of Nitrate (NO_3^-) is observed in the range of 0.1-45.8 mg/l. The highest value of nitrate is observed at B/W near M/S Andhra sugars Ltd., Kovvur, W.G. Distt. (45.8 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, Meghalaya, Mizoram and Tripura

The water quality monitoring of ground water in Assam, Meghalaya and Tripura is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 5.6-8.1 and pH observed below 6.0 at following monitoring locations Kunjban, Agartala and A.D.Nagar, Agartala, in Tripura. Conductivity varies from 48-1294 µmhos/cm and is meeting the criteria limit for drinking as well as irrigation purposes. BOD is not meeting the desired criteria at Guwahati (12.0 mg/l), Berpeta (6.8 mg/l) and Sibsagar (4.5 & 4.3 mg/l). Total Coliforms are not meeting the desired criteria at monitoring locations in Silchar (240000 MPN/100ml); Guwahati (15000 MPN/100ml) and Sibsagar, Berpeta, Bonaigaon & Guwahati (9300 MPN/100ml). The concentration of Nitrate (NO_3^-) is observed in the range of 0.03-12.0 mg/l. The quality of ground water in Assam, Meghalaya and Tripura is presented in Annexure-I Table 20.2.

20.5 Status of Ground Water Quality in Chattisgarh and Madhya Pradesh

The water quality monitoring of groundwater in Chattisgarh and Madhya Pradesh is carried out by respective State Pollution Control Boards. pH of groundwater is observed in the range of 6.1-8.9 and meet the water quality criteria. Conductivity varies from 210-2225 µmhos/cm. BOD and Total Coliform are meeting the desired criteria at all the locations. The quality of ground water in Chattisgarh and Madhya Pradesh is presented in Annexure-I Table 20.3.

20.6 Status of Ground Water Quality in Himachal Pradesh, Chandigarh and Punjab

The water quality monitoring of ground water in Himachal Pradesh, Chandigarh and Punjab is carried out by respective State Pollution Control Boards and Pollution Control Committees. pH of groundwater is observed in the range of 4.2-8.8.The Lowest value of pH is observed at Bhagwan Singh, H. No. 907, Dashmesh Nagar, Gali No. 6, Ludhiana, Punjab. Conductivity varies from 304-1520 µmhos/cm. BOD is found in the range of Nil-10.0 mg/l and meeting the water quality criteria except at Shimla D/s of MSW Dumping Siot. Total Coliforms are meeting the desired criteria at all the locations. The quality of ground water in Himachal Pradesh, Chandigarh and Punjab is presented in Annexure-I Table 20.4.

20.7 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 4.0-7.6 and does not meet the water quality criteria at few locations such as Kundra in Kollam (4.0 mg/l); Kalamassery in Ernakulam (4.5 mg/l); Kannur (4.6 mg/l), Chumgapallayam & Pappanamkode (5.3 mg/l); Mavoor Kozhikkode Distt. (5.5 mg/l); Eloor & Punkunnam Trissur Distt. (5.6 mg/l); Nedumangad in Thiruvananthapuram (5.7 mg/l); Edayar in Ernakulam & Malapuram (5.8 mg/l); and Cherthala, Alleppy & Payyannur (6.0 mg/l). Conductivity varies from 90-700 µmhos/cm. BOD and Total Coliforms are meeting the desired criteria at all the locations. The quality of ground water in Kerala is presented in Annexure-I Table 20.5.

20.8 Status of Ground Water Quality in Pondicherry and Tamil Nadu

The State Pollution Control Board/ Pollution Control Committee carry out the water quality monitoring of ground water in Pondicherry and Tamilnadu. pH of groundwater is observed in the range of 5.9-9.0. Conductivity varies from 82-37,650 µmhos/cm. Conductivity observed high in well at Nehru Statue (5240 µmhos/cm), Vadamattai (4120 µmhos/cm) and Chunmbar river (37,650 µmhos/cm) in Pondicherry due to sea water intrusion in ground water. BOD observed high at following locations than the desired criteria at Chunmbar (9.0 mg/l), Nehru Statue (8.0 mg/l) and Collector well at Thirupuvanam for Madurai wat (3.2 mg/l). Nitrate is observed in the range of 0.08-2.90 mg/l.

The quality of ground water in Pondicherry and Tamilnadu is presented in Annexure-I Table 20.6.

20.9 Status of Ground Water Quality in Daman, Maharashtra and Gujarat

The water quality monitoring of ground water in Daman, Maharashtra and Gujarat is carried out by respective State Pollution Control Board of Maharashtra and Gujarat and CPCB Zonal Office, Varodara. pH of groundwater is observed in the range of 6.1-8.5 and meeting the water quality criteria at all monitoring locations except at Khanjirenagar (6.1) and Parvati Industrial Estate & MIDC, Shinoli (6.3). Conductivity varies from 105-6424 µmhos/cm and meeting the desired criteria at all locations except at Mira-Bhayander (6424 µmhos/cm), Mehsana (2480 µmhos/cm), Narol, Ahmedabad (2450 µmhos/cm), Palghar (2424 µmhos/cm), Surendra Nagar & Nadiad (2420 µmhos/cm), Nandesari (2360 µmhos/cm), Bhuj (2270 µmhos/cm), Dahanu (2017 µmhos/cm)in Gujarat and Rasulwadi-Sambarwadi (4278 µmhos/cm), Khanjirenagar, Ichalkaranji (3812 µmhos/cm), Savali, Sangli (3673 µmhos/cm), Parvati Industrial estate, Shirol (3562 µmhos/cm), Bhahmni Kalmeshwar, Nagpur (2594 µmhos/cm) in Maharashtra. BOD was 28.0 mg/l at MSW site, Pathardi, Nashik, 12.0 mg/l at BMW site, Burudgaon, Ahmednagar, 10.0 mg/l at Bhahmni, kamleshwar, Nagpur , 9.0 mg/l at Koradi, Nagpur, 8.0 mg/l at Industrial estate, Tarapur & TPS, Durgapur, Chandrapur, 7.0 mg/l at Mira- Bhayander, Vasai & MSW site, Taloja, Raigad. The concentration of Nitrate is observed in the range of 0.08- 35.0 mg/l. The quality of ground water in Daman, Maharashtra and Gujarat is presented in Annexure-I Table 20.7.

20.10 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 6.9-8.8 and meet the water quality criteria. The conductivity varies from 200-16,900 µmhos/cm and is not meeting the desired criteria at well of Bhopal Singh, 24 km. from Pali Town (16,900 µmhos/cm), well U/s 1 km from Jodhpur Town (15,700 µmhos/cm), Village Vinayakia, Jodhpur(Hukum Singh Rathore) (10,200 µmhos/cm), Near Khanpura Talab, Ajmer(9100 µmhos/cm), well of Loomji Chaudhary, near Nayagaon, Pali (6500 µmhos/cm), Well Kothi in village Bagar Rajput, Alwar (5300 µmhos/cm), Pabupura Road near Civil Airport, Jodhpur(4500 µmhos/cm), Village Vinayakia, Jodhpur (Badri Kumhar) (3500 µmhos/cm), Hand pump near Secondary School about 300 metre from Kansua Nallah, Kota (3100 µmhos/cm), Village Vinayakia, Jodhpur (Hiralal Kumhar) (3000 µmhos/cm), Outside JLN Hospital, Ajmer (2900 µmhos/cm), Village Harchandpur, Bhiwadi (2900 µmhos/cm), Handpump of Vidhani village, Goner road, Jaipur (2900 µmhos/cm), Hotel Orient Place, Subhas Nagar, Udaipur (2800 µmhos/cm), Opp. Pvt. Bus Stand, Ajmer (2700 µmhos/cm) and near Shree Kalyaneshwar Mahadev Temple, Jaisinghpura Khurd, Jaipur (2500 µmhos/cm). BOD observed in the range of 0.1-6.5 mg/l and the location having BOD more than the criteria is at Well of Bhopal Singh 24 km from Pali town (6.5 mg/l) and at U/s 1 Km. from Jodhpur town (4.6 mg/l). Total

Coliforms are meeting the desired criteria at all the locations. The quality of ground water in Rajasthan is presented in Annexure-I Table 20.8.

20.11 Status of Ground Water Quality in Uttar Pradesh and Uttaranchal

The ground water quality monitoring in Uttar Pradesh and Uttaranchal is carried out by State Pollution Control Boards. pH of groundwater is observed in the range of 6.2-8.5 and meet the water quality criteria except at M/S Kanoria Chemical, Sonbhadra, U.P. (6.2). Conductivity varies from 410-2439 µmhos/cm. Conductivity is observed high in the well at Roadways Bus Station Unnao (2439 µmhos/cm) and at Sahibabad industrial area Ghaziabad (2260 µmhos/cm). BOD observed high at Sardar Nagar (6.2 mg/l) and Captain Ganj (4.0 mg/l). Total Coliform is meeting the desired criteria. The quality of ground water in Uttar Pradesh and Uttaranchal is presented in Annexure-I Table 20.9.

20.12 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 6.5-8.4 and meet the water quality criteria. Conductivity varies from 135-2590 µmhos/cm and meeting the criteria for beneficial uses. BOD is observed in the range of Nil-3.9 mg/l. Total Coliform varies from Nil-900 MPN/100 ml and meeting the desired criteria at all the locations. The quality of ground water in West Bengal is presented in Annexure-I Table 20.10.

20.13 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 7.0-8.4 and meet the water quality criteria. Conductivity varies from 120-1606 µmhos/cm and meeting the desired criteria. The quality of ground water in Orissa is presented in Annexure-I Table 20.11.

ANNEXURE-I

WATER QUALITY DATA-2007

- **RIVER BASINS - INDUS, GANGA, BRAHMAPUTRA, MAHI, SABARMATI, NARMADA, TAPI, MAHANADI, BRAHMANI AND BAITRANI, SUBARNAREKHA, GODAVARI, KRISHNA, PENNERU & CAUVERY.**
- **MEDIUM & MINOR RIVERS, CANALS, CREEKS AND DRAINS**
- **STATEWISE - LAKES, TANKS AND PONDS**
- **STATEWISE - GROUNDWATER**

TABLE 4.1 :- WATER QUALITY OF RIVER BEAS - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1001	BEAS AT U/S MANALI, H.P.	2	16	10	7.7	11.0	9.4	6.2	7.6	7.1	160	226	182	1.6	1.6	1.6	0.2	0.5	0.4	0.10	0.10	0.10							2	17	7	6	2400	616
1002	BEAS AT D/S KULU, H.P.	6	18	12	6.7	11.2	9.2	7.5	7.7	7.6	134	201	176	2.8	2.8	2.8	0.4	1.0	0.6	0.10	0.20	0.20							6	17	14	17	2400	1232
1003	BEAS AT D/S AUT, H.P.	7	18	13	7.8	11.0	9.1	7.0	7.5	7.2	179	406	280	1.2	1.2	1.2	0.2	0.9	0.5	0.10	0.20	0.20							9	9	9	6	2400	835
1004	BEAS AT U/S PANDON DAM, H.P.	7	18	13	7.9	11.1	9.5	6.5	7.8	7.3	110	205	169	1.6	1.6	1.6	0.2	0.5	0.3	0.08	0.20	0.10							4	14	8	17	2400	673
1005	BEAS AT EXIT OF TUNNEL DEHAL POWER HOUSE, H.P.	6	19	15	9.0	12.8	10.9	7.4	7.9	7.6	184	470	291	1.2	1.2	1.2	0.1	0.2	0.2	0.10	0.20	0.20							2	11	7	7	170	80
1550	BEAS AT U/S MANDI, H.P	7	18	15	8.3	11.0	9.5	7.6	7.9	7.8	100	331	249	2.0	2.0	2.0	0.3	0.5	0.4	0.10	0.20	0.10							2	7	5	6	2400	641
1006	BEAS AT D/S MANDI, H.P.	9	19	16	8.0	9.5	8.8	7.1	7.9	7.5	157	401	272	12.0	12.0	12.0	1.2	2.9	1.8	0.10	0.70	0.40							17	2400	700	2400	2400	2400
1007	BEAS AT D/S ALAMPUR, H.P.	10	23	16	7.2	9.5	8.2	7.8	8.9	8.4	86	337	215	2.0	2.0	2.0	0.3	0.8	0.6	0.11	0.40	0.30				1.12	1.20	1.20	2	9	5	9	43	22
1008	BEAS AT D/S DEHRAGOPIPUR, H.P.	15	26	19	7.7	8.7	8.1	8.2	8.6	8.4	141	341	237	3.0	12.0	7.5	0.1	0.9	0.6	0.10	0.80	0.40				1.80	2.20	2.00	2	11	5	14	49	28
1009	BEAS AT D/S PONG DAM, H.P.	17	19	18	4.2	8.0	6.6	7.6	8.4	8.1	143	204	181	2.0	3.0	2.5	0.1	0.8	0.5	0.20	0.50	0.30				1.12	1.20	1.20	4	8	6	12	41	29
1693	BEAS AT TALWARA H/W, PUNJAB	12	20	18	7.8	8.0	7.9	7.4	8.0	7.8	200	310	232	1.8	2.0	1.9	0.2	0.2	0.2	0.40	1.80	1.20	0.20	0.80	0.60	0.40	0.40	0.40	0	7	2	23	35	32
1694	BEAS AT U/S PATHANKOT, PUNJAB	13	21	17	7.6	7.9	7.8	7.4	7.7	7.6	212	224	217	3.4	38.0	21.0	0.4	1.1	0.8	1.00	1.80	1.40	0.40	0.80	0.60	0.60	0.60	0.60	0	50	28	110	350	270
1695	BEAS AT D/S PATHANKOT,PUNJAB	13	22	18	7.4	7.7	7.6	7.3	7.7	7.5	230	236	233	3.8	4.4	4.1	0.6	1.3	0.9	1.00	2.00	1.50	0.40	0.80	0.70	0.30	0.30	0.30	0	50	34	110	500	365
1010	BEAS AT MIRTHAL BRIDGE, GURDASPUR, PUNJAB	7	22	16	7.2	7.6	7.4	7.2	7.7	7.5	228	400	277	3.8	4.4	4.1	0.6	1.3	0.9	1.00	2.20	1.60	0.40	1.00	0.90	0.20	0.20	0.20	0	50	38	70	500	355
1294	BEAS AT 1KM.D/S OF EFFL. DISH. POINT AT MUKERIAN ,PUNJAB	12	22	18	6.8	7.5	7.3	7.6	7.7	7.7	246	286	263	4.1	4.5	4.3	1.0	1.4	1.2	0.80	2.40	1.70	0.40	1.20	0.90	0.40	0.40	0.40	0	110	53	110	1100	553
1011	BEAS AT G.T.ROAD UNDER BDG. NEAR KAPURTHALA, PUNJAB	14	22	18	6.8	8.0	7.4	7.5	7.9	7.7	202	356	293	4.0	8.2	6.1	0.2	0.8	0.5	0.80	1.80	1.40	0.30	1.20	0.90	0.80	0.80	0.80	0	170	98	70	900	493
1696	BEAS AT U/S GOINDWAL, PUNJAB	14	22	18	6.6	7.6	7.1	7.6	7.8	7.7	210	361	287	4.2	8.1	6.2	0.1	0.8	0.6	1.20	2.40	1.70	0.40	1.80	1.00	0.40	0.40	0.40	23	170	73	170	600	405
1012	BEAS AT 100M D/S INDUST. DISCH., GOINDWAL,PUNJAB	14	22	18	6.6	7.6	7.0	7.5	7.8	7.6	212	370	291	4.4	8.5	6.5	0.1	0.9	0.6	1.40	2.00	1.70	0.60	1.00	0.80	1.20	1.20	1.20	23	250	106	170	1800	743
1697	BEAS AT HARIKE, PUNJAB	15	22	18	5.9	7.7	6.9	7.6	7.8	7.7	284	419	354	2.1	6.8	5.2	0.2	1.4	0.8	1.60	2.60	2.20	0.80	1.20	1.00	0.40	1.60	1.00	0	50	20	0	350	280

TABLE 4.2 :- WATER QUALITY OF RIVER SATLUJ - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1867	RIVER SATLUJ B/C WITH RIVER SPITI AT KHAB, DISTT.KINNAUR, H.P.	5	11	7	8.4	11.5	9.8	7.8	8.2	8.1	252	500	386	4.0	4.0	4.0	0.1	0.1	0.1	0.40	0.90	1.00	0.40	0.90	1.00							3	4	3
1389	SATLUJ AT NEPTHA ZAKHAI, H.P.	6	13	9	8.9	11.6	9.9	7.7	8.2	8.0	216	400	312	4.0	4.0	4.0	0.1	0.3	0.2	0.10	0.60	0.00	0.10	0.60	0.00				1	3	2	8	27	15
1086	SATLUJ AT U/S RAMPUR, H.P.	8	16	12	8.9	11.9	10.0	7.4	8.2	7.9	152	346	266	16.0	16.0	16.0	0.1	0.2	0.1	0.30	0.70	1.00	0.30	0.70	1.00				4	29	12	32	162	79
1087	SATLUJ AT D/S RAMPUR, H.P.	8	16	12	8.2	11.5	9.3	7.5	8.3	8.0	145	269	216	20.0	20.0	20.0	0.1	0.4	0.3	0.40	0.90	1.00	0.40	0.90	1.00				4	42	21	10	180	101
1013	SATLUJ AT U/S TATAPANI, H.P.	10	26	17	8.6	11.7	9.7	8.1	8.6	8.3	189	337	273	16.0	16.0	16.0	0.2	0.4	0.3	0.20	0.60	0.00	0.20	0.60	0.00				14	51	25	52	160	89
1014	SATLUJ AT U/S SLAPPER, H.P.	7	18	15	8.9	11.7	10.3	7.5	8.0	7.7	353	462	426	2.8	2.8	2.8	0.3	0.5	0.4	0.10	0.20	0.00	0.10	0.20	0.00				5	14	9	17	540	269
1015	SATLUJ AT D/S SLAPPER, H.P.	8	19	15	9.2	12.0	10.4	7.6	8.0	7.8	270	396	355	2.0	2.0	2.0	0.1	0.4	0.2	0.08	0.20	0.00	0.08	0.20	0.00				2	11	7	8	350	110
1016	SATLUJ AT D/S BHAKHRA, H.P.	12	26	21	7.7	9.2	8.8	8.0	8.4	8.2	184	244	213	24.0	24.0	24.0	0.1	0.2	0.2	0.20	0.40	0.00	0.20	0.40	0.00				2	8	5	12	36	22
1017	SATLUJ AT 100M U/S OF HEADWORKS, NANGAL, PUNJAB	12	19	17	7.9	8.6	8.3	7.7	7.9	7.8	168	280	244	1.6	1.6	1.6	0.0	0.0	0.0	0.40	1.40	1.00	0.40	1.40	1.00	0.20	0.80	0.50	0	0	0	23	70	41
1018	SATLUJ AT 100M D/S NANGAL, PUNJAB	13	20	17	7.8	8.2	8.0	7.7	7.8	7.8	183	288	260	2.0	2.4	2.2	0.2	0.6	0.4	1.00	2.00	2.00	1.00	2.00	2.00	0.60	1.00	0.80	0	9	2	110	110	110
1293	SATLUJ AT 1 KM. D/S OF ZENITH, PUNJAB	14	21	19	6.2	7.8	7.2	7.4	7.8	7.6	190	392	321	3.0	3.4	3.2	0.4	1.8	1.0	1.80	3.00	3.00	1.80	3.00	3.00	1.00	1.40	1.30	0	900	450	110	2200	1155
1019	SATLUJ AT U/S HEAD WORKS ROPAR, PUNJAB	14	21	19	7.0	7.8	7.5	7.2	7.8	7.5	190	310	278	3.0	3.8	3.4	0.4	1.0	0.7	1.60	2.40	2.00	1.60	2.40	2.00	0.80	1.20	1.00	0	110	55	110	500	305
1380	SATLUJ AT D/S NFL, PUNJAB	13	21	18	7.8	8.0	7.9	7.8	7.9	7.8	178	274	241	1.8	1.8	1.8	0.4	0.4	0.4	0.80	2.00	2.00	0.80	2.00	2.00	0.40	0.80	0.70	0	11	4	70	110	97
1814	SATLUJ AT D/S KIRATPUR SAHIB, PUNJAB	14	14	14	7.9	7.9	7.9	7.8	7.8	7.8	187	187	187	2.6	2.6	2.6	0.2	0.2	0.2	1.60	1.60	2.00	1.60	1.60	2.00	0.80	0.80	0.80	0	0	0	110	110	110
1690	U/S BUDHA NALLAH (UPPER), PUNJAB	18	24	21	6.2	7.1	6.6	7.1	7.3	7.2	362	416	381	6.0	6.0	6.0	1.0	2.6	1.5	1.60	3.20	2.00	1.60	3.20	2.00	0.60	1.40	0.90	70	500	357	230	1100	777
1020	SATLUJ AT 100M D/S BUDHA NALA CONFL., LUDHIANA, PUNJAB	20	26	23	3.2	7.4	5.5	7.2	7.4	7.3	532	865	699	62.0	76.0	69.0	8.0	28.0	17.9	1.80	5.40	3.00	1.80	5.40	3.00	1.20	2.20	1.50	1100	90000	23600	30000	170000	70000
1021	SATLUJ AT BOAT BDG. DHARMKOTNAKODAR ROAD, JALANDHAR, PUNJAB	20	25	23	4.5	5.6	5.1	7.2	7.4	7.3	448	625	508	42.0	52.0	47.0	6.0	16.0	10.7	2.00	3.60	3.00	2.00	3.60	3.00	0.80	1.40	1.20	500	11000	3400	11000	90000	30750
1381	SATLUJ AT D/S EAST BEIN, PUNJAB	5	22	16	5.6	6.9	6.1	7.3	7.5	7.4	493	500	498	36.0	50.0	43.0	3.2	8.0	4.6	2.80	3.20	3.00	2.80	3.20	3.00	0.20	2.00	1.30	500	1100	950	5000	53000	24750
1691	U/S HUSSANIWALA - H/W FEROZEPUR, PUNJAB	15	20	18	5.8	7.0	6.4	7.6	7.8	7.7	374	408	396	6.6	7.6	7.1	0.8	1.0	0.9	1.20	2.20	2.00	1.20	2.20	2.00	0.60	1.20	0.90	0	100	33	350	500	400
1692	D/S HUSSANIWALA-H/W FEROZEPUR, PUNJAB	15	21	19	5.8	7.0	6.3	7.0	7.8	7.5	378	420	403	6.6	7.6	7.1	0.8	1.8	1.2	2.00	2.40	2.00	2.00	2.40	2.00	1.20	1.20	1.20	0	110	37	350	500	400
1022	SATLUJ AT BRIDGE HARIKE, AMRITSAR, PUNJAB	2	22	13	6.0	7.0	6.5	7.5	7.7	7.6	360	478	413	26.0	26.0	26.0	1.2	4.8	2.7	2.20	3.00	3.00	2.20	3.00	3.00	0.80	1.20	1.00	110	500	370	500	3500	2333

TABLE 4.3 :- WATER QUALITY OF RIVER RAVI, PARVATI, LARGI, SIRSA & SWAN - 200

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1089	RAVI AT U/S CHAMBA, H.P.	5	11	9	8.1	10.0	9.2	7.5	8.3	8.1	106	205	144	2.0	2.0	2.0	0.1	0.7	0.4	0.16	0.70	0.40				0.30	1.12	0.70	0	2	1	0	14	5
1088	RAVI AT U/S MADHOPUR, H.P.	14	18	16	8.2	8.8	8.4	7.6	8.6	8.1	155	217	183	2.0	2.0	2.0	0.2	0.7	0.5	0.46	0.80	0.60				2.20	2.20	2.20	2	4	3	7	23	15
1097	RAVI AT U/S OF MADHOPUR HEADWORKS, GURDASPUR, PUNJAB	12	19	16	7.7	8.0	7.9	7.7	7.9	7.8	192	226	209	2.0	2.0	2.0	0.2	0.4	0.3	0.60	1.20	0.90	0.20	0.80	0.50							35	70	53
1290	PARVATI BEFORE CONF. TO RIVER BEAS, H.P.	7	18	12	9.1	11.0	10.1	6.7	7.4	7.0	122	384	198	1.2	1.2	1.2	0.1	0.3	0.2	0.10	0.30	0.20				0.00	0.00	0.00	4	14	8	4	920	326
1090	LARGI AT D/S, H.P.	6	18	13	8.6	11.3	9.7	7.2	7.9	7.7	169	364	240	1.2	1.2	1.2	0.3	0.6	0.5	0.10	0.20	0.20				0.20	0.20	0.20	4	17	10	6	2400	635
1551	RIVER SIRSA , U/S SITOMAJRI NALLAHGARH, H.P	10	31	23	8.5	11.7	9.7	7.2	8.0	7.7	372	431	399	16.0	16.0	16.0	0.4	2.0	1.0	0.30	1.10	0.80				0.30	0.30	0.30	16	50	27	40	200	113
1552	RIVER SIRSA , D/S NALAGARH BRIDGE, H.P.	16	39	31	8.2	14.3	10.0	7.7	8.3	8.0	583	927	736	44.0	44.0	44.0	0.8	3.0	2.1	0.72	3.40	2.50				0.00	0.00	0.00	21	160	100	100	650	380
1868	RIVER SIRSA AT D/S NALAGARH DISTT. SOLAN, H.P.	16	38	31	6.6	14.8	9.4	7.8	8.2	8.0	636	939	762	32.0	32.0	32.0	0.9	4.8	2.0	0.62	3.10	2.20				0.00	0.00	0.00	36	180	94	117	610	367
1869	RIVER SWAN AT D/S NANGAL DISTT. UNA, H.P.	14	36	27	2.4	11.1	6.3	7.8	8.6	8.3	389	608	479	48.0	48.0	48.0	0.8	4.8	2.5	0.36	1.20	0.80				0.00	0.00	0.00	46	56	51	130	220	178

TABLE 5.1 :- WATER QUALITY OF RIVER GANGA- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1491	BHAGIRATHI AT GANGOTRI, UTTARANCHAL	7	7	7	9.8	9.8	9.8	6.8	7.4	7.1	91	108	100	2.6	2.6	2.6	0.0	0.0	0.0										0	0	0	0	9100	4550
1484	ALKANANDA B/C MANDAKINI AT RUDRA PRAYAG, UTTARANCHAL	4	19	15	7.8	10.0	9.7	7.1	8.4	7.7	95	186	141	6.0	6.0	6.0	0.0	2.1	1.0	0.20	0.30	0.26	0.01	0.01	0.01				0	31000	7993	0	3100000	661571
1485	MANDAKINI B/C ALKALNADA AT RUDRAPRAYAG, UT	4	18	15	8.0	10.0	9.8	7.2	8.2	7.5	58	147	98	4.0	4.0	4.0	0.0	2.1	0.9	0.20	0.40	0.29	1.00	1.00	1.00				30	26000	8757	0	12580000	2180143
1486	ALKANANDA A/C MANDAKINI AT RUDRAPRAYAG, UT	8	18	15	7.5	11.0	10.1	7.2	8.1	7.4	95	180	138	6.0	6.0	6.0	0.0	3.0	1.0	0.20	0.30	0.24	0.02	0.02	0.02				0	12400	3168	0	2500000	384286
1487	ALKANANDA B/C TO BHAGIRATHI AT DEVPRAYAG, UT	5	19	15	6.7	11.0	9.8	7.1	8.6	7.6	120	143	128	6.0	6.0	6.0	0.0	2.5	0.9	0.10	0.20	0.17	0.01	0.01	0.01				0	8900	2403	0	2880000	470571
1488	BHAGIRATHI B/C WITH ALAKNANDA AT DEVPRAYAG, UT	5	19	15	8.3	11.0	9.9	7.1	8.6	7.5	95	177	133	6.0	6.0	6.0	0.0	2.9	1.0	0.20	0.30	0.26	0.01	0.04	0.03				0	240	93	0	1200000	251143
1489	ALKANANDA A/C WITH BHAGIRATHI AT DEVPRAYAG, UT	8	20	16	6.9	10.0	9.5	7.2	8.4	7.6	86	154	118	8.0	8.0	8.0	0.0	2.3	0.9	0.20	0.30	0.24	0.01	0.01	0.01				0	1700	453	0	1870000	290129
1060	GANGA AT RISHIKESH U/S, U.T	12	21	19	8.2	9.6	9.1	6.5	8.5	7.4	275	275	275	12.0	12.0	12.0	0.0	2.1	1.2													17	1700	317
1061	GANGA AT HARIDWAR D/S, U.T	12	23	20	6.2	7.6	6.7	6.1	7.8	6.8	482	482	482	18.0	18.0	18.0	3.0	5.6	3.8										23	23	23	1600	1600	1600
1062	GANGA AT GARHMUKTESHWAR, U.P	12	27	21	7.6	11.0	8.8	7.2	7.6	7.5	95	267	202	13.6	20.0	17.1	1.5	3.5	2.5	0.30	0.60	0.44							150	4000	1724	390	11000	3883
1145	GANGA AT NARORA (BULANDSAHAR), U.P.	11	25	19	7.2	10.0	8.5	7.8	8.6	8.2	141	268	195	16.0	30.0	21.7	1.6	3.7	3.1										262	1800	872	2200	9200	4257
1063	GANGA AT KANNAUJ U/S (RAJGHAT), U.P.	16	30	25	6.7	9.3	7.8	7.4	8.8	7.9	25	413	71				2.1	5.0	3.4	0.80	2.80	1.77	0.10	3.30	1.17				1500	2300	2033	4300	9300	8080
1064	GANGA AT KANNAUJ D/S, U.P	15	30	25	6.6	9.9	7.7	7.2	8.6	8.0	25	425	72				2.6	6.0	3.9	1.10	2.90	1.80	0.10	0.10	0.10				2000	7500	3389	9300	15000	10440

1146	GANGA AT BITHOOR (KANPUR), U.P.	18	30	26	6.2	8.9	7.5	7.3	8.5	8.0	23	53	37				1.9	3.8	2.7	0.10	2.20	1.42	0.10	1.40	0.53				1500	4300	2150	4300	9300	7544
1067	GANGA AT KANPUR U/S (RANIGHAT), U.P.	14	30	25	6.0	11.0	7.7	7.2	8.6	8.1	26	4300	419				2.0	6.4	2.9	0.70	2.90	1.80							900	7500	2633	4300	15000	7580
1068	GANGA AT KANPUR D/S (JAJMAU PUMPING STATION), U.P	14	30	25	1.4	7.6	5.5	7.3	8.4	7.9	26	381	75				3.4	9.8	6.1	2.00	3.80	2.82	0.10	2.00	0.50				20000	46000	32889	43000	93000	76100
1147	GANGA AT DALMAU (RAI BAREILLY), U.P.	16	30	24	7.8	9.6	8.6	7.5	8.2	7.8	233	386	323	19.8	26.1	22.4	3.1	3.5	3.3	0.30	0.70	0.62	0.10	0.50	0.30	0.00	0.10	0.03	3300	6700	4833	4300	7300	5817
1046	GANGA AT ALLAHABAD (RASOOLABAD), U.P.	16	31	26	6.7	10.0	8.3	7.9	8.7	8.2	275	632	426				2.8	4.0	3.2	1.40	2.90	2.06	0.03	0.10	0.08				1100	6000	2950	2400	9000	4925
1049	GANGA AT ALLAHABAD D/S (SANGAM), U.P.	17	31	26	6.7	9.3	8.1	7.5	8.7	8.2	294	568	471				3.1	4.7	3.6	1.70	2.80	2.22	0.10	0.10	0.10				1400	9000	5150	2800	14000	7983
1070	GANGA AT VARANASI U/S (ASSIGHAT), U.P	24	30	26	8.6	9.0	8.8	7.1	7.4	7.3	220	249	234	11.2	11.2	11.2	3.1	3.8	3.3	0.10	0.40	0.30	0.20	0.20	0.20	0.10	0.10	0.10	8000	13000	10000	11000	21000	15000
1071	GANGA AT VARANASI D/S (MALVIYA BRIDGE), U.P	25	31	27	6.4	7.9	7.1	7.4	8.8	8.4	250	390	303	24.4	24.4	24.4	10.0	14.0	11.9	0.20	1.80	1.17	0.40	0.40	0.40	1.40	1.40	1.40	8000	94000	81714	90000	180000	125714
1073	GANGA AT TRIGHAT (GHAZIPUR), U.P.	25	31	27	7.9	8.4	8.2	7.9	8.7	8.3	254	390	287	13.2	13.2	13.2	3.4	4.6	4.0	0.20	1.60	1.03	0.60	0.60	0.60	1.50	1.50	1.50	17000	22000	20143	22000	43000	29571
1074	GANGA AT BUXAR,BIHAR	20	21	21	8.6	8.9	8.8	8.2	8.3	8.3	326	362	339				2.0	2.3	2.2							0.60	0.70	0.63	800	5000	2933	1400	9000	6467
1077	GANGA AT KHIURI, PATNA U/S, BIHAR	18	19	19	9.2	9.2	9.2	7.8	8.3	8.1	350	362	356				2.1	2.1	2.1							0.80	1.00	0.90	5000	9000	7000	16000	16000	16000
1079	GANGA AT PATNA D/S (GANGA BRIDGE),BIHAR	17	18	17	9.1	9.1	9.1	7.7	8.8	8.3	341	365	353				2.3	2.4	2.4							1.00	1.20	1.10	5000	16000	10500	24000	24000	24000
1817	GANGA AT MOKAMA (U/S)	20	21	21	8.8	9.1	9.0	8.2	8.2	8.2	332	355	344				2.0	2.1	2.1							0.70	0.80	0.75	3000	9000	6000	9000	16000	12500
1815	GANGA AT MOKAMA (D/S)	21	21	21	8.7	8.8	8.8	8.1	8.1	8.1	356	372	364				2.3	2.4	2.4							0.60	0.80	0.70	9000	9000	9000	24000	24000	24000
1818	GANGA AT MUNGER	18	18	18	9.0	9.0	9.0	8.3	8.3	8.3	385	385	385				2.0	2.0	2.0							0.70	0.70	0.70	5000	5000	5000	9000	9000	9000
1819	GANGA AT BHAGALPUR	16	16	16	9.3	9.3	9.3	8.3	8.3	8.3	360	360	360				2.1	2.1	2.1							0.80	0.80	0.80	5000	5000	5000	16000	16000	16000
1816	GANGA AT KAHALGAON	18	19	19	9.0	9.0	9.0	7.2	8.2	7.7	345	345	345				2.1	2.2	2.2							0.70	0.80	0.75	9000	9000	9000	16000	24000	20000
1080	GANGA AT BAHARAMPORE WEST BENGAL	18	33	27	1.6	8.9	6.8	7.0	8.3	7.7	165	330	255	25.0	25.0	25.0	1.0	3.9	2.1	0.10	0.80	0.30				0.00	0.30	0.13	11000	70000	33667	17000	110000	57250
1472	GANGA AT SERAMPORE WEST BENGAL	19	31	27	5.4	8.3	6.5	7.9	8.2	8.1	184	331	256	5.0	5.0	5.0	1.4	2.3	1.8	0.10	0.30	0.20				0.00	0.40	0.13	17000	110000	76750	30000	170000	112500
1053	GANGA AT DAKSHINESHWAR WEST BENGAL	21	31	27	4.4	8.9	6.3	7.5	8.5	7.8	181	386	295	6.6	6.6	6.6	2.3	6.2	4.0	0.10	1.00	0.29				0.10	0.80	0.43	20000	700000	237917	110000	1400000	483750
1471	GANGA AT HOWRAH SHIVPUR WEST BENGAL	21	31	28	5.1	8.5	6.7	7.7	7.9	7.8	245	350	292	3.0	3.0	3.0	1.4	2.5	2.0	0.10	0.30	0.23				0.10	1.00	0.40	70000	350000	140000	135000	700000	433750
1470	GANGA AT GARDEN REACH WEST BENGAL	29	32	30	5.5	6.9	6.0	7.6	8.1	7.9	211	488	330	8.6	8.6	8.6	2.4	4.1	3.5	0.10	0.30	0.20				0.00	0.60	0.30	20000	700000	382500	135000	1400000	746250
1052	GANGA AT ULUBERIA WEST BENGAL	19	32	27	4.7	8.0	6.3	7.6	8.3	7.9	202	383	293	5.0	5.0	5.0	1.3	4.1	2.7	0.10	1.00	0.39				0.10	0.80	0.40	2000	170000	37917	17000	300000	96167
1054	GANGA AT PALTA WEST BENGAL	21	32	27	5.2	7.5	6.5	7.5	8.3	7.8	168	352	259	28.1	28.1	28.1	0.8	4.2	2.3	0.10	0.50	0.29				0.00	0.40	0.16	50000	110000	75455	70000	220000	134545
1469	GANGA AT DIAMOND HARBOUR WEST BENGAL	29	32	31	5.4	8.2	7.0	7.8	7.9	7.9	215	5040	1835	16.0	16.0	16.0	1.5	3.2	2.2	0.10	0.20	0.17				0.40	0.70	0.60	14000	33000	23000	27000	110000	56667

TABLE 5.2 :- WATER QUALITY OF RIVER YAMUNA- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1492	YAMUNOTRI, UTTARANCHAL	7	8	7	11.4	11.4	11.4	7.2	7.3	7.2	57	119	88	2.8	2.8	2.8	0.0	0.0	0.0										0	0	0	0	74000	37000
1493	SHYAMA CHATTI, UTTARANCHAL	8	10	9	9.0	9.0	9.0	7.2	7.2	7.2	102	110	106	3.0	3.0	3.0	0.0	0.0	0.0										0	0	0	0	165000	82500
1494	YAMUNA AT U/S OF LAKHWAR DAM, U.T.	13	23	18	9.1	10.7	9.8	7.1	8.1	7.4	96	280	213	2.0	10.0	6.0	0.0	1.4	0.7	0.17	0.26	0.21	0.01	0.01	0.01				0	2900	1275	0	370000	86333
1490	YAMUNA AT U/S DAK PATTHAR, UTTRANCHAL	14	24	18	7.1	10.2	8.5	6.9	8.0	7.3	187	303	233	2.0	13.0	8.3	0.0	2.1	1.0	0.22	0.41	0.30	0.01	0.01	0.01	0.21	0.21	0.21	0	39000	12550	0	1030000	363000
1553	U/S PAONTA SAHIB, H.P	14	30	22	6.6	10.6	8.5	6.7	8.3	7.7	148	632	423	1.0	43.0	9.2	0.1	2.0	0.9	0.10	0.20	0.15				0.08	1.10	0.39	240	185000	46582	61000	14500000	2821500
1554	D/S PAONTA SAHIB, H.P	14	27	22	7.3	8.9	8.2	7.1	8.4	7.8	122	431	309	8.0	8.0	8.0	0.2	0.8	0.5	0.10	0.30	0.20				1.20	1.20	1.20						
1117	HATNIKUND	11	27	20	6.6	13.0	9.2	7.4	8.2	7.7	158	427	301	4.0	36.0	9.8	1.0	2.0	1.2							0.07	0.24	0.15	300	230000	44770	12000	33000000	3909667
1496	KALANAUR	11	30	23	3.2	10.2	7.6	7.4	8.1	7.7	182	470	366	2.0	20.0	10.0	1.0	5.0	2.0							0.05	0.87	0.33	860	1150000	147880	68000	8700000	2702333
1119	SONEPAT D/S	9	31	21	4.5	8.8	7.1	7.3	8.3	7.7	190	741	492	6.0	20.0	12.6	1.0	5.0	2.8							0.29	2.18	0.97	800	109000	26165	22000	2500000	691250
1120	PALLA	15	32	23	5.5	12.1	8.3	7.4	8.1	7.8	204	664	456	3.0	27.0	13.9	1.0	6.0	3.0	1.05	9.0	3.52	0.05	0.21	0.12	0.09	1.40	0.67	200	26000	5617	16000	17700000	1643667
1121	NIZAMUDDIN BRIDGE	14	33	25	0.0	2.1	0.3	7.0	7.9	7.5	290	1749	1134	16.0	102	66.6	2.0	47.0	23.8	0.20	3.22	0.91	0.03	0.03	0.03	1.68	28.9	15.0	130000	11500000	3757583	64000	260000000	50172000
1375	OKHLA BRIDGE (INLET OF AGRA CANAL), DELHI	23	28	25	7.0	7.8	7.4	5.0	8.1	7.2	310	610	453	20.0	20.0	20.0	1.0	3.6	1.9				0.90	0.90	0.90	2.10	2.10	2.10				300	300	300
1812	OKHLA AFTER MEETING SHADHARA DRAIN				0.0	0.5	0.0	6.9	7.8	7.4							12.0	93.0	47.7										490000	23000000	7441667	4700000	320000000	64875000
1497	MAZAWALI	11	30	22	0.0	12.1	2.5	7.2	8.1	7.7	495	1940	1152	25.0	407	94.8	5.0	37.0	17.8	0.87	1.05	0.96	0.02	0.37	0.14	1.51	28.3	13.5	8900	2400000	384742	180000	27000000	4942500
1123	MATHURA U/S	13	31	24	3.7	7.8	5.8	7.5	8.1	7.8	512	1492	1084	19.0	83.0	40.3	6.0	20.0	10.8	0.75	2.06	1.37	0.03	0.65	0.16	2.39	19.1	9.50	1400	47000	17550	29000	2700000	520333
1124	MATHURA D/S	14	34	25	4.2	7.6	5.8	7.5	8.2	7.8	519	1490	1060	18.0	59.0	36.9	4.0	15.0	9.3	0.76	2.45	1.65	0.02	0.65	0.21	2.38	19.5	8.95	8500	240000	50692	370000	5500000	1469167
1125	AGRA U/S	14	32	24	3.8	14.6	7.0	7.4	8.1	7.8	596	1544	1113	21.0	64.0	36.0	5.0	16.0	10.2	1.32	3.49	1.94	0.03	0.49	0.25	0.23	19.1	8.04	2700	460000	70475	97000	4300000	1184000
1126	AGRA D/S	15	33	24	0.0	9.0	4.9	7.3	8.2	7.8	540	1503	1071	21.0	99.0	53.4	5.0	33.0	16.7	0.45	4.04	1.97	0.05	1.02	0.39	1.03	15.8	6.88	13100	15000000	1483675	240000	77000000	9425000
1498	BATESHWAR	16	34	26	3.5	17.7	8.2	7.3	8.3	7.8	612	1689	1137	15.0	108	50.2	3.0	20.0	11.4							0.38	15.7	4.25	2300	210000	43167	32000	6800000	1920333
1127	ETAWAH	16	34	26	5.7	15.1	10.1	7.5	8.2	7.8	620	1429	1073	15.0	93.0	44.3	3.0	16.0	10.2							0.33	14.3	3.39	2100	270000	38417	42000	6700000	917333
1499	JUHIKA	14	34	25	6.5	13.2	9.3	7.4	8.0	7.8	298	735	519	8.0	56.0	21.3	2.0	7.0	4.2							0.17	2.06	0.75	1100	75000	21692	47000	3400000	567917
1129	YAMUNA AT ALLAHABAD. U.P.	18	23	21	8.5	8.9	8.7	8.0	8.1	8.0	672	672	672				2.2	2.2	2.2	1.80	1.80	1.80							1100	1100	1100	1700	1700	1700
1069	YAMUNA AT ALLAHABAD D/S (BALUA GHAT), U.P.	17	32	27	7.3	10.0	8.5	7.3	8.4	8.1	326	735	564				1.8	3.1	2.5	1.80	2.40	2.13	0.10	0.10	0.10				700	5000	1775	1700	8000	3158

TABLE 5.3 :- WATER QUALITY OF RIVER KALINADI, RAMGANGA, GOMTI, SARYU, GHAGARA, HINDON, KALI-HINDON, RIHAND, RAPTI, GANDAK, SAI, SIKRANA, DAHA, SIRSA AND FARMAR - 20

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1480	KALI (E)AT GULAWATI	18	30	23	0.0	2.5	0.8	7.3	7.8	7.6	356	423	390				17.0	34.0	23.7	0.39	2.11	1.23	0.01	0.01	0.01				12000	130000	52333	24000	35000000	11758000
1065	KALI (E) AT KANNAUJ (BEFORE CONF.),U.P	13	28	23	0.0	3.0	0.6	6.9	7.5	7.1	742	1305	988				20.0	120	45.3	0.50	7.40	1.75	1.30	1.30	1.30				4300	160000	94573	17000	310000	217909
1477	KALI (W) AT U/S OF MUZAFFAR NAGAR U.P.	26	29	27	7.9	8.4	8.1	8.1	8.5	8.3	240	301	261				3.4	4.1	3.9	0.20	0.88	0.61							17000	22000	19250	22000	34000	26250
1478	KALI (W) AT D/S OF MUZAFFAR NAGAR, U.P.	20	32	26	0.0	0.0	0.0	6.9	7.5	7.3	1230	1450	1303				22.0	24.0	23.5	7.20	8.40	7.65	1.10	1.60	1.33				31000	46000	39000	220000	270000	247500
1064	RAMGANGA AT KANNAUJ (BEFORE CONF.),U.P.	25	25	25	7.8	7.8	7.8	7.6	8.6	8.1	310	1250	919				2.5	14.0	5.9				0.10	0.50	0.25				24	1600	812	18	1600	1424
1351	GOMTI AT LUCKNOW U/S AT WATER INTAKE POINT,U.P.	18	30	27	5.8	9.5	7.7	7.6	8.7	8.0	180	593	322	13.2	13.2	13.2	1.6	3.8	2.5	0.10	0.70	0.48	0.10	0.40	0.16				130	23000	8118	300	31000	11127
1352	GOMTI AT LUCKNOW D/S, U.P.	14	30	23	3.4	10.6	7.2	7.6	8.4	8.1	415	643	494				1.0	3.2	2.0	0.30	0.90	0.58	0.10	0.20	0.15				140	2800	1295	1400	4300	2818
1354	GOMTI AT SITAPUR U/S AT WATER INTAKE, U.P.	16	33	25	7.7	8.4	7.9	7.3	8.4	8.0	240	830	446	12.0	22.0	16.6	1.4	4.2	2.1	0.10	1.00	0.34	0.10	0.10	0.10				50	17000	3456	110	26000	5320
1353	GOMTI AT JAUNPUR D/S, U.P.	18	31	23	1.1	7.5	5.7	7.5	8.0	7.8	325	720	545	12.8	12.8	12.8	1.2	12.0	3.4	0.20	0.90	0.57	0.10	0.10	0.10				1300	90000	16850	2400	160000	29900
1072	GOMTI AT VARANASI, U.P	17	32	24	5.8	9.3	7.6	7.8	8.8	8.3	218	620	386	19.0	28.0	23.5	1.9	3.0	2.2	0.10	0.86	0.39				0.42	0.70	0.56	60	1400	598	160	2800	1300
1361	SAI AT UNNAO AFTER DRAIN OUTFALL, U.P.	13	31	25	5.2	12.7	9.0	7.5	9.2	8.3	301	579	430	14.2	14.2	14.2	1.0	2.8	1.5	0.10	0.60	0.36	0.10	0.20	0.12				40	1300	608	230	5000	1869
1355	SARYU AT AYODHYA AT MAIN BATHING GHAT, U.P.	17	29	24	8.4	9.5	8.7	7.0	7.8	7.5	133	350	263	18.0	22.1	20.0	2.4	3.3	2.7	0.20	0.60	0.48	0.10	0.30	0.24	0.00	0.10	0.03	2300	5500	3975	3100	6900	4950
1356	GHAGHARA AT DEORIA D/S, U.P.	16	31	24	7.7	8.0	7.8	7.8	8.3	8.1	306	360	330	12.0	28.0	19.7	1.4	3.0	2.2	0.20	0.86	0.42	0.10	0.10	0.10	0.10	0.42	0.24	50	110	73	110	240	167
1076	GHAGHARA NEAR CHAPRA, BIHAR	17	18	18	9.1	9.3	9.2	8.1	8.8	8.5	218	232	225				2.0	2.0	2.0							0.70	0.70	0.70	900	1400	1150	1700	2800	2250
1357	HINDON AT SAHARANPUR D/S,U.P.	17	32	25	0.0	0.0	0.0	6.9	7.5	7.3	950	1450	1238	160.0	196.0	174	20.0	24.0	22.5	7.00	8.40	7.50	1.10	1.60	1.30				31000	46000	38833	220000	310000	253333
1483	HINDON PURA MAHADEV	20	30	25	0.0	0.0	0.0	7.5	7.8	7.6	308	423	363				11.0	34.0	20.7	0.39	2.11	1.23	0.01	0.01	0.01				8500	130000	51167	49000	35000000	9044750
1358	HINDON AT GHAZIABAD D/S, U.P.	13	28	23	0.0	3.0	0.8	6.9	7.5	7.1	356	1305	933	60.0	576	139	20.0	120	43.8	0.50	1.60	1.18							4300	160000	87108	17000	280000	197583
1359	RIHAND AT RENUKUT U/S, U.P.	20	33	28	7.6	8.8	8.1	7.3	8.3	7.9	144	316	236				1.4	2.6	2.3	1.30	2.30	1.58	0.10	0.10	0.10				500	2200	1200	1300	3000	2200
1360	RIHAND AT RENUKUT D/S, U.P.	21	33	28	7.3	8.8	8.1	7.6	8.3	8.0	126	400	242				1.0	2.7	2.4	1.60	3.00	1.98	0.10	0.10	0.10				800	2200	1400	1700	3500	2450
1363	RAPTI AFTER CONFL. OF R. HONIN NR. DOMINGARH RLY BRIDGE, GORAKHPUR, U.P.	16	30	23	7.6	7.9	7.8	7.8	8.2	8.1	306	384	336	16.0	24.0	19.4	1.6	3.1	2.2	0.10	0.52	0.25	0.10	0.10	0.10	0.08	0.28	0.17	40	120	81	130	260	184
1078	GANDAK AT SONEPUR, PATNA (BEFORE CONFL.),BIHAR	16	17	17	9.0	9.2	9.1	8.3	8.3	8.3	152	166	159				1.8	1.9	1.9							0.90	0.90	0.90	800	900	850	1400	1700	1550
1820	SIKRANA AT CHANPATIYA	15	15	15	4.0	4.0	4.0	7.9	7.9	7.9	127	127	127				8.0	8.0	8.0							1.00	1.00	1.00	9000	9000	9000	16000	16000	16000
1821	DAHA AT SIWAM	18	18	18	8.6	8.6	8.6	8.2	8.2	8.2	366	366	366				2.0	2.0	2.0							0.70	0.70	0.70	700	700	700	1700	1700	1700
1822	SIRSA AT RUXOL	21	21	21	6.5	6.5	6.5	7.4	7.4	7.4	129	129	129				2.0	2.0	2.0							1.10	1.10	1.10	800	800	800	1400	1400	1400
1824	FARMAR AT JOGBANI	17	17	17	9.0	9.0	9.0	8.1	8.1	8.1	375	375	375				2.1	2.1	2.1							0.70	0.70	0.70	700	700	700	1400	1400	1400

TABLE 5.4 :- WATER QUALITY OF RIVER CHAMBAL, KHAN, KSHIPRA, PARVATI, BETWA, SIND, TONS, SONE, JOHILA, SANKH, MANDAKINI AND GOHAD - 200

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1356	BETWA BEFORE CONF. YAMUNA AT HAMIRPUR, U.P.	15	30	24	7.0	8.5	7.6	7.0	8.2	7.6	244	360	280	18.1	33.2	26.6	1.3	2.8	2.1	11.1	19.3	15.3				21.0	21.0	21.0	70	90	79	310	360	325
1614	R.BETWA NEAR INTAKE POINT, MDISHA, M.P.	19	27	23	7.5	8.2	7.9	7.2	8.0	7.6	242	348	290	28.0	28.0	28.0	1.2	2.6	1.9	0.10	0.20	0.11				0.00	0.00	0.00				262	2400	980
1735	GOVIND SAGAR, U.P	20	34	26	7.1	8.3	7.7	7.2	8.1	7.7	258	273	266	17.6	26.3	21.3	1.7	1.9	1.8	14.2	21.0	17.6				15.0	15.0	15.0	80	90	84	300	400	333

1365	CHAMBAL AT NAGDA U/S (WATER INTAKE POINT) M.P.	25	25	25	7.9	7.9	7.9	7.6	8.6	8.1	220	794	523	20.0	20.0	20.0	1.0	3.0	2.0				0.10	7.80	3.95	0.60	0.60	0.60	140	140	140	240	1600	545
1366	CHAMBAL AT NAGDA D/S, M.P.	24	29	26	0.0	7.4	3.7	6.8	8.1	7.6	220	10680	6157	64.0	64.0	64.0	1.0	34.0	17.6				0.10	0.40	0.18	2.00	2.00	2.00	1600	1600	1600	40	1600	1220
1288	CHAMBAL AT KOTA U/S (INTAKE PT. NEAR BARRAGE), RAJASTHAN	21	33	28	4.2	8.1	5.5	7.5	8.7	8.2	220	450	310	1.7	1.7	1.7	0.2	2.0	1.1	0.10	0.58	0.31				0.00	0.24	0.09	3	7	4	4	28	15
1289	CHAMBAL AT KOTA D/S (2 KM. FROM CITY),RAJASTHAN	19	32	27	3.7	8.4	5.6	8.0	8.8	8.4	230	790	451	13.3	13.3	13.3	0.6	5.3	2.4	0.30	1.02	0.58				0.04	0.30	0.15	4	28	12	14	210	126
1516	TON RIVER, H.P.	14	28	18	7.5	11.6	9.0	7.3	8.1	7.6	56	441	217	4.0	8.0	6.0	0.2	1.0	0.6	0.17	0.44	0.28	0.01	0.02	0.01	0.00	0.00	0.00	5	12100	2764	26	1310000	299739
1609	R. CHAMBAL AT DHOLPUR, M.P.	16	29	23	6.8	7.9	7.5	7.3	7.9	7.6	327	701	472	33.6	33.6	33.6	1.2	1.2	1.2	0.10	1.50	0.55	0.20	0.20	0.20									
1376	CHAMBAL AT ETAWAH BEFORE CONFL. TO R. YAMUNA, U.P.	14	32	25	6.7	13.3	8.2	7.4	8.0	7.7	254	547	440	3.0	41.0	12.8	1.0	4.0	2.0							0.14	1.22	0.47	1400	22000	5633	7000	8700000	1092250
1413	CHAMBAL AT RAMESHWARGHAT NR. SAWAIMADHOPUR, RAJASTHAN	19	33	28	2.6	6.8	5.3	7.8	8.8	8.1	220	810	459	5.8	5.8	5.8	0.6	4.3	1.9	0.22	1.40	0.49				0.04	2.00	0.36	4	14	6	14	210	50
1418	CHAMBAL AT GANDHI SAGAR DAM, RAMPURA, MP	23	30	26	7.4	7.8	7.6	7.5	8.2	8.0	310	610	453	20.0	20.0	20.0	1.0	3.6	2.3				0.90	0.90	0.90	2.10	2.10	2.10				110	300	210
1607	GOHAD DAM, GOHAD, M.P	20	33	27	7.8	8.4	8.0	7.3	8.1	7.8	500	830	589	16.8	16.8	16.8	1.5	2.1	1.8	0.10	1.00	0.38												
1611	R JOHILA NEAR NAROJABAD NEAR UMARIA ROAD BRIDGE, M.P	21	21	21	8.2	8.2	8.2	7.4	7.4	7.4	1580	1580	1580				1.6	1.6	1.6	0.10	0.10	0.10							50	50	50	170	170	170
1367	KHAN AT KABIT KHEDI (NEAR INDORE) M.P.	25	30	27	0.0	0.0	0.0	7.4	8.5	7.9	1219	2261	1813	200	490	345	50.0	125	77.5	10.2	42.0	22.0	0.10	0.30	0.20	15.0	15.0	15.0	20	40	31	1600	19700	8380
1613	KOLAR DAM WATER SUPPLY INTAKE WELL, DISTT. SEHORE, M.P.	19	35	25	7.1	8.6	7.7	7.1	7.7	7.4	210	298	257	28.5	28.5	28.5	0.8	1.6	1.2							0.0	0.0	0.0				28	2400	272
1368	KSHIPRA AT RAMGHAT AT UJJAIN, M.P.	25	30	28	7.1	8.6	7.9	7.1	8.7	8.2	360	1290	973	40.0	40.0	40.0	3.9	15.0	8.0				0.10	6.90	1.00	1.20	1.20	1.20	1600	1600	1600	1600	1600	1600
1370	KSHIPRA AT TRIVENISANGAM (1 KM. D/S OF SANGAM), M.P.	24	24	24	7.8	7.8	7.8	7.6	8.6	8.1	310	1250	928	40.0	40.0	40.0	2.5	14.0	5.9				0.10	0.30	0.18	1.40	1.40	1.40	24	1600	812	18	1600	1424
1468	KSHIPRA AT SIDDHAWAT (D/S) OF UJJAIN, M.P.	26	26	26	8.4	8.4	8.4	7.4	8.8	8.1	332	1200	980	64.0	64.0	64.0	3.5	8.0	6.2				0.10	0.40	0.28	1.50	1.50	1.50	1600	1600	1600	1600	1600	1600
1372	MANDAKINI AT CHITRAKUT, M.P.							8.5	8.5	8.5	104	104	104				5.0	5.0	5.0	0.60	0.60	0.60							54	54	54	174	174	174
1432	PARVATI NEAR VILLAGE BATAODAPAR, M.P.	20	20	20	9.2	9.2	9.2	8.5	8.5	8.5							2.0	2.0	2.0															
1615	R.PARVATI NEAR INTAKE POINT PILLUKHEDI DISTT. RAJGARH, M.P	22	27	25	4.3	8.8	7.4	7.5	8.6	8.0	278	991	569	48.4	48.4	48.4	1.2	4.5	2.6	0.10	0.20	0.13	0.20	0.20	0.20	0.00	0.00	0.00				340	2400	1479
1433	SANKH AT TIGRA RESERVOIR, M.P.	19	27	23	7.1	7.8	7.5	7.3	8.1	7.7	210	390	313				1.2	1.8	1.5	0.10	0.40	0.21												
1608	R. SINDH AT DABRA, M.P	26	30	28	7.9	8.0	8.0	6.9	7.8	7.4	612	755	667	33.6	33.6	33.6				0.20	0.60	0.37												
1075	SONE AT KOELWAR, BIHAR	20	20	20	9.0	9.0	9.0	8.8	8.8	8.8	127	218	172				2.0	2.2	2.1							0.70	0.80	0.75	900	5000	2950	1700	9000	5350
1142	SONE AT CHACHAI, M.P.	22	22	22	6.6	6.6	6.6	7.1	7.1	7.1	237	237	237				1.4	1.4	1.4	0.20	0.20	0.20							33	33	33	150	150	150
1143	TONS AT CHAKGHAT, M.P.	22	22	22	6.7	6.7	6.7	7.2	7.2	7.2	284	284	284				1.5	1.5	1.5	0.20	0.20	0.20							40	40	40	170	170	170
1144	TONS AT MADHAVGARH, M.P.							8.0	8.0	8.0	1991	1991	1991				8.0	8.0	8.0	0.80	0.80	0.80							36	36	36	174	174	174

TABLE 5.5 :- WATER QUALITY OF RIVER DAMODAR, RUPNARAYAN, BARAKAR AND MAHANANDA - 200

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1331	DAMODAR AT DISHERGARH VILL.(NR.BIHAR-WEST BENGAL BORDER) WEST BENGAL	20	35	28	7.0	8.8	8.0	6.7	8.0	7.4	108	238	174				0.6	2.4	1.4	0.20	0.70	0.35				0.10	0.50	0.33	800	50000	7527	1100	160000	24045
1332	DAMODAR AT D/S OF IISCO AFTER 3RD OUTFALL AT DHENNA VILLAGE, WEST BENGAL	20	36	28	7.0	9.9	8.2	6.9	8.6	7.8	149	295	219	4.4	4.4	4.4	0.7	1.8	1.3	0.10	0.50	0.32				0.10	1.10	0.36	1400	17000	8367	3300	50000	21192
1333	DAMODAR AT NARAINPUR AFTER CONFL. OF NUNIA NALLAH, WEST BENGAL	19	36	29	6.4	9.8	8.0	6.7	8.5	7.7	192	283	235	20.2	20.2	20.2	0.8	4.9	2.0	0.10	0.60	0.40				0.00	0.80	0.26	1400	30000	12564	1700	50000	28064
1334	DAMODAR NEAR MUJHER MANA VILLAGE AFTER CONF. OF TAMLA NALLAH, WEST BENGAL	22	36	29	4.5	7.2	6.1	7.0	8.3	7.8	320	549	451	59.8	59.8	59.8	2.1	4.9	3.5	0.10	2.80	0.82				0.60	13.0	4.09	13000	90000	39667	17000	160000	77500
1335	DAMODAR AT HALDIA D/S (2 KM AWAY FROM HALDIA TOWN), WB	22	35	29	3.9	7.4	6.0	5.8	8.2	7.8	269	13840	5691	26.3	26.3	26.3	0.8	4.1	2.5	0.20	0.80	0.51				0.20	1.50	0.58	10000	2500000	586250	20000	4500000	1117083
1336	BARAKAR AT ASANSOL (WATER INTAKE POINT), WEST BENGAL	21	33	28	6.9	8.6	7.7	6.5	7.8	7.4	136	218	169	26.4	26.4	26.4	2.4	3.0	2.6	0.10	1.00	0.45				0.00	0.30	0.15	17000	50000	34250	35000	160000	128750
1337	RUPNARAYAN BEFORE CONFL. TO RIVER GANGA NEAR GEONKHALI, WEST BENGAL	19	32	28	4.1	8.0	5.9	7.2	8.2	7.9	172	357	236	5.4	5.4	5.4	1.0	2.3	1.6	0.10	0.50	0.28				0.10	0.70	0.33	13000	400000	200750	30000	700000	366250
1946	MAHANANDA AT SILIGURI	29	29	29	5.6	5.6	5.6	7.4	7.4	7.4	162	162	162	6.2	6.2	6.2	1.3	1.3	1.3	0.10	0.10	0.10				0.60	0.60	0.60	4000	4000	4000	22000	22000	22000

TABLE 6.1 :- WATER QUALITY OF RIVER BRAHAMPUTRA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1260	BRAHAMPUTRA AT KHERGHAT (AFTER CONFL. WITH DIBANG & DIHANG), ASSAM	20	29	23	5.5	10.0	7.7	6.0	7.9	7.0	107	211	158	6.0	6.0	6.0	0.4	2.4	1.3	0.10	0.20	0.11				0.10	0.10	0.10	0	9300	2267	1	150000	26174
1030	BRAHAMPUTRA AT DIBRUGARH, ASSAM	21	25	23	6.8	10.2	8.0	6.6	7.6	7.1	111	227	159	5.6	5.6	5.6	0.2	2.5	1.1	0.10	1.00	0.19				0.10	0.10	0.10	300	4300	1119	730	21000	4156
1262	BRAHAMPUTRA AT NIMATIGHAT, ASSAM	18	27	22	5.1	8.2	6.8	6.2	7.5	7.0	76	276	158	6.9	6.9	6.9	0.5	2.7	1.7	0.10	1.00	0.19				0.20	0.20	0.20	360	9300	2288	730	46000	9558
1526	BRAHMPUTRA RIVER AT SHENUKHAPAHAR, ASSAM	18	25	22	6.2	10.6	7.0	6.2	7.6	7.1	85	185	136	4.6	4.6	4.6	0.4	3.1	1.4	0.10	0.10	0.10				0.00	0.00	0.00	360	240000	40660	1500	240001	44092
1031	BRAHAMPUTRA AT PANDU, ASSAM	18	32	24	6.7	9.5	7.8	6.5	7.4	7.1	132	223	167				0.1	2.9	1.2	0.10	2.50	0.35							0	21000	4932	0	240000	48342
1299	BRAHAMPUTRA AT JOGIJHOGA NEAR BRIDGE, ASSAM	20	31	27	5.1	7.9	6.8	5.9	7.9	7.1	84	645	239	4.6	4.6	4.6	0.2	3.4	1.2	0.10	0.30	0.13				0.00	0.00	0.00	360	2800	1233	910	9300	3593
2069	BRAHMPUTRA RIVER NEAR WATER INTAKE POINT AT KACHARIGHAT, PANBAZAR, GUWAHATI, ASSAM	18	31	26	5.9	9.7	7.7	6.7	7.5	7.1	127	220	173	15.4	15.4	15.4	0.5	1.1	0.9	0.10	0.30	0.18				0.00	0.00	0.00	360	720	450	730	7500	2958
2064	BRAHMPUTRA RIVER AT CHANDRAPUR, GUWAHATI	19	32	26	6.2	9.2	7.5	6.6	7.2	7.0	131	283	181	9.8	9.8	9.8	1.1	3.3	1.9	0.10	0.10	0.10				0.10	0.10	0.10	360	730	543	730	7500	2660
2067	BRAHMPUTRA RIVER AT SUALKUCHI, DIST. KAMRUP, ASSAM	21	28	24	7.3	7.8	7.5	6.8	7.7	7.1	130	188	159	3.1	3.1	3.1	1.3	3.1	2.2	0.10	0.10	0.10				0.00	0.00	0.00	300	360	320	910	1500	1303
2066	BRAHMAPUTRA RIVER AT DHUBRI	22	30	27	7.0	7.9	7.4	7.0	7.7	7.4	91	167	138	4.5	4.5	4.5	0.7	1.6	1.1	0.10	0.20	0.17				0.00	0.00	0.00	730	2800	1590	2000	15000	7100

TABLE 6.2 :- WATER QUALITY OF RIVER DHANSIRI - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1796	DHANSIRI AT FULL NAGARJAN, NAGALAND	19	31	27	5.2	8.0	6.2	6.6	8.5	7.7	46	341	190				0.8	3.6	1.9	1.60	4.60	2.87				1.10	1.10	1.10						
1799	DHANSIRI AT TOWN BOUNDARY BRIDGE (DIPHU ROAD), NAGALAND	20	35	26	4.0	8.0	5.6	6.5	8.5	7.7	39	415	201				0.8	3.2	2.2	1.70	9.20	4.30				0.50	62.0	16.5						
1797	DHANSIRI AT BRIDGE NEAR PURANA BAZAAR, NAGALAND	20	32	26	4.0	8.0	6.1	6.5	8.7	7.4	121	259	160				0.8	2.4	1.6	1.20	5.20	2.97				0.50	3.90	1.83						
1800	DHANSIRI AT NUTON BASTI, NAGALAND	21	31	25	1.2	5.2	2.7	6.5	7.9	7.1	76	415	201				2.4	4.8	3.7	1.30	8.80	5.03				0.50	1.10	0.70						
1798	DHANSIRI AT NEAR CHECK GATE (DIMAPUR KHUTKHUTI ROAD), NAGALAND	21	35	28	4.8	7.6	6.2	6.5	9.2	7.9	51	268	151				0.8	3.2	2.0	1.00	5.20	3.27				0.50	1.10	0.70						
1259	DHANSIRI AT GOLAGHAT, ASSAM	6	30	21	5.6	28.0	12.2	6.8	7.7	7.1	136	220	181	8.9	8.9	8.9	0.3	3.4	1.2	0.10	0.20	0.17				0.80	0.80	0.80	0	730	273	0	1500	840
1928	DHANSIRI AT NAGALAND-ASSAM BORDER, DIMAPUR	20	32	27	4.0	7.6	6.3	6.4	8.2	7.3	134	272	195				0.8	4.0	2.2	1.20	6.40	3.10				0.50	1.10	0.70						
1930	DZU D/S KOHIMA TOWN	18	25	22	5.6	8.0	6.4	6.8	9.3	8.1	179	537	357				0.8	4.4	1.9	1.80	4.90	3.33				0.50	1.60	0.87						
1929	CHATHE AT MEDZIPHEMA, DIMAPUR	19	29	24	4.8	8.4	6.2	6.5	8.7	7.8	65	133	89				0.8	4.4	2.5	1.80	4.30	2.67				1.10	1.60	1.27						

TABLE 6.3 :- WATER QUALITY OF RIVER SUBANSIRI, BURHIDING, PAGLDIA, JAI BHARALI, KOLONG, MANAS, DISANG, JHANJI, BHOGDOI, MORA BHARALI, BORAK, DIGBOI, KHARSANG, BHARALU, DEPAR BILL - 20(

CODE		TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		

STATION CODE	LOCATIONS																																		
		MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1263	SUBANSIRI AT GEREKAMUKH,ASSAM,(BEFORE CONFL. WITH BRAH.),ASSAM	20	23	21	6.9	7.7	7.3	7.3	7.6	7.4	77	122	98	6.2	6.2	6.2	1.2	1.6	1.4	0.10	0.10	0.10				0.00	0.00	0.00	0	1500	500	0	15000	5000
2061	RIVER KHARSANG BEFORE CONFLUENCE WITH BURIDIHING NEAR KHARSANG (ASSAM-ARUNANCHAL BORDER)	20	24	22	5.7	12.7	8.2	6.0	7.7	6.9	122	342	236	4.2	4.2	4.2	0.2	1.9	0.8	0.10	0.50	0.23				1.50	1.50	1.50	0	9300	2575	0	9310	2668
2062	BURIDIHING NEAR DULIAJAN AT D/S, TINSUKIA	22	24	23	6.3	8.9	7.1	6.3	7.7	6.9	204	356	246	7.0	7.0	7.0	0.4	2.3	1.3	0.10	1.00	0.40				0.10	0.10	0.10	0	730	440	0	1500	933
1423	BURHIDIHING AT MARGHERITA, ASSAM	22	24	23	6.4	8.2	7.0	6.6	7.5	6.9	146	260	208	7.0	7.0	7.0	0.5	7.9	2.6	0.10	1.00	0.33				0.20	0.20	0.20	360	1500	830	730	2800	1765
2063	PAGLDIA RIVER NEAR NALBARI TOWN, DIST. NALBARI, ASSAM	18	29	24	6.2	8.0	7.2	6.4	7.4	7.0	142	203	172	10.8	10.8	10.8	0.2	1.7	1.0	0.10	0.10	0.10				0.00	0.00	0.00	360	2000	987	730	15000	5910
1535	DIGBOI RIVER AT LAKHIPATHE, RESERVE FOREST, DIGBOI, ASSAM	22	23	22	6.8	8.7	7.7	6.1	7.5	6.9	205	322	266	25.5	25.5	25.5	0.6	4.4	2.6	0.10	0.10	0.10				0.70	0.70	0.70	0	240000	80667	0	240001	80934
2064	JAI BHARALI RIVER NEAR BISWANATH CHARALI, SONITPUR	19	24	21	5.3	6.1	5.7	7.4	7.5	7.5	52	102	75	6.2	6.2	6.2	1.0	1.9	1.6	0.10	0.20	0.13				0.00	0.00	0.00	360	730	483	910	3400	1937
2059	KOLONG RIVER AT MARIGAON	20	23	21	7.1	8.2	7.6	6.9	7.6	7.2	81	118	98	8.2	8.2	8.2	1.6	3.9	2.5	0.10	0.20	0.15				0.00	0.00	0.00	0	1500	620	910	2300	1570
2060	MANAS RIVER AT NH-31 CROSSING, BARPETA, DISTRICT	22	30	27	7.5	8.2	7.9	7.2	7.9	7.6	46	472	337	9.6	9.6	9.6	0.6	1.2	0.9	0.10	0.10	0.10				0.00	0.00	0.00	0	910	408	360	3600	1943
2058	DISANG RIVER AT DILLIGHAT, DIBRUGARH DIST., ASSAM	22	23	22	5.8	9.5	7.4	6.2	7.3	6.8	207	272	244	3.0	3.0	3.0	0.4	1.5	1.0	0.20	0.30	0.25				0.00	0.00	0.00	0	1500	743	1	9300	3344
1298	DISANG AT GUNDAMGHAT, ASSAM	19	24	22	6.4	6.9	6.7	7.0	7.5	7.3	128	189	159				1.1	2.1	1.6	0.10	0.10	0.10							0	740	370	730	2000	1365
1258	JHANJI AT N.H. CROSSING JORHAT, ASSAM	19	26	23	6.3	7.7	6.7	6.6	7.5	7.2	74	122	91	5.5	5.5	5.5	0.5	1.5	0.9	0.10	1.00	0.35				0.00	0.00	0.00	720	1100	865	1100	2100	1425
1527	BHOGDOI RIVER AT JORHAT ASSAM	19	26	23	6.0	7.5	6.5	6.6	7.5	7.1	68	160	122	11.2	11.2	11.2	0.2	1.7	0.9	0.10	0.20	0.13				0.00	0.00	0.00	910	46000	15978	2001	240000	88525
1531	MORA BHARALI AT TEZPUR, ASSAM	18	27	22	5.4	9.3	7.2	7.1	7.5	7.4	83	116	98	4.6	4.6	4.6	1.1	4.5	2.3	0.10	0.10	0.10				0.00	0.00	0.00	730	910	775	1500	2100	1900
1423	BORAK AT PANCHAGRAM, ASSAM	18	28	24	6.5	6.8	6.6	6.4	7.4	7.1	37	238	120	4.6	4.6	4.6	0.4	3.5	1.5	0.10	0.20	0.13				0.10	0.10	0.10	0	15000	4353	1500	110000	32125
1528	BHARALU RIVER AT GUWAHATI	25	32	29	0.0	0.4	0.1	6.8	7.2	7.0	638	777	679	91.5	91.5	91.5	3.5	36.0	21.1	0.10	0.10	0.10				10.6	10.6	10.6	360	240000	62598	730	240001	72183
1529	DEEPAR BILL, ASSAM	20	33	29	5.5	7.6	6.6	7.1	7.3	7.2	139	405	230	32.3	32.3	32.3	0.7	11.0	4.2	0.10	0.10	0.10				0.00	0.00	0.00	0	7300	2005	0	15000	4308
2065	U/S OF R. KATHAKAL AT MATIJURI, DIST. HAILAKANDI, ASSAM	17	28	25	6.0	6.8	6.4	6.6	7.5	7.1	84	146	117	3.1	3.1	3.1	0.3	1.1	0.7	0.10	0.40	0.27				0.10	0.10	0.10	360	9300	2733	2000	46000	16600

TABLE 7 .1 :- WATER QUALITY OF RIVER MAHI & ITS TRIBUTARY - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1233	MAHI AT BADNAWAR, M.P.	24	24	24	6.8	7.8	7.3	7.6	8.0	7.8	234	422	332	20.0	20.0	20.0	1.2	2.0	1.6	0.10	1.50	0.70	0.10	0.10	0.10	2.80	2.80	2.80				70	160	118
1232	MAHI (DS) CONF WITH R. CHAP (UNDER SAGWARA-SARHI RD., BDG.),RAJASTHAN	22	31	27	5.4	8.8	6.4	7.9	8.9	8.3	310	810	498	2.5	2.5	2.5	0.3	3.1	1.4	0.16	1.40	0.49				0.00	0.60	0.20	3	11	6	7	150	29
1230	RIVER MAHI AFTER CONF.WITH ANAS AT PARDI(BANSWADA)	25	28	27	7.0	10.8	9.1	7.5	8.6	8.2	249	353	315	7.0	7.0	7.0	1.6	3.9	2.6	0.03	0.15	0.06	0.01	0.05	0.02	0.08	0.08	0.08	2	4	3	3	20	9
1863	RIVER MAHI AT UMETA	24	31	27	7.2	8.3	7.6	7.5	8.4	8.0	186	590	408	7.0	7.0	7.0	1.4	3.7	2.3	0.09	0.50	0.31				0.10	0.10	0.10	2	4	3	4	21	12
1864	RIVER MAHI AT MUJPUR	24	27	26	7.9	10.4	8.8	7.7	8.4	8.1	199	3720	1493	17.0	17.0	17.0	2.0	5.7	3.8	0.04	0.52	0.32				0.04	0.04	0.04	2	4	3	14	15	15
1231	RIVER MAHI AT VIRPUR	25	28	26	5.8	10.6	8.4	6.9	8.3	7.9	221	421	335	7.0	7.0	7.0	1.4	4.2	2.2	0.07	0.16	0.10				0.08	0.08	0.08	2	4	3	3	28	10
4	RIVER MAHI AT SEVALIYA	22	30	27	5.4	10.6	8.3	7.8	8.6	8.3	222	438	361	3.0	3.0	3.0	0.6	3.7	2.3	0.04	0.27	0.09				0.10	0.10	0.10	2	4	3	3	20	9
5	MAHI AT VASAD	20	30	26	4.6	10.8	8.4	7.8	8.4	8.2	266	480	407	10.0	10.0	10.0	1.1	7.2	3.2	0.01	0.16	0.09				0.08	0.08	0.08	2	4	3	3	28	10
1237	RIVER PANAM AT LUNAWADA	26	27	26	7.5	10.7	9.1	7.7	8.2	8.0	204	370	285	10.0	10.0	10.0	1.9	3.7	2.9	0.04	0.08	0.06				0.08	0.08	0.08	2	4	3	4	15	11
1228	RIVER ANAS AT KUSHALGADH	25	28	27	7.2	10.7	9.1	8.0	8.4	8.3	323	471	400	7.0	7.0	7.0	1.4	3.6	2.6	0.04	0.13	0.07				0.05	0.05	0.05	2	3	3	3	15	10
1229	MAHI NEAR RAJASTHAN BOARDER AT KADANADAM	25	29	27	6.2	9.9	8.2	7.6	8.4	8.0	208	395	329	10.0	10.0	10.0	0.3	8.2	2.7	0.03	0.09	0.05	0.01	0.05	0.02	0.05	0.05	0.05	2	4	3	3	20	10

TABLE 8.1 :- WATER QUALITY OF RIVER SABARMATI & ITS TRIBUTARIES - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1866	RIVER SABARMATI AT HANSAOL BRIDGE, GUJARAT	27	27	27	6.7	6.7	6.7	7.5	7.5	7.5	744	744	744				15.0	15.0	15.0	1.10	1.10	1.10				2.8	2.8	2.8	15000	15000	15000	43000	43000	43000
1221	SABARMATI AT KHEROJ BRIDGE, GUJARAT	28	28	28	2.4	2.4	2.4	7.7	7.7	7.7	292	292	292				12.0	12.0	12.0	1.10	1.10	1.10				0.6	0.6	0.6	5000	5000	5000	75000	75000	75000
1	SABARMATI AT DHAROI DAM, GUJARAT							4.0	4.0	4.0																									
2	SABARMATI AT AHMEDABAD AT V.N. BRIDGE,GUJARAT	26	26	26				7.1	7.1	7.1	2270	2270	2270				310	310	310	0.10	0.10	0.10				31.9	31.9	31.9	9300	9300	9300	15000	15000	15000
1409	SABARMATI AT RAILWAY BRIDGE AHMEDABAD, GUJARAT	26	26	26	5.6	5.6	5.6	7.4	7.4	7.4	536	536	536				29.0	29.0	29.0	1.10	1.10	1.10				1.7	1.7	1.7	15000	15000	15000	43000	43000	43000
1408	SABARMATI AT VILL. MIROLI TALUKA DASCROI, AHMEDABAD, GUJARAT	26	26	26				7.2	7.2	7.2	2920	2920	2920				103	103	103	0.20	0.20	0.20				17.9	17.9	17.9	9300	9300	9300	15000	15000	15000
1223	SABARMATI AFTER CONF. WITH MESHWA AT VAUTHA (NEAR DHOKLA),GUJARAT	26	26	26				7.5	7.5	7.5	2700	2700	2700	203	203	203	105	105	105	0.10	0.10	0.10	0.10	0.10	0.10	0.56	0.56	0.56	1500	1500	1500	2000	2000	2000
1222	SHEDHI AT KHEDA, GUJARAT	23	27	25	3.7	6.8	5.3	7.2	7.6	7.4	710	735	723	16.0	16.0	16.0	2.0	4.0	3.0	1.00	1.10	1.05	0.10	0.10	0.10	0.56	1.1	0.83	15	2100	1058	43	7500	3772
1437	KHARI AT LALI VILLAGE NEAR AHMEDABAD, GUJARAT	27	29	28	5.3	8.0	6.7	7.3	7.5	7.4	610	1750	1180	35.0	35.0	35.0	7.0	19.0	13.0	0.10	0.70	0.40	0.30	0.30	0.30	0.6	1.12	0.86	200	9300	4750	1500	15000	8250

TABLE 9.1 :- WATER QUALITY OF RIVER NARMADA & ITS TRIBUTARIES - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1241	NARMADA AT MANDLA NEAR ROAD BDG. M.P.	30	30	30				7.8	7.8	7.8	1424	1424	1424				2.4	2.4	2.4	5.20	5.20	5.20							15	15	15	1100	1100	1100
44	NARMADA AT SETHANIGHAT M.P.				6.2	6.2	6.2	8.0	8.0	8.0	284	284	284				3.5	3.5	3.5													1600	1600	1600
1240	NARMADA AT NARSINGHPUR M.P.	31	31	31				7.9	7.9	7.9	1629	1629	1629				2.8	2.8	2.8	7.20	7.20	7.20							11	11	11	1100	1100	1100
1234	NARMADA AT HOSHANGABAD U/S M.P.	25	25	25	7.6	7.6	7.6	8.8	8.8	8.8	244	244	244	19.3	19.3	19.3	1.6	1.6	1.6													64	64	64
1235	NARMADA AT HOSHANGABAD D S M.P.	26	26	26	7.1	7.1	7.1	7.5	7.5	7.5	372	372	372				3.0	3.0	3.0													542	542	542
1430	NARMADA AT D S OF OMKARESHWAR M.P.	24	24	24	7.0	7.0	7.0	7.6	7.6	7.6	276	276	276				1.3	1.3	1.3	0.30	0.30	0.30				1.80	1.80	1.80				140	140	140
45	NARMADA AT MANDLESHWAR M.P.	28	28	28	7.8	7.8	7.8	8.0	8.0	8.0	302	302	302				1.5	1.5	1.5	0.90	0.90	0.90	0.10	0.10	0.10	1.00	1.00	1.00				140	140	140
1431	NARMADA AT MAHESHWAR, M.P.	28	28	28	7.6	7.6	7.6	8.0	8.0	8.0	323	323	323				1.7	1.7	1.7	0.90	0.90	0.90	0.10	0.10	0.10	1.00	1.00	1.00				170	170	170
1239	NARMADA AT BADWANI, M.P.,	26	26	26	9.1	9.1	9.1	8.2	8.2	8.2	372	372	372				2.0	2.0	2.0	0.06	0.06	0.06				1.00	1.00	1.00	2	2	2	7	7	7
7	NARMADA AT GARUDESHWAR, GUJARAT	19	19	19	10.4	10.4	10.4	8.5	8.5	8.5	263	263	263	10.0	10.0	10.0	2.0	2.0	2.0							0.00	1.00	0.50	4	4	4	21	21	21
1245	RIVER NARMADA AT CHANOD	23	29	26	7.1	11.6	8.8	7.9	8.4	8.1	194	361	271	7.0	7.0	7.0	0.6	2.9	2.0	0.04	0.08	0.06				0.08	0.08	0.08	2	4	3	3	28	14
1244	RIVER NARMADA AT PANETHA	24	30	27	6.4	9.8	8.4	7.3	8.4	8.0	196	351	269	3.0	3.0	3.0	1.3	4.2	2.1	0.05	0.17	0.08				0.10	0.10	0.10	2	4	3	3	28	11
1243	RIVER NARMADA AT ZADESHWAR	20	30	26	7.0	10.0	8.4	7.7	8.3	8.1	214	13250	1357	10.0	10.0	10.0	0.7	5.0	2.4	0.05	0.12	0.08				0.10	0.10	0.10	2	4	3	3	21	11
1236	CHOTA TAWA BEFORE CONFL. WITH RIVER NARMADA,M.P.	25	29	27	6.8	8.0	7.0	7.5	7.6	8.0	352	641	491				1.2	1.4	1.0	0.20	0.70	0.00	0.10	0.10	0.10							140	200	160

TABLE 10.1 :- WATER QUALITY OF RIVER TAPI & ITS TRIBUTARIES - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
9	TAPI AT NEPANAGAR M.P.	23	23	23	7.0	7.0	7.0	8.0	8.0	8.0	311	311	311				1.2	1.2	1.2	0.40	0.40	0.40										110	110	110

10	TAPI AT BURHANPUR M.P.	26	26	26	7.4	7.4	7.4	7.9	7.9	7.9	370	370	370	20.0	20.0	20.0	1.1	1.1	1.1	0.60	0.60	0.60	0.10	0.10	0.10	0.90	0.90	0.90				170	170	170
1250	TAPI AT HATHNUR M.P.	28	28	28	7.4	7.4	7.4	8.4	8.4	8.4	584	584	584				1.6	1.6	1.6	1.40	1.40	1.40										140	140	140
1313	TAPI AT AJNAND VILLAGE, MAHARASHTRA	28	28	28	3.7	3.7	3.7	8.0	8.0	8.0	210	210	210				25.0	25.0	25.0	1.20	1.20	1.20							25	25	25	275	275	275
1251	TAPI AT BHUSAWAL U/S MAHARASHTRA	28	28	28	4.4	4.4	4.4	8.0	8.0	8.0	447	447	447				18.0	18.0	18.0	1.70	1.70	1.70							20	20	20	40	40	40
1314	TAPI AT UPPAD VILLAGE, MAHARASHTRA	31	31	31	3.9	3.9	3.9	7.7	7.7	7.7	220	220	220				22.0	22.0	22.0	1.10	1.10	1.10							7	7	7	17	17	17
46	TAPI AT UKAI, SHERULA BRIDGE, GUJARAT	32	32	32	5.8	5.8	5.8	8.3	8.3	8.3	370	370	370				3.7	3.7	3.7				0.30	0.30	0.30	0.60	0.60	0.60						
1247	TAPI AT MANDAVI, GUJARAT	31	31	31	8.7	8.7	8.7	8.3	8.3	8.3	351	351	351				3.0	3.0	3.0				0.30	0.30	0.30	0.30	0.30	0.30	430	430	430	750	750	750
47	TAPI AT KATHORE, (NH-8 BRIDGE), GUJARAT	23	23	23	8.6	8.6	8.6	8.1	8.1	8.1	587	587	587				3.2	3.2	3.2				1.20	1.20	1.20	0.30	0.30	0.30	15000	15000	15000	46000	46000	46000
1248	TAPI AT SURAT U/S KATHORE, GUJARAT	25	25	25	7.4	7.4	7.4	8.4	8.4	8.4	498	498	498				3.0	3.0	3.0				0.90	0.90	0.90	0.80	0.80	0.80	1500	1500	1500	7500	7500	7500
1982	TAPI AT RANDER BRIDGE, SURAT	23	23	23	7.8	7.8	7.8	8.1	8.1	8.1	586	586	586	9.0	9.0	9.0	2.6	2.6	2.6	0.36	0.36	0.36				0.80	0.80	0.80	4300	4300	4300	9300	9300	9300
1253	GIRNA AT MALEGAON (MANMAD), MAHARASHTRA	26	26	26	4.0	4.0	4.0	7.3	7.3	7.3	217	217	217				23.0	23.0	23.0	3.00	3.00	3.00							11	11	11	25	25	25
1252	GIRNA AT JALGAON, MAHARASHTRA	25	25	25	4.6	4.6	4.6	8.5	8.5	8.5	370	370	370				10.0	10.0	10.0	0.80	0.80	0.80				0.30	0.30	0.30	20	20	20	95	95	95
1907	RANGAVALI D/S OF NAVAPUR	39	39	39	6.0	6.0	6.0	8.4	8.4	8.4	325	325	325	36.0	36.0	36.0	9.0	9.0	9.0	0.20	0.20	0.20				0.60	0.60	0.60	20	20	20	95	95	95

TABLE 11.1 :- WATER QUALITY OF RIVER MAHANADI- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1851	MAHANADI AT SIHAWA	30	30	30	7.8	7.8	7.8	7.3	7.3	7.3	358	358	358	23.0	23.0	23.0	2.6	2.6	2.6	0.46	0.46	0.46	0.09	0.09	0.09							130	130	130
1264	MAHANADI AT RUDRI U/S AT DHAMTORI RESERVOIR,CHHATISSGARH.	26	26	26	7.8	7.8	7.8	7.3	7.3	7.3	149	149	149	2.8	2.8	2.8	2.4	2.4	2.4	0.50	0.50	0.50										27	27	27
1099	MAHANADI AT U/S OF RAJIM, CHHATISSGARH.	30	30	30	7.6	7.6	7.6	7.9	7.9	7.9	348	348	348	30.0	30.0	30.0	3.2	3.2	3.2	0.50	0.50	0.50										150	150	150
1852	MAHANADI AT ARRANG, RAIPUR	30	30	30	6.4	6.4	6.4	7.7	7.7	7.7	176	176	176	22.6	22.6	22.6	2.8	2.8	2.8	0.78	0.78	0.78	0.26	0.26	0.26							27	27	27
1100	MAHANADI AT KHARAD CHHATISSGARH.	30	30	30	6.9	6.9	6.9	8.5	8.5	8.5	218	218	218				2.4	2.4	2.4	0.16	0.16	0.16	0.86	0.86	0.86							54	54	54
1282	MAHANADI AT SHEORINARAYAN VILLAGE, CHHATISSGARH.	28	28	28	8.1	8.1	8.1	7.6	7.6	7.6	184	184	184				2.6	2.6	2.6	1.89	1.89	1.89	1.33	1.33	1.33							42	42	42
1467	MAHANADI AFTER CONFL. WITH RIVER MAND,CHHATISSGARH.	27	27	27	7.6	7.6	7.6	8.7	8.7	8.7	188	188	188				2.0	2.0	2.0	1.10	1.10	1.10	1.80	1.80	1.80							32	32	32
1101	MAHANADI AT INTERSTATE BOUNDRY CHHATISSGARH.	28	28	28	7.4	7.4	7.4	8.3	8.3	8.3	142	142	142				3.1	3.1	3.1	1.27	1.27	1.27	1.46	1.46	1.46							210	210	210
1281	MAHANADI AT HIRAKUD RESERVOIR, ORISSA	26	26	26	6.2	6.2	6.2	8.3	8.3	8.3	200	200	200	13.6	13.6	13.6	2.5	2.5	2.5	0.46	0.46	0.46	0.78	0.78	0.78	1300	1300	1300	1700	1700	1700
1270	MAHANADI AT SAMBALPUR U/S. ORISSA	26	26	26	8.0	8.0	8.0	8.3	8.3	8.3	181	181	181	9.7	9.7	9.7	2.2	2.2	2.2	0.50	0.50	0.50	0.56	0.56	0.56	1300	1300	1300	2200	2200	2200
1271	MAHANADI AT SAMBALPUR D/S. ORISSA	33	33	33	7.5	7.5	7.5	7.9	7.9	7.9	210	210	210	20.0	20.0	20.0	3.6	3.6	3.6				0.56	0.56	0.56	13000	13000	13000	35000	35000	35000			
1272	MAHANADI D/S (AFTER CONFL. WITH R. ONG SONEPUR U/S), ORISSA	27	27	27	7.2	7.2	7.2	7.7	7.7	7.7	104	104	104	11.6	11.6	11.6	2.0	2.0	2.0	0.27	0.27	0.27	0.45	0.45	0.45	700	700	700	940	940	940
1274	MAHANADI AFTER CONFL. WITH R.TEL (SONEPUR D/S),ORISSA	27	27	27	6.9	6.9	6.9	8.1	8.1	8.1	193	193	193	17.6	17.6	17.6	2.0	2.0	2.0	0.78	0.78	0.78	0.67	0.67	0.67	1100	1100	1100	1700	1700	1700
1275	MAHANADI AT TIKARPADA, ORISSA	29	29	29	8.5	8.5	8.5	8.2	8.2	8.2	280	280	280	9.0	9.0	9.0	1.8	1.8	1.8				0.56	0.56	0.56	1100	1100	1100	2100	2100	2100			
1276	MAHANADI AT NARSINGHPUR, ORISSA	30	30	30	7.2	7.2	7.2	7.5	7.5	7.5	203	203	203	11.2	11.2	11.2	1.2	1.2	1.2	0.11	0.11	0.11	1.01	1.01	1.01	700	700	700	1100	1100	1100			
1277	MAHANADI AT CUTTACK U/S, ORISSA	22	22	22	7.9	7.9	7.9	7.5	7.5	7.5	102	102	102	6.0	6.0	6.0	1.7	1.7	1.7	0.42	0.42	0.42	0.41	0.41	0.41	790	790	790	1400	1400	1400			
1278	MAHANADI AT CUTTACK D/S, ORISSA	28	28	28	6.9	6.9	6.9	7.7	7.7	7.7	229	229	229	24.0	24.0	24.0	3.1	3.1	3.1				0.84	0.84	0.84	17000	17000	17000	35000	35000	35000			
1639	MAHANADI AT PARADEEPDS, ORISSA	27	27	27	8.9	8.9	8.9	7.5	7.5	7.5	813	813	813	19.0	19.0	19.0	1.6	1.6	1.6	0.14	0.14	0.14	0.84	0.84	0.84	1400	1400	1400	2100	2100	2100			

TABLE 11. 2 :- WATER QUALITY OF RIVER SEONATH, KHAROON, HASDEO, ARPA, KELO, IB, KUAKHAI, KATHAJODI AND BIRUPA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1107	SEONATH AT U/S RAJNANDGAON, CHHATISSGARH	23	32	26	7.2	8.2	7.1	7.0	7.5	6.9	305	326	291	12.0	12.0	6.0	0.8	7.1	1.4	0.40	0.70	0.60							0.60	0.90	0.70	93	93	47	64	460	194
1845	SEONATH RIVER WATER SUPPLY WELL, DURG.	23	30	27	7.2	7.9	7.5	7.5	7.5	7.5	316	330	323	16.0	16.0	16.0	1.1	1.8	1.3	0.50	0.80	0.70							0.70	0.90	0.80				75	460	213
1266	SEONATH AT SHIMGA AFTER CONFL. WITH R. KHAROON,CHHATISSGARH	27	32	30	7.1	7.7	7.4	7.4	7.8	7.7	198	352	275	20.0	30.0	24.2	2.6	3.1	2.9	0.30	0.80	0.50												23	210	90
1265	KHAROON AT RAIPUR U/S, CHHATTISGARH	27	31	30	7.4	7.7	7.6	7.3	8.8	7.8	186	387	261	20.0	28.8	23.0	1.3	2.4	2.0	0.20	0.80	0.60							0.00	0.40	0.20				21	140	78
1847	KHAROON RIVER B/C KHAPRI DRAIN, DURG, RAIPUR ROAD BRIDGE	22	30	27	7.4	7.6	7.5	7.5	7.5	7.5	304	327	317	16.0	16.0	16.0	1.0	1.5	1.2	0.60	0.70	0.60							0.70	0.90	0.80				75	460	213
1846	KHAROON RIVER A/C KHAPRI DRAIN	22	31	27	7.2	7.3	7.2	7.5	7.5	7.5	309	329	322	20.0	20.0	20.0	1.4	1.9	1.6	0.60	0.80	0.70							0.70	1.00	0.80				93	1100	437
1853	KHAROON RIVER BUNDRI, RAIPUR	27	32	30	7.1	7.8	7.6	7.3	8.9	8.0	140	346	241	20.0	38.0	28.7	2.6	3.0	2.8	0.40	0.80	0.60							0.00	0.80	0.30				21	150	89
1105	HASDEO AT U/S KORBA,CHHATISSGARH	24	26	23	6.2	6.5	5.9	6.9	7.3	6.6							2.1	2.9	2.2	1.00	1.60	1.20												110	270	140
1106	HASDEO AT U/S OF CHAMPA,CHHATISSGARH	21	35	28	6.2	7.9	7.0	7.7	8.3	8.0	106	329	182				0.3	1.6	0.8	0.20	1.70	1.00	0.10	0.10	0.10	0.80	1.30	1.00				15	68	37
1848	ARPA RIVER D/S OF BILASPUR	27	28	28	6.9	7.1	7.0	6.9	6.9	6.9	7	7	7	1.0	1.1	0.9	7.0	7.0	7.0	2.00	2.00	2.00	7.60	8.10	7.90	1.10	1.10	1.10	8	8	8	8	8	8
1849	KELO RIVER U/S OF RAIGARH	21	29	26	6.8	7.9	7.4	7.2	8.1	7.6	72	194	130				1.7	2.9	2.1	1.10	1.20	1.20				1.10	1.40	1.20				43	240	105
1850	KELO RIVER D/S OF RAIGARH	21	29	26	6.7	8.0	7.4	7.2	8.1	7.8	72	198	137				1.8	2.9	2.3	1.10	1.20	1.20				1.10	1.40	1.30				72	240	137
1267	IB AT SUNDARGARH, ORISSA	23	37	30	6.6	8.7	7.8	7.4	8.0	7.6	75	155	121	6.0	14.2	9.7	0.3	2.3	1.0	0.10	0.70	0.20				0.40	1.10	0.80	330	1400	812	790	7900	1947
1268	IB AT JHARSUGUDA (INTAKE), ORISSA	22	38	29	7.0	8.7	7.9	7.2	8.3	7.6	61	187	131	6.0	16.6	10.5	0.5	1.8	1.1	0.20	0.30	0.20				0.30	1.10	0.70	330	1700	1051	790	2800	1832
1300	IB AT RAJ NAGAR U/S, ORISSA	22	38	29	5.9	9.4	8.0	7.0	8.2	7.6	71	165	137	6.0	15.9	10.7	0.5	2.0	1.0	0.10	0.20	0.20				0.50	0.80	0.60	320	1400	922	390	2100	1319
1269	IB AT BRAJRAJNAGAR (INTAKE) D/S, ORISSA	22	36	29	5.8	8.2	7.5	7.2	8.1	7.6	81	298	172	6.0	25.2	14.6	0.8	2.2	1.4	0.10	0.60	0.20				0.60	2.20	0.90	230	2700	1648	1700	4900	2944
1280	KUAKHAI AT BHUBANESWAR D/S, ORISSA	21	34	27	5.7	8.2	7.2	7.1	8.2	7.7	88	283	209	16.0	36.0	21.8	2.3	4.0	3.1	0.30	3.40	1.30				0.50	2.80	1.20	1400	17000	5856	2100	35000	12722
1279	KUAKHAI AT BHUBANESWAR U/S, ORISSA	22	36	27	5.0	8.6	7.2	7.2	8.6	7.8	76	258	173	4.0	18.0	11.1	0.2	1.8	1.3	0.10	0.30	0.20				0.20	1.10	0.70	460	1100	830	1100	2200	1489
1301	KATHAJODI AT CUTTACK D/S, ORISSA	23	34	28	6.0	8.3	7.1	7.5	8.5	7.9	95	382	218	18.0	36.0	26.2	2.3	4.2	3.5	0.10	0.30	0.20				0.40	1.70	1.00	24000	92000	54889	54000	160000	121422
1640	BIRUPA AT CHOUDWAR, ORISSA	26	33	29	6.6	9.1	7.8	7.2	8.2	7.7	1289	32800	20747	8.0	42.0	31.2	0.8	4.0	2.3	0.20	0.20	0.20				0.60	1.10	0.80	680	1700	1065	1400	2600	1975

TABLE 12.1 :- WATER QUALITY OF RIVER BRAHMANI & ITS TRIBUTARIES - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1037	BRAHMANI AT U/S PANPOSH, ORISSA	24	35	28	6.5	8.6	7.6	7.3	8.3	8.0	110	174	151	5.7	14.0	10.0	0.6	2.0	1.3	0.11	0.54	0.37				0.56	1.68	0.96	110	1200	656	210	1700	981
1038	BRAHMANI AT D/S PANPOSH, ORISSA	23	35	29	5.5	7.5	6.9	7.1	8.2	7.7	164	324	262	20.0	38.0	26.2	1.4	4.8	3.5	0.25	6.00	2.12	0.21	0.21	0.21	0.56	1.4	1.00	4600	22000	12800	7900	54000	25913
1302	BRAHMANI AT ROURKELA D/S, ORISSA	22	38	29	6.6	7.7	7.3	7.4	8.2	7.8	91	269	210	16.0	36.0	23.2	0.8	3.4	2.6	0.10	2.83	1.23				0.56	1.4	0.95	4900	13000	9063	7900	35000	16863
1039	BRAHMANI AT BONAIGARH, ORISSA	23	33	27	7.0	8.0	7.6	7.8	8.0	7.9	158	245	189	6.0	10.0	7.9	0.7	1.8	1.1							0.56	1.96	1.06	270	1100	720	390	2200	1230
1040	BRAHMANI AT RENGALI, ORISSA	24	31	27	7.4	8.9	8.1	7.2	8.0	7.7	125	180	145	5.1	10.0	7.0	0.5	1.3	0.8	0.16	0.33	0.25				0.45	1.68	0.9	330	1200	773	1400	1700	1600
1041	BRAHMANI AT SAMAL, ORISSA	24	31	27	7.9	8.9	8.3	7.3	8.0	7.6	132	150	139	9.4	16.0	11.8	0.6	1.8	1.3	0.21	0.41	0.31				0.56	1.4	0.88	630	940	757	1100	1200	1167
1303	BRAHMANI AT TALCHER U/S, ORISSA	22	39	28	7.1	8.6	7.7	7.2	8.5	7.7	66	181	130	10.0	22.0	16.4	1.0	1.8	1.4	0.12	0.44	0.23				0.56	0.84	0.7	490	1700	1166	1200	2800	2063
1042	BRAHMANI AT KAMALANGA, ORISSA	26	40	30	6.7	8.4	7.4	6.9	8.4	7.9	134	232	176	12.0	28.0	19.4	1.4	2.8	2.0	0.10	0.40	0.26				0.34	1.68	0.9	1400	2400	1914	2100	9200	4371
1043	BRAHMANI AT BHUBAN, ORISSA	26	33	29	6.4	8.1	7.3	7.8	8.1	8.0	114	252	167	6.0	11.4	7.8	0.4	1.3	0.8	0.22	0.30	0.26				0.62	1.12	0.86	790	1500	1130	1700	2100	1833
1044	BRAHMANI AT DHARMASHALA, ORISSA	24	27	26	6.8	9.3	8.2	7.6	8.0	7.8	145	223	179	10.0	12.0	11.2	1.0	1.6	1.3	0.35	0.40	0.38				0.67	1.4	0.97	1300	1400	1333	3500	3500	3500
1045	BRAHMANI AT PATTAMUNDAI, ORISSA	26	34	29	6.4	9.2	7.9	7.2	8.5	7.9	145	574	252	8.0	18.0	12.7	1.0	2.4	1.4	0.13	0.60	0.36				0.56	1.12	0.84	790	1700	1069	1100	2400	1725
1033	ROEL AT BASIA,DAM U/S,JHARKHAND	22	39	29	1.8	8.5	7.2	6.7	8.1	7.3	220	410	305	16.0	64.0	34.3	1.1	4.9	2.3										110	350	261	1200	1500	1325
1036	ROEL AT MANOHARPUR AFTER MEETING KOINA RIVER D/S,JHARKAND	23	35	29	6.8	8.3	7.8	7.0	7.8	7.4	153	217	182	8.0	12.0	11.0	0.3	1.2	0.6	1.96	4.12	2.89				0.04	0.48	0.32						
1035	KARO AT LOHOJIMI U/S, JHARKAND	21	30	26	6.2	8.5	7.5	6.8	7.6	7.3	180	582	349	20.0	52.0	31.7	0.8	3.2	1.8										200	350	245	750	1500	850

1034	SANKH AT BOLBA, JHARKAND	20	35	27	1.9	8.9	7.6	7.1	7.9	7.4	230	462	318	12.0	40.0	27.7	1.0	4.0	2.0								110	350	257	1200	1500	1350

TABLE 12.2 :- WATER QUALITY OF RIVER BAITARNI & ITS TRIBUTARIES - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1081	BAITARNI AT JODA ORISSA	22	30	26	6.7	8.8	8.0	7.6	8.2	8.0	143	208	170	7.0	12.0	10.1	0.4	1.4	0.9	0.23	0.23	0.23	0.56	0.84	0.75	220	790	490	790	1100	943
1082	BAITARNI AT ANANDPUR, ORISSA	24	30	27	6.5	8.0	7.4	7.5	7.6	7.5	151	158	155	6.0	16.9	9.6	0.6	0.7	0.6	2.11	2.11	2.11	0.56	1.4	0.84	170	1200	720	330	2100	1277
1083	BAITARNI AT JAJPUR ORISSA	24	31	27	6.5	8.2	7.4	7.3	7.6	7.4	136	186	164	12.0	18.6	15.5	1.6	1.7	1.6	0.18	0.41	0.29	0.56	1.12	0.77	490	2200	1363	1100	2800	2000
1084	BAITARNI AT CHANDBALI, ORISSA	25	35	29	5.6	8.4	6.9	7.3	8.2	7.8	210	10330	6400	14.0	19.0	17.0	1.6	2.2	1.9	0.16	0.90	0.53	0.56	1.46	0.95	460	1400	987	1100	2800	1867
1085	BAITARNI AT DHAMRA ORISSA	24	32	27	5.7	7.9	6.9	7.4	8.0	7.8	2110	19450	10447	18.0	20.9	19.6	1.2	1.8	1.5	0.11	0.34	0.23	0.78	0.84	0.82	1100	1300	1233	1700	5400	3167

TABLE 13.1 :- WATER QUALITY OF RIVER SUBARNAREKHA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
24	SUBARNAREKHA AT JAMSHEDPUR, JHARKHAND	22	37	30	6.6	7.9	7.4	7.4	7.8	7.7	189	278	224	18.0	48.0	30.6	0.9	1.9	1.4	2.42	4.56	3.48	0.86	2.18	1.73						
49	SUBARNAREKHA AT D/S JAMSHEDPUR, (TATA NAGAR), JHARKAND	23	35	28	4.8	7.0	6.2	7.3	7.8	7.7	214	312	258	32.0	68.0	48.0	1.4	4.4	3.0	3.16	7.18	4.74	3.28	6.86	4.42						
48	SUBARNAREKHA AT CHANDIL BRIDGE, JHARKAND	22	36	29	7.6	8.4	8.1	7.4	7.6	7.5	134	198	175	4.0	16.0	8.0	0.3	0.8	0.6	0.37	3.14	2.17	0.26	3.1	1.13						
1641	SUBARNAREKHA AT RAJGHAT NEAR BIHAR BORDER, ORISSA	19	30	25	7.2	7.7	7.5	7.6	7.8	7.7	142	214	189	6.8	12.0	8.6	1.1	1.8	1.4				0.50	1.10	0.70	330	700	497	790	940	840
23	SUBARNAREKHA AT RANCHI,(TATISILWAI) JHARKHAND	19	33	24	4.6	8.7	5.5	6.0	8.1	6.7	502	740	495	40.0	100	57.5	1.2	8.0	3.5							200	430	269	750	2400	1950
1762	SUBARNAREKHA AT BIHAR - WEST BENGAL BORDER, WEST BENGAL	29	35	32	5.2	7.2	6.3	6.8	7.8	7.2	310	330	319	33.0	96.0	58.6	1.8	3.8	2.3							280	920	523	540	2400	1100

TABLE 14.1 :- WATER QUALITY OF RIVER GODAVARI - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1096	GODAVARI AT PANCHAVATI AT RAMKUND, MAHARASHTRA	21	37	28	4.7	7.7	5.7	5.9	8.1	7.5	128	458	250	16.0	16.0	16.0	3.0	17.0	8.9	0.10	3.0	1.30				0.00	2.10	0.30	4	550	70	14	1800	492
1095	GODAVARI AT U/S OF GANGAPUR DAM, NASIK, MAHARASHTRA	21	36	28	5.9	7.5	6.6	7.2	8.5	7.8	126	311	178	12.0	12.0	12.0	4.0	9.0	5.8	0.10	2.10	0.90				0.00	1.50	0.30	0	13	5	5	40	20
1211	GODAVARI AT NASIK D/S, MAHARASHTRA	21	37	28	3.2	5.9	4.8	6.5	8.2	7.6	131	549	291				7.2	36.0	15.0	0.10	2.90	1.20				0.00	2.90	0.50	7	250	59	11	1800	565
1312	GODAVARI AT JAYAKWADI DAM, AURNAGABAD, MAHARASHTRA	20	32	27	5.9	7.6	6.8	7.8	8.9	8.2	334	396	371	8.0	8.0	8.0	2.5	5.0	3.9	0.10	1.00	0.40				0.00	2.80	0.30	6	17	8	170	350	242
12	GODAVARI AT DHALEGAON, MAHARASHTRA	27	27	27	5.7	7.5	6.9	7.0	8.6	7.9	286	671	386	12.0	12.0	12.0	3.6	5.2	4.5	0.10	2.50	0.70				0.00	5.00	0.57	4	14	7.6	140	300	234
1210	GODAVARI AT NANDED, MAHARASHTRA	27	27	27	6.3	7.4	6.9	7.2	8.5	8.1	285	659	407	8.0	8.0	8.0	3.6	5.2	4.3	0.10	2.50	0.80				0.00	1.10	0.20	4	14	8	120	300	232
1209	GODAVARI AT RAHER, MAHARASHTRA	28	31	29	6.2	7.0	6.7	7.0	8.3	7.9	246	679	490	12.0	12.0	12.0	3.1	5.4	4.2	0.10	1.90	0.70				0.00	1.60	0.20	6	14	9	170	350	243
13	GODAVARI AT MANCHERIAL, A.P.	25	29	27	6.3	12.0	8.4	7.2	9.0	8.1	344	918	546	5.0	12.0	10.0	0.2	3.9	2.3	0.10	0.90	0.30	0.10	0.10	0.10	0.00	0.00	0.00	0	3	1	14	460	89
14	GODAVARI AT POLAVARAM, A.P.	27	32	29	6.0	7.2	6.5	7.1	7.6	7.3	195	516	268	3.0	3.0	3.0	0.2	0.5	0.3	0.20	0.60	0.40				0.10	3.60	0.50	0	1600	509	8000	28000	18000
1218	GODAVARI AT RAJAHMUNDRY U/S, A.P.	27	29	28	6.1	6.7	6.4	7.1	7.9	7.6	190	266	238	2.0	2.0	2.0	0.2	0.4	0.3	0.30	0.60	0.40				0.30	1.20	0.60	0	500	167	18000	22000	20000
1219	GODAVARI AT RAJAHMUNDRY D/S, A.P.	28	32	29	5.7	6.9	6.3	7.7	8.4	8.1	215	486	281	3.0	3.0	3.0	0.2	6.0	1.0	0.20	0.50	0.40	0.10	0.10	0.10	0.40	0.80	0.50	500	2200	1167	12000	36000	24167

TABLE 14.2 :- WATER QUALITY OF RIVER INDRAVTI, SHANKNI, MANER, MANJARA, WARDHA, WAINGANGA, KOLAR, KANHAN, PURNA AND NIRA- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1854	INDRAVATI RIVER A/C DANTEWADA RIVER , NELSONNAR, DANTEWADA.	22	32	26	6.7	7.8	7.3	7.4	7.9	7.6				44.0	68.0	53.0	2.1	2.8	2.4	0.40	0.40	0.40				0.40	0.50	0.50				8	8	8
1856	SHANKNI RIVER A/C DANKANI RIVER DANTEWADA.	22	33	26	6.5	7.1	6.9	7.0	8.3	7.6				28.2	56.0	45.0	2.0	2.6	2.3	0.30	0.30	0.30				0.40	0.50	0.50				10	10	10
1157	MANJERA AT RAIPALLU, A.P.	25	31	28	4.1	6.2	5.2	7.1	8.1	7.9	280	823	448				0.0	2.2	1.1	0.10	19.2	2.70	0.10	0.50	0.10				2	4	3	80	2500	287
1781	MANJEERA RIVER - NEAR GANAPATHI SUGARS , MEDAK DIST., A.P	25	31	28	4.0	6.0	5.1	7.1	8.7	8.0	288	510	389	4.0	4.0	4.0	0.0	18.0	2.4	0.10	3.30	1.20	0.10	0.10	0.10				2	5	3	11	125	98
1891	MANJRA AT D/S IN INTAKE POINT TO BIDAR CITY	25	29	27	8.0	8.4	8.1	7.7	8.7	8.2	300	750	588	11.0	11.0	11.0	1.0	4.0	2.0	0.30	3.80	0.90				0.00	2.80	0.50	0	900	362	17	1600	929
1215	MANER AT WARANGAL U/S, A.P.	26	27	27	2.9	7.3	5.9	7.5	8.3	8.0	113	1108	497	12.0	12.0	12.0	1.9	4.3	2.8	0.40	8.30	4.00	0.10	0.10	0.10				0	3	1	9	150	86
1158	MANER AT SOMNAPALLI, A.P.	25	29	27	6.5	10.5	7.9	7.5	9.2	8.2	312	1006	601	6.0	12.0	8.0	0.7	2.8	1.8	0.10	0.60	0.20	0.10	0.10	0.10				0	3	0	14	1216	179
1212	WARDHA AT RAJURA BRIDGE, MAHARASHTRA	23	26	24	5.6	6.6	6.0	7.9	8.3	8.1	288	675	478	16.0	16.0	16.0	4.5	6.9	5.8	1.60	2.20	2.00				0.40	3.90	1.60	22	70	48	34	170	136
1213	WAINGANGA AT BALAGHAT, M.P.	14	30	23				7.1	7.7	7.5	249	1050	450				1.2	2.7	1.7	0.10	2.10	0.90							0	11	2	7	1100	336
1214	WAINGANGA AT CHINDWARA, M.P.	14	29	21				7.2	7.8	7.6	255	1623	597				1.1	2.7	1.6	0.80	8.20	2.60							0	15	2	39	1100	329
1910	WAINGANGA AFTER CONLUENCE WITH KANHAN	21	25	24	5.0	6.7	5.6	7.3	8.0	7.7	226	477	336	18.0	18.0	18.0	5.5	8.5	6.7	1.00	2.40	1.70				0.00	3.50	1.20	21	500	170	130	1600	683
11	WAINGANGA AT ASHTI, MAHARASHTRA	20	31	25	4.6	7.0	5.5	7.2	8.7	8.1	211	401	305	14.0	14.0	14.0	4.0	9.2	6.6	0.20	2.20	1.10				0.10	12.8	2.30	14	110	62	33	280	165
1908	KOLAR BEFORE CONFLUENCE TO KANHAN AT KAMPTEE	21	25	23	4.8	5.5	5.2	8.0	8.4	8.2	474	651	585	24.0	24.0	24.0	6.0	9.6	7.5	0.40	2.60	1.50				0.10	2.60	1.10	17	23	19	50	240	108
1909	KANHAN D/S OF NAGPUR	24	25	25	4.9	6.5	5.5	7.4	8.1	7.7	231	602	422	20.0	20.0	20.0	4.0	9.0	6.7	0.80	1.70	1.30				0.20	3.40	2.20	22	500	201	110	1600	548
1913	PURNA AT DHUPESHWAR	24	28	27	5.0	6.0	5.5	7.9	8.3	8.1	260	912	655	20.0	20.0	20.0	6.0	6.9	6.5	0.10	2.50	0.80				0.30	3.90	1.40	50	300	143	240	900	498
1315	NIRA AT PULGAON COTTON MILL, WARDHA, MAHARASHTRA	2	35	24	4.6	6.2	5.5	7.8	8.6	8.2	288	538	428	32.0	32.0	32.0	4.5	11.5	6.9	0.10	32.0	4.20				0.00	4.70	1.60	27	500	123	170	900	393

TABLE 15.1 :- WATER QUALITY OF RIVER KRISHNA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1194	KRISHNA AT MAHABALESHWAR DHOM DAM NEAR KOINA DAM,MAHARASHTRA	13	29	22	5.2	6.9	6.5	7.5	8.7	7.9	80	797	178	16.0	16.0	16.0	3.2	8.2	5.4	0.10	1.20	0.57				0.00	2.60	0.41	2	350	54	50	1600	404
1153	KRISHNA AT RAJAPUR WEIR, MAHARASHTRA	25	30	28	5.1	6.7	6.0	6.7	7.6	7.2	96	711	357				1.6	4.4	2.9	0.40	2.10	1.46				0.10	0.30	0.15	4	26	10	9	280	113
36	KRISHNA AT KRISHNA BRIDGE, KARAD, MAHARASHTRA	19	30	23	5.6	7.0	6.3	7.1	8.7	7.8	69	864	225	20.0	20.0	20.0	3.4	9.8	6.8	0.10	1.70	0.63				0.00	1.20	0.32	6	275	48	85	900	291
1906	KRISHNA D/S OF ISLAMPUR	23	37	28	5.1	7.6	6.4	6.2	7.6	6.7	108	1160	355	16.0	16.0	16.0	1.2	4.2	2.4	0.30	3.00	1.17				0.10	0.20	0.18	2	14	7	17	110	55
37	KRISHNA AT SANGLI, MAHARASHTRA	22	38	28	3.2	7.8	6.1	6.3	7.7	6.7	176	3166	788	24.0	24.0	24.0	1.4	4.8	2.9	0.10	2.70	1.63				0.10	0.30	0.18	4	26	10	17	220	91
1310	KRISHNA AT KURUNDWAD IN KOLHAPUR,MAHARASHTRA	25	33	28	3.8	7.2	5.9	6.6	7.8	7.2	94	667	327	32.0	32.0	32.0	1.4	5.0	2.9	0.30	3.30	1.53				0.10	0.60	0.17	2	17	8	12	170	86
1182	KRISHNA AT U/S OF UGARKHURD BARRAGE,KARNATAKA	23	29	26	3.0	8.6	6.1	7.1	8.3	7.8	270	1220	619	4.0	4.0	4.0	0.1	9.8	1.7	2.60	21.3	8.10				1.10	1.10	1.10	9	1500	584	95	1600	1147
1889	KRISHNA - ANKALI BRIDGE ALONG CHIKKODI KAGWAD ROAD	24	28	26	4.3	8.5	6.6	7.2	8.5	7.9	310	970	584	4.0	4.0	4.0	0.1	2.1	1.0	3.70	21.1	8.60							80	1600	876	900	1600	1536

1181	KRISHNA AT D/S OF NARAYANPURA DAM,KARNATAKA	25	36	30	6.3	13.0	7.5	8.1	9.1	8.4	275	820	477				0.5	1.6	1.2	0.10	0.90	0.37				0.00	0.60	0.20	0	500	131	20	900	298
1028	KRISHNA AT TINTINI BRIDGE, KARNATAKA	24	34	28	7.0	10.0	7.9	8.0	8.9	8.5	370	1410	683	14.0	14.0	14.0	0.5	2.0	1.3	0.10	0.30	0.16				0.00	1.20	0.23	0	1600	296	8	1600	314
1170	KRISHNA AT D/S OF DEVASAGAR BDG.,KARNATAKA	25	33	27	6.0	10.0	7.5	8.0	8.8	8.5	440	940	720	10.0	10.0	10.0	1.0	3.4	1.8	0.10	0.40	0.21				0.00	0.80	0.20	0	900	190	0	1600	398
1784	THANGADI , MAHABOOBNAGAR DIST., A.P	25	32	29	6.7	7.2	7.0	7.4	8.2	7.9	378	845	618	11.0	11.0	11.0	1.2	2.6	1.7	0.80	2.60	1.35	0.10	0.10	0.10	1.80	1.80	1.80	0	3	1	52	210	142
39	KRISHNA AT GADWAL BRIDGE, A.P.	25	33	29	6.7	8.2	7.2	7.3	8.3	7.8	305	870	526	11.0	11.0	11.0	0.9	2.3	1.4	0.50	1.90	0.95	0.10	0.10	0.10	1.60	1.60	1.60	0	3	1	0	230	115
1175	KRISHNA AFTER CONFL. WITH TUNGABHADRA, SANGAMESHWARAM A.P.	26	33	28	6.8	8.0	7.5	7.3	8.5	8.0	295	940	608	12.0	12.0	12.0	1.0	3.8	2.6	0.20	1.20	0.46	0.10	0.10	0.10				70	420	168	1700	71600	17058
1465	KRISHNA AT WADAPALLY AFTER CONFL. WITH R. MUSI, A.P.(SHIFTED FROM 1220)	26	30	27	4.0	6.9	5.1	7.0	8.7	7.7	394	662	501	4.0	4.0	4.0	0.1	2.1	1.0	0.10	5.90	1.36	0.10	0.10	0.10				2	3	3	75	250	100
1786	VEDADRI , GUNTUR DIST., A.P	28	29	29	3.8	7.0	5.7	7.0	8.3	7.6	438	534	472	16.0	16.0	16.0	1.2	1.8	1.5	0.50	5.50	1.78	0.10	0.10	0.10				2	8	3	2400	3000	2688
1787	AMARAVATI , GUNTUR DIST., A.P	32	32	32	5.5	8.8	7.5	7.5	8.5	7.9	440	530	486	16.0	16.0	16.0	1.0	1.8	1.5	0.20	1.50	0.75	0.10	0.10	0.10				2	4	2	2400	16000	5988
25	KRISHNA AT VIJAYWADA, A.P.	27	33	29	4.7	8.6	7.0	7.0	8.0	7.6	176	1223	508	8.0	12.0	10.0	0.8	1.8	1.3	0.60	11.4	4.41	0.10	0.10	0.10	0.00	0.30	0.15	2	12	4	2400	9000	4250
1782	HAMSALA DEEVI , GUNTUR DIST, A.P	26	33	29	3.8	7.2	6.3	6.4	8.0	7.5	330	23400	8007	48.0	48.0	48.0	0.6	4.4	1.9	0.1	6.6	2.1	0.10	0.40	0.20				2	21	4	480	3500	1433

TABLE 15.2 :- WATER QUALITY OF RIVER PANCHGANGA AND BHIMA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1311	PANCHAGANGA AT ICHALKARANJI, MAHARASHTRA	26	32	29	4.2	7.6	6.3	6.4	7.6	7.1	104	483	248	16.0	16.0	16.0	2.2	3.6	2.6	0.30	1.50	0.98	0.10	1.30	0.45	8	17	12	27	350	154
1904	PANCHAGANGA U/S OF KOLHAPUR TOWN	24	31	27	5.9	7.5	6.6	6.3	8.0	7.2	73	297	134	8.0	8.0	8.0	1.6	2.8	2.1	0.70	2.60	1.27	0.10	0.30	0.13	2	27	10	12	280	102
1905	PANCHAGANGA D/S OF KOLHAPUR TOWN	24	30	27	2.3	6.9	5.2	6.3	7.9	7.1	91	270	155	16.0	16.0	16.0	2.0	6.4	3.8	0.50	2.00	1.15	0.10	2.90	0.43	9	70	19	34	900	245
1188	BHIMA AT PUNE U/S VITHALWADI, MAHARASHTRA	25	30	27	3.0	4.7	3.6	7.1	7.4	7.3	209	434	343	24.0	24.0	24.0	9.8	16.4	12.2	1.60	2.60	2.07	0.00	2.10	1.05	9	35	23	95	350	265
1190	BHIMA AT PUNE, D/S OF BUNDGARDEN,MAHARASHTRA	24	29	27	1.7	3.4	2.5	7.0	7.9	7.4	226	515	408	28.0	28.0	28.0	11.4	28.6	18.8	1.20	2.80	1.80	0.00	3.10	1.05	17	350	116	140	1600	629
1191	BHIMA AT PARGAON (AFTER CONFL WITH MULE MARTHA) MAHARASHTRA.	25	31	28	4.5	6.1	5.4	7.4	8.0	7.7	589	1201	788	12.0	12.0	12.0	5.2	16.8	8.9	1.20	1.60	1.38	0.00	3.40	1.80	4	40	18	110	350	178
1192	BHIMA AFTER CONF. WITH DAUND, MAHARASHTRA	25	30	28	4.7	6.3	5.7	7.5	8.2	7.8	334	1204	753	16.0	16.0	16.0	4.6	8.8	6.3	1.20	1.60	1.40	0.00	5.80	3.28	7	350	97	80	1600	488
1189	BHIMA AT NARSINGHPUR,(D/S AF.CONFL.WITH R.NIRA),MAHARASHTRA	23	32	25	4.8	6.8	6.0	7.3	8.5	8.1	301	4515	1088	16.0	16.0	16.0	3.4	10.4	7.2	0.10	1.30	0.57	0.00	8.10	1.42	4	35	18	80	350	165
28	BHIMA AT TAKLI, MAHARASHTRA	24	29	26	3.4	6.9	5.8	7.2	8.5	8.0	341	1535	816	20.0	20.0	20.0	4.4	10.4	6.8	0.10	3.40	0.88	0.00	11.80	1.59	5	275	65	85	1600	449
1183	BHIMA AT D/S OF ROAD BRIDGE AT GANGAPUR VILLAGE,KARNATAKA	23	32	27	5.6	6.9	6.5	7.9	8.4	8.2	500	1410	817	19.0	19.0	19.0	1.8	3.4	2.3	0.10	0.70	0.36	0.00	0.50	0.14	0	900	506	80	1600	886
1184	BHIMA AT FEROZABAD VILLAGE (D/S), KARNATAKA	25	34	29	6.5	7.0	6.8	8.0	8.8	8.4	540	1200	768	8.0	8.0	8.0	1.0	2.1	1.5	0.10	1.00	0.40	0.00	0.50	0.14	0	500	244	10	1600	793
1888	BHIMA RIVER AT CONFLUENCE OF JEWARGI TOWN SEWAGE DISPOSAL POINT	25	34	29	6.2	7.2	6.6	8.0	8.6	8.4	450	1220	717	12.0	12.0	12.0	1.0	2.0	1.5	0.10	0.80	0.30	0.00	0.50	0.08	0	1600	532	26	1600	652
1167	BHIMA AT D/S OF BDG. NEAR YADGIR,KARNATAKA	23	34	27	6.0	7.2	6.7	8.0	8.6	8.3	430	820	679	12.0	12.0	12.0	1.0	2.3	1.7	0.10	1.10	0.43	0.00	0.50	0.12	0	1600	783	33	1700	612

TABLE 15.3 :- WATER QUALITY OF RIVER GHATPRABHA, MALPRABHA, NIRA, TUNGBHADRA, TUNGA, BHADRA, MUSI, PALLERU, MUNERU, CHANDRABHAGA AND KAGINA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1185	GHATPRABHA AT D/S OF NUDHOL RD. CROSS BDG., KARNATAKA	25	36	29	5.2	7.6	6.3	6.5	8.0	7.5	320	950	638	4.0	4.0	4.0	0.5	1.8	1.3	3.90	24.2	11.3										80	500	330	500	1600	900
1163	GHATPRABHA AT W.A. POINT TO GOKAK TOWN,KARNATAKA	25	29	28	4.2	7.1	5.5	7.1	8.0	7.6	220	430	368	4.0	4.0	4.0	0.2	1.8	1.1	3.50	17.2	8.98	0.10	0.10	0.10							70	600	430	500	1600	1325
1187	MALPRABHA AT D/S OF KHANAPUR VILLAGE,KARNATAKA	19	27	24	4.8	6.6	5.8	7.0	7.6	7.3	150	440	263	8.1	8.1	8.1	0.2	1.6	1.1	1.60	4.30	3.38										200	1500	693	900	1600	1425
1164	MALPRABHA AT WATER ABSTR. PT. TO HUBLI,DHARWAR, KARNATAKA	24	30	26	4.5	7.6	6.2	7.1	7.7	7.5	200	310	248	4.0	4.0	4.0	0.2	1.8	1.0	1.20	5.70	3.10										80	1500	593	140	1600	620
1186	MALPRABHA AT D/S OF AIHOLE TOWN, KARNATAKA	24	34	28	6.3	6.9	6.7	6.8	8.0	7.5	380	690	558	8.1	8.1	8.1	1.0	1.8	1.3	2.70	12.7	7.63										100	900	700	1600	1600	1600
1463	NIRA AT SAROLE BDG.ON PUNE-BANGLORE HIGHWAY, MAHARASHTRA	24	30	27	5.7	7.7	6.6	7.3	8.8	7.9	60	283	135	16.0	16.0	16.0	2.8	9.6	6.0	0.10	1.60	0.56				0.00	4.80	1.55	6	225	39	120	900	357
38	TUNGHABHADRA AT HONNALI BRIDGE, KARNATAKA	24	27	26	7.0	7.4	7.2	6.8	7.9	7.3	170	360	237				0.7	16.5	3.6	0.10	0.60	0.23				0.00	0.20	0.16	23	50	38	30	70	51
1029	TUNGHABHADRA AT KARALAHALLI BRIDGE, KARNATAKA	24	32	26	7.3	8.9	8.0	6.8	8.9	7.8	109	680	309				0.6	6.0	2.0	0.10	0.60	0.25				0.10	0.50	0.23	23	50	36	30	60	46
29	TUNGHABHADRA AT ULLANUR, KARNATAKA	25	28	27	6.4	8.2	7.5	7.8	8.9	8.4	220	1030	727	16.0	16.0	16.0	0.6	3.8	2.1	0.10	1.00	0.47				0.00	0.50	0.20	0	1600	533	50	1700	1019
1785	TUNGABHADRA AT MANTHRALAYAM , KURNOOL DIST., A.P.	26	33	28	5.6	6.8	6.4	7.9	8.3	8.1	589	866	747	10.0	10.0	10.0	1.8	3.3	2.5	0.20	5.60	2.50	0.10	0.10	0.10				40	200	113	1600	9000	4600
1174	TUNGHABHADRA AT KURNOOL U/S, BAVAPURAM, A.P.	26	34	29	5.6	10.0	7.2	8.0	8.4	8.2	490	1586	1110	10.0	10.0	10.0	1.8	3.0	2.3	0.50	4.80	1.80	0.10	0.10	0.10				6	200	87	27	4800	2707
1168	TUNGHA AT D/S OF SHIMOGA TOWN, KARNATAKA	24	28	26	6.1	7.2	6.7	7.0	9.7	7.4	130	360	249				0.9	13.5	3.0	0.10	0.60	0.25				0.00	0.20	0.18	30	130	75	50	170	98
1896	CONFLUENCE POINT OF TUNGA AND BHADRA AT KUDLI	25	27	26	6.3	7.2	6.7	7.0	7.8	7.6	290	460	343				1.8	3.0	2.4	0.10	0.60	0.33				0.00	0.40	0.18	50	80	68	60	110	85
1091	BHADRA AT MALLESWARAM D/S OF KIOCL, KARNATAKA	14	27	23	6.1	7.5	6.7	6.6	7.6	7.2	48	98	78	40.0	40.0	40.0	1.0	2.0	1.2	0.04	2.80	0.49	0.10	0.40	0.20	0.00	3.00	0.66	250	400	321	1300	1800	1617
1387	BHADRA AT D/S OF BHADRAVATHI, KARNATAKA	24	27	26	4.6	7.1	5.8	6.7	7.5	7.2	200	530	348				1.4	22.5	5.0	0.10	0.90	0.32				0.00	0.30	0.18	90	350	239	140	500	335
1169	BHADRA AT D/S OF KIOCL ROAD BRIDGE, NEAR HOLEHUNNUR,KARNATAKA	23	28	26	5.6	7.1	6.4	6.2	7.9	7.2	200	430	278				1.0	13.5	3.4	0.10	0.60	0.27				0.00	0.20	0.17	50	240	137	70	300	178
1172	MUSI U/S AT HYDERABAD, A.P.	22	30	26	6.8	7.1	7.0	8.0	8.3	8.2	285	435	340	13.0	13.0	13.0	1.1	2.0	1.5	0.40	0.80	0.67	0.10	0.10	0.10				0	0	0	66	190	135
1173	MUSI D/S AT HYDERABAD, A.P.	20	30	26	0.0	2.6	1.0	6.8	8.0	7.6	956	1550	1331	94.0	94.0	94.0	15.0	51.0	21.4	3.50	39.5	9.54	0.10	1.50	0.70	15.0	15.0	15.0	72	550	289	1440	6500	3263
1178	PALLERU BEFORE CONFL. WITH KRISHNA, JAGGAYYAPET, A.P.	28	31	30	4.0	8.5	6.5	7.2	8.0	7.7	526	828	665	12.0	12.0	12.0	0.8	2.0	1.3	0.60	3.40	1.73	0.10	0.10	0.10				2	2	2	2200	5000	3038
1177	MUNERU BEFORE CONFL. WITH KRISHNA, NANDIGAMA, A.P.	27	30	29	4.2	8.6	6.6	7.5	8.1	7.8	502	772	645	16.0	16.0	16.0	1.0	1.8	1.3	0.20	0.90	0.58	0.10	0.10	0.10				2	4	2	2400	2800	2625
1911	CHANDRABHAGA U/S OF PANDHARPUR TOWN	24	25	24	4.9	6.7	5.8	7.2	8.2	7.7	397	1546	770	12.0	12.0	12.0	4.4	9.6	6.5	0.10	1.40	0.70				0.00	1.20	0.28	4	40	21	70	425	218
1912	CHANDRABHAGA D/S OF PANDHARPUR TOWN	23	25	24	4.7	6.4	5.8	7.3	8.2	7.7	404	1535	791	16.0	16.0	16.0	4.6	10.2	6.8	0.10	1.60	1.03				0.00	0.60	0.20	7	275	67	85	1600	430
1895	KAGINA D/S OF SEWAGE DISPOSAL POINT	27	32	30	5.8	6.8	6.3	7.8	8.5	8.2	510	620	580	19.0	19.0	19.0	1.9	3.2	2.4	0.10	0.30	0.18				0.10	0.50	0.35	0	500	210	220	1600	687

TABLE 16.1 : - WATER QUALITY OF RIVER PENNAR - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1255	PENNAR BEFORE CONFL.WITH CHITRAVATHI,TADPATRI,UNGANOOR,A.P.	27	30	28	3.8	6.8	5.3	7.2	8.7	7.8	816	1916	1434	10.0	10.0	10.0	0.5	2.4	1.5	1.10	14.0	9.13	0.10	0.10	0.10	1.00	1.00	1.00	2	63	22	21	2400	658
1256	PENNAR AFTER CONF. WITH PAPAGNI,PUSPAGINI,A.P.	22	31	26	3.1	7.2	4.6	7.3	8.6	8.1	607	1244	828	10.0	10.0	10.0	0.7	3.0	1.6	0.20	8.60	2.68	0.10	0.10	0.10				2	110	50	21	5000	2160
1257	PENNAR AFTER CONF. WITH CHEYYURU,SOMASILE,A.P.	28	31	31	3.6	7.8	6.2	7.0	7.8	7.5	250	1295	504	12.0	12.0	12.0	0.8	2.6	1.2	0.20	0.50	0.36	0.10	0.10	0.10				2	12	4	500	3000	2340
30	PENNAR AT SIDDVATA, NELLORE, A.P.	21	30	25	2.8	6.9	4.3	8.0	8.4	8.2	609	1379	974	10.0	10.0	10.0	0.6	3.0	1.6	0.40	7.60	3.58	0.10	0.10	0.10				4	110	52	14	5000	1886

TABLE 17.1 :- WATER QUALITY OF RIVER CAUVERY - 2007

CODE		TEMPERAT			D.O. (mg/l)			pH			CONDUCTIVITY			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - N (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1198	CAUVERY AT NAPOKULU BDG (D/S), KARNATAKA	19	30	25	4.5	8.3	7.1	6.8	8.6	7.5	28	100	58	23.0	23.0	23.0	1.0	1.0	1.0	0.10	0.80	0.30									11	350	82	1600	1600	1600
1195	CAUVERY AT KUSHAL NAGAR U/S (NEAR BACHANAHALLI), KARNATAKA	21	29	26	6.5	8.4	7.6	7.1	8.6	7.7	50	140	95	38.0	38.0	38.0	1.0	2.0	1.2	0.10	3.30	0.60									15	120	45	1600	1600	1600
33	CAUVERY AT KRS DAM,BALAMURIKSHETRA,KARNATAKA	23	29	26	4.0	12.0	8.6	6.5	8.6	8.0	68	360	236	12.0	12.0	12.0	1.0	2.0	1.1	0.10	0.80	0.40									8	240	50	48	1600	930
1386	CAUVERY AT D/S OF KAREKUARA VILLAGE, KARNATAKA	25	30	27	6.3	12.4	9.1	7.9	8.6	8.3	82	390	253	28.0	28.0	28.0	1.0	1.0	1.0	0.10	0.70	0.40									4	240	66	48	1600	1046
1171	CAUVERY AT SRI RANGAPATTANNA,D/S OF ROAD BDG.,KARNATAKA	25	30	27	3.1	12.0	8.6	7.8	8.8	8.2	88	400	266	28.0	28.0	28.0	1.0	2.0	1.3	0.10	1.20	0.50									14	280	79	1600	1600	1600
34	CAUVERY AT SATHYAGALAM BRIDGE, KARNATAKA	26	30	29	6.7	14.0	9.0	7.7	8.7	8.2	159	410	308	45.0	45.0	45.0	1.0	2.0	1.1	0.20	1.20	0.60									6	79	26	110	1600	825.45
50	CAUVERY AT METTUR, TAMIL NADU	24	30	27	4.1	8.4	6.2	7.1	8.7	7.8	272	1257	465	8.0	8.0	8.0	0.2	3.0	1.3	0.10	1.00	0.30	0.10	1.00	0.20	5.00	5.00	5.00	70	2200	453	90	2800	673
1322	CAUVERY AT 1KM. D/S OF BHAVANI RIVER CONFL., TAMILNADU	27	31	29	2.4	8.7	6.7	6.9	8.2	7.7	230	711	451	8.0	8.0	8.0	0.3	6.0	1.5	0.10	0.50	0.20	0.10	0.20	0.10	5.00	5.00	5.00	110	5000	1453	270	9000	2194
51	CAUVERY AT PALLIPPALAYAM, TAMIL NADU	26	30	27	3.8	7.8	5.8	7.3	8.6	7.9	237	610	431	8.0	8.0	8.0	0.6	3.0	1.5	0.10	0.40	0.20	0.01	0.10	0.10	5.00	5.00	5.00	140	2800	794	260	3500	1303
1320	CAUVERY AT ERODE NEAR CHIRAPALAYAM, TAMILNADU	28	31	30	0.0	7.8	2.8	7.0	7.9	7.5	276	1835	869	56.0	56.0	56.0	0.8	38.0	13.0	0.10	1.10	0.30	0.10	0.20	0.10	5.00	5.00	5.00	500	17000	4733	800	28000	10375
1323	CAUVERY AT VELORE NEAR KATTIPALAYAM, TAMILNADU	26	31	29	4.3	8.4	7.3	7.3	8.6	8.0	270	916	521	8.0	8.0	8.0	0.3	2.0	0.8	0.10	0.40	0.20	0.10	0.10	0.10	5.00	5.00	5.00	60	1100	398	120	1700	700
1324	CAUVERY AT MOHANUR NEAR PATTAIPALAYAM, TAMILNADU	24	30	28	5.7	8.6	7.2	7.1	8.5	7.9	254	988	530	8.0	8.0	8.0	0.2	2.0	0.9	0.10	1.20	0.30	0.10	0.10	0.10	5.00	5.00	5.00	140	1100	468	170	1400	672
1451	CAUVERY AT THIRUMUKKUDAL-CONFL. PT.OF R. AMRAVATI,TAMILNADU	30	31	30	6.7	8.2	7.6	7.8	8.5	8.2	360	940	622	8.0	8.0	8.0	0.6	2.0	1.2	0.10	0.25	0.20	0.10	0.10	0.10	5.00	5.00	5.00	20	270	160	40	330	223
31	CAUVERY AT MUSIRI, TAMIL NADU	30	32	31	6.8	8.4	7.7	7.4	8.3	7.9	342	970	641	8.0	8.0	8.0	0.5	2.0	1.3	0.10	0.33	0.20	0.10	0.10	0.10	5.00	5.00	5.00	40	2200	648	140	2800	863
1202	CAUVERY AT TIRUCHIRAPPALLI U/S, TAMILNADU	30	32	31	6.9	8.3	7.7	7.4	8.5	8.1	306	890	578	8.0	8.0	8.0	0.7	2.0	1.2	0.10	0.19	0.10	0.10	0.10	0.10	5.00	5.00	5.00	90	1700	713	140	2800	1260
1325	CAUVERY AT TIRUCHIRAPPALLI D/S, TAMILNADU	30	31	30	6.6	7.8	7.0	7.4	8.3	7.9	420	1104	753	8.0	8.0	8.0	0.1	6.0	2.3	0.10	0.30	0.20	0.10	0.10	0.10	5.00	5.00	5.00	140	2200	1188	270	3500	1768
1203	CAUVERY AT TRICHY,GRAND ANAICUT, TAMILNADU	21	31	28	5.5	8.2	7.3	6.9	8.8	7.9	420	1370	828	16.0	16.0	16.0	0.5	5.0	1.8	0.10	0.40	0.20	0.10	0.10	0.10	5.00	5.00	5.00	60	2800	708	120	3500	1082
1206	CAUVERY AT THANJAVUR, TAMILNADU	23	28	26	7.2	8.2	7.7	7.5	8.3	7.8	300	601	414				0.2	1.0	0.5	0.10	0.10	0.10	0.10	0.10	0.10				40	800	323	90	1100	453
1326	CAUVERY AT COLEROON, TAMILNADU	24	32	29	6.7	8.8	7.8	7.5	8.6	7.9	449	56500	10120	16.0	16.0	16.0	0.3	3.0	1.3	0.10	0.30	0.10	0.10	0.30	0.10				70	800	281	80	2800	670
1327	CAUVERY AT PITCHAVARAM, TAMILNADU	25	31	29	1.8	8.6	5.9	6.8	8.3	7.6	460	55500	7917	16.0	16.0	16.0	0.1	2.0	1.0	0.10	0.90	0.20	0.10	0.10	0.10	5.00	5.00	5.00	90	3500	689	140	16000	1959

TABLE 17.2 :- WATER QUALITY OF RIVER YAGACHI, HEMAVATI, SHIMSA, AKRAVATI, LAKSHMANTIRTHA, KABBANI, BHAVANI AND AMRAVATI -2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1893	YAGACHI RIVER NEAR PUMPING STATION. HASSAN CITY	24	27	26	7.1	7.4	7.2	7.0	7.7	7.3	280	550	395	64.0	64.0	64.0	1.0	3.0	1.5	0.30	0.80	0.60				0.10	0.40	0.27	150	250	188	500	1400	825
1196	HEMAVATI AT D/S OF HOLENARASIPURA TOWN AT RAMADEVALA WEIR	23	27	26	6.8	7.1	7.0	7.3	8.0	7.5	300	360	335	120	120	120	1.0	3.0	2.0	0.20	0.60	0.40				0.10	0.70	0.40	300	350	313	1500	1800	1688
1200	SHIMSHA AT D/S OF HIGHWAY BRIDGE, YEDIYAR, KARNATAKA	23	26	25	5.6	9.2	7.7	7.0	8.4	7.6	100	400	267	13.0	13.0	13.0	2.0	3.0	2.7	0.50	2.40	1.50				2.20	2.20	2.20	110	1600	643	900	1600	1367
1166	SHIMSHA AT D/S OF BRIDGE, HALAGUR, KARNATAKA	26	29	27	4.4	10.0	7.4	7.7	8.4	8.1	402	690	578	48.0	48.0	48.0	1.0	2.0	1.3	0.20	0.80	0.50							13	40	24	540	1600	1335
1165	ARKAVATHI AT D/S OF KANAKAPURA TOWN, KARNATAKA	27	30	29	5.0	9.0	7.0	7.2	8.4	7.8	300	1000	675				2.0	5.0	3.5	1.20	8.50	4.10	1.10	2.80	2.00				33	300	146	900	1600	1367
1196	LAKSHMANTIRTHA AT D/S OF HUNSUR TOWN, KARNATAKA	21	27	25	0.0	8.3	5.5	6.9	8.4	7.5	28	951	401	61.0	61.0	61.0	1.0	10.0	3.2	0.30	1.80	0.80				0.20	0.20	0.20	21	240	105	1600	1600	1600
1207	KABBANI AT MUTHANKARA, KERALA	27	29	27	5.6	7.0	6.5	6.2	6.9	6.7	53	132	86	6.0	6.0	6.0	0.4	0.9	0.6	0.10	0.50	0.30	0.10	0.10	0.10				120	1100	530	300	2200	1175
1197	KABBANI AT SARAGUR VILLAGE D/S, KARNATAKA	25	27	26	6.6	10.0	7.8	6.6	7.7	7.2	76	207	126	42.0	42.0	42.0	1.0	1.0	1.0	0.20	0.70	0.40							24	48	38	1600	1600	1600
41	KABBANI AT CAUSE WAY SATTUR, KARNATAKA	25	31	28	7.3	10.0	8.7	7.6	8.3	7.9	61	550	267	15.0	15.0	15.0	1.0	1.0	1.0	0.40	1.80	0.90							12	40	26	150	1600	925
1445	KABBANI AT WATER INTAKE OF KIADB AT NANJANGUD,KARNATAKA	26	33	28	5.3	12.2	8.4	7.2	8.4	7.8	95	410	220	8.0	8.0	8.0	1.0	1.0	1.0	0.20	0.90	0.50							70	540	190	920	1600	1430
1208	BHAVANI AT ELACHIVAZHY, KERALA	26	29	27	6.9	7.0	6.9	7.1	7.6	7.4	38	248	141	8.0	8.0	8.0	0.4	0.9	0.6	0.10	0.60	0.20	0.10	0.10	0.10				100	170	133	280	600	370
1201	BHAVANI AT PATHIRAKALIAMMAN KOIL, TAMILNADU	29	33	31	7.1	8.2	7.7	6.9	8.7	7.7	70	298	147				0.2	1.8	0.7	0.10	1.00	0.40	0.10	0.10	0.10				110	800	278	170	1700	476
1204	BHAVANI AT SIRUMUGAI,TAMILNADU	27	33	30	6.2	7.9	7.4	6.9	8.4	7.5	65	220	139	8.0	8.0	8.0	0.1	3.0	1.0	0.10	0.40	0.20	0.00	0.10	0.10	5.00	5.00	5.00	20	330	187	40	2800	506
1321	BHAVANI AT BHAVANI SAGAR, TAMILNADU	25	32	29	2.8	7.8	6.2	6.8	7.9	7.2	79	212	157	16.0	16.0	16.0	0.4	4.0	1.3	0.10	0.40	0.10	0.10	0.10	0.10	5.00	5.00	5.00	170	2800	930	330	3500	1545
1319	AMRAVATI AT 1KM D/S FROM EFF.DIS. PT. AT MADHUTHUKKULAM,TAMILNADU	26	30	28	7.6	8.7	8.0	7.0	8.1	7.5	73	490	170				0.2	1.6	0.9	0.10	0.40	0.20	0.10	0.10	0.10				110	500	241	220	700	366
1205	BHAVANI AT BHAVANI. TAMILNADU	27	31	29	4.4	8.5	6.8	7.1	8.0	7.6	172	612	427	8.0	8.0	8.0	0.4	4.0	1.4	0.10	0.40	0.10	0.10	0.10	0.10	5.00	5.00	5.00	140	3300	1224	220	22000	3408

TABLE 18.1 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN GUJARAT & DAMAN - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1393	DAMANGANGA AT D/S OF MADHUBAN, DAMAN							7.3	7.8	7.6	190	330	253							1.10	5.70	2.77				3.10	9.90	5.33						
1150	DAMANGANGA AT KACHIGAON U/S AT GIDC WIER,GUJARAT	20	27	25	6.8	7.2	7.0	7.3	8.1	7.7	171	2041	448	12.0	12.0	12.0	0.3	1.1	0.4	0.10	0.32	0.16				1.40	1.40	1.40	11	30	17	27	60	42
1246	DAMANGANGA AT KACHIGAON D/S (DAMAN),GUJARAT	22	28	25	3.1	7.1	4.8	7.1	7.9	7.5	10000	30000	20360	80.0	80.0	80.0	0.8	16	8.8	0.10	0.32	0.22				11.2	11.2	11.2	17	30	23	34	90	65
1860	BALEHWAR KHADI AT N.H. NO. 8	23	30	27	3.2	6.7	4.9	7.5	8.2	7.7	308	1900	904	10.0	10.0	10.0	2.9	4.7	3.6				0.30	1.90	0.85	0.30	1.10	0.70	7500	24000	13950	15,000	46,000	32,750
1861	RIVER PURNA ON BRIDGE AT SURAT-NAVSARI HIGHWAY	23	31	28	6.0	7.0	6.4	7.8	8.4	8.0	222	755	477	7.0	7.0	7.0	1.0	3.9	2.4				0.20	1.50	0.75	0.30	0.80	0.57	2800	24000	12325	9,300	46,000	22,825
1862	RIVER KAVERI ON BRIDGE AT BILLIMORA-VALSAD ROAD	23	34	29	6.1	7.0	6.7	7.6	8.3	7.9	202	32000	14111	18.0	18.0	18.0	1.3	3.6	2.9				0.20	1.00	0.60	0.30	0.60	0.50	9300	15000	10725	15,000	24,000	21,000
1865	RIVER DHADHAR AT KOTHWADA	26	30	28	4.0	6.7	5.7	7.3	8.3	7.6	224	1481	868	46.0	46.0	46.0	2.2	6.3	4.2	0.09	0.94	0.41				4.48	4.48	4.48	2	9	5	15	93	57
1148	AMBIKA AT BILIMORA, GUJARAT	27	33	30	5.0	7.0	6.2	7.6	8.4	8.0	213	2720	899	18.0	18.0	18.0	1.3	4.7	3.1				0.10	0.70	0.33	0.30	1.10	0.63	7500	15000	10275	15,000	21,000	16,500
1149	KOLAK AT PATALIA BDG., GUJARAT	24	27	26	2.8	6.8	4.8	7.4	7.8	7.6	477	41700	14426	93.0	93.0	93.0	1.0	19.0	10.4	0.10	0.15	0.14				3.92	3.92	3.92	22	40	32	70	220	148
1435	KOLAK AT RAILWAY BRIDGE NO. 313 VAPI,VALSAD, GUJARAT	26	27	27	5.3	7.3	6.2	7.1	7.8	7.4	14200	43380	29920	49.0	49.0	49.0	0.8	8.0	3.6	0.14	0.30	0.18				2.24	2.24	2.24	11	21	14	30	60	41
1434	AMLAKHADI AT ANKLESHWAR	26	28	27				7.3	7.9	7.5	316	9470	5414	1750	1750	1750	73.0	522	359	0.05	0.13	0.11				258	258	258	2	4	3	4	28	14
1438	MINDHOLA AT STATE HIGHWAY BRIDGE SACHIN, GUJARAT	23	30	27	2.5	6.5	4.2	7.6	8.2	7.8	276	865	589	11.0	11.0	11.0	3.2	5.3	4.0				0.50	1.30	0.80	0.60	0.80	0.68	9300	46000	23575	21,000	110,000	50,250

TABLE 18.2 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN GOA & MAHARASHTRA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1399	ZUARI AT D/S OF PT. WHERE KUMBARJRIA CANAL JOINS, GOA	26	33	30	5.2	8.6	6.8	6.4	8.1	7.5	380	26090	2870	2.4	40.0	11.8	0.5	5.1	2.5	0.01	0.25	0.11	0.01	0.05	0.03	0.00	0.11	0.05	2	3500	582	5	5400	1114
1475	ZUARI AT PANCHAWADI	28	32	29	4.6	7.8	6.5	6.4	7.8	6.9	220	10050	1690	1.6	24.0	7.4	0.6	3.4	1.5	0.02	0.33	0.12	0.01	0.1	0.05	0.00	0.10	0.03	5	2800	555	8	9200	1331
1476	MANDOVI AT TONCA, MARCELA, GOA	27	34	29	4.9	8.5	6.5	6.6	7.6	7.1	330	28210	3110	2.0	9.2	5.8	0.0	3.3	1.6	0.04	0.15	0.09	0.01	0.05	0.03	0.01	0.08	0.03	130	3500	1243	170	5400	2056
1400	MANDOVI AT NEGHBOURHOOD OF PANAJI, GOA	27	34	29	4.6	7.5	6.4	7.4	8.1	7.7	23000	63000	44000	3.2	47.6	14.1	0.8	4.9	2.3	0.01	0.33	0.08	0.01	0.05	0.03	0.01	0.20	0.06	0	3500	814	0	5400	1287

1543	RIVER KALNA AT CHANDEL-PERNEM, GOA	25	31	27	5.7	7.8	7.2	6.7	7.5	7.2	44	87	70	2.4	10.7	4.7	0.4	3.4	1.6	0.03	0.15	0.07	0.01	0.05	0.03	0.00	0.13	0.04	8	9200	1554	33	16000	2887
1544	RIVER VALVANT AT SANKLI - BICHOLIM, GOA	25	32	28	6.7	8.1	7.2	6.3	7.9	6.8	41	87	60	2.0	5.9	4.2	0.5	5	2.1	0.06	0.19	0.13	0.01	0.05	0.04	0.00	0.08	0.03	540	16000	5778	920	24000	10403
1545	RIVER MADAI AT DABOS - VALPOI, GOA	25	34	28	6.2	8.5	7.4	6.4	7.9	7.1	44	124	80	2.0	10.8	4.5	0.8	2.6	1.4	0.02	0.12	0.05	0.05	0.05	0.05	0.00	0.06	0.02	2	1300	475	5	3500	1010
1546	RIVER KHANDEPAR AT OPA - PONDA, GOA	26	33	28	6.2	7.6	7.2	6.1	7.6	6.9	36	173	80	2.4	12.0	5.3	0.4	4.1	1.3	0.04	0.18	0.11	0.01	0.05	0.04	0.00	0.18	0.03	13	9200	1009	17	16000	1938
1547	RIVER TALPONA AT CANACONA, GOA	27	34	29	6.5	8.3	7.4	6.1	8.0	7.0	46	106	66	2.0	8.7	4.1	0.1	4.1	2	0.01	0.2	0.06	0.01	0.05	0.04	0.00	0.07	0.03	17	3500	700	27	9200	1451
1548	RIVER ASSONORA AT ASSONORA, GOA	25	32	28	5.2	7.2	6.3	6.2	7.5	6.6	45	95	66	2.4	7.2	4.5	0.5	3.1	1.6	0.04	0.25	0.13	0.01	0.05	0.04	0.00	0.05	0.02	70	5400	1427	79	9200	3293
1093	ULHAS AT U/S OF NRC BUND AT MOHANE, MAHARASHTRA	22	32	26	5.0	7.3	6.4	6.6	7.7	7.3	66	135	103	20.0	20.0	20.0	3.0	6.0	4.0	0.10	0.50	0.24				0.00	0.30	0.04	8	350	126	70	1600	753
1094	ULHAS AT U/S OF BADLAPUR, MAHARASHTRA	22	32	27	6.2	7.3	6.7	6.7	7.7	7.4	64	145	103	16.0	16.0	16.0	3.0	5.0	3.9	0.10	0.40	0.22				0.00	0.70	0.15	7	110	64	80	1600	644
1461	BHATSA AT D/S OF PISE DAM NEAR PISE VILLAGE (ULHAS), MAHARASHTRA	22	33	28	6.1	7.0	6.6	7.3	7.8	7.5	81	113	97	12.0	12.0	12.0	3.0	4.2	3.7	0.10	0.60	0.25				0.00	0.90	0.28	8	25	16	50	225	169
1092	KALU AT ATALE VILLAGE, MAHARASHTRA	23	33	28	4.8	6.7	5.7	6.9	7.4	7.2	184	1269	531	24.0	24.0	24.0	4.0	7.5	5.3	0.10	1.50	0.75				0.00	0.50	0.28	80	175	116	225	900	456
1462	PATALGANGA NEAR INTAKE OF MIDC W/W, MAHARASHTRA	20	30	25	5.5	7.0	6.4	6.5	7.8	7.1	56	183	113	24.0	24.0	24.0	3.0	5.0	3.9	0.10	0.80	0.47				0.00	0.50	0.21	30	140	60	175	900	400
1151	PATALGANGA AT SHILPHATA, MAHARASHTRA	20	31	25	5.8	7.2	6.6	6.5	7.6	7.2	56	185	88	24.0	24.0	24.0	3.4	5.0	3.9	0.10	1.40	0.45				0.00	0.90	0.19	130	350	228	350	1800	1146
1152	KUNDALIKA AT ROHA CITY, MAHARASHTRA	19	28	22	5.6	7.3	6.2	6.9	8.1	7.3	104	129	117	24.0	24.0	24.0	3.2	5.0	4.0	0.20	1.20	0.50				0.00	1.00	0.30	130	275	169	550	900	638

TABLE 18.3 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN KERALA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
17	PERIYAR NEAR ALWAYE-ELOOR, KERALA	25	31	28	2.7	7.7	5.5	6.3	6.9	6.6	45	4000	1314	6.4	6.4	6.4	0.5	2.8	1.7	0.10	0.90	0.36	0.05	0.10	0.09				50	750	290	160	1360	668
18	PERIYAR AT KALADY, KERALA	25	29	27	7.0	8.0	7.5	6.5	7.0	6.8	21	52	32	3.2	3.2	3.2	0.2	1.9	0.8	0.10	0.50	0.25	0.10	0.10	0.10				40	560	200	250	1820	738
1338	PERIYAR AT SEWAGE DISCHARGE POINT, KERALA	24	31	28	5.0	7.6	6.7	6.4	7.4	6.8	31	66	42	4.0	4.0	4.0	0.3	1.6	1.0	0.10	0.90	0.35	0.05	0.10	0.09				50	750	230	130	2640	804
20	CHALIYAR AT KOOLIMADU, KERALA	27	29	28	6.0	7.4	6.9	5.8	7.3	6.7	32	118	73	4.0	4.0	4.0	0.4	0.6	0.5	0.10	0.40	0.24	0.10	0.10	0.10				60	1700	688	500	2400	1242
21	CHALIYAR AT CHUNGAPALLY, KERALA	27	29	28	5.6	7.4	6.8	6.1	7.6	6.9	53	36000	7920	16.0	16.0	16.0	0.4	0.9	0.5	0.10	0.40	0.21	0.10	0.10	0.10	0.20	0.20	0.20	40	1000	391	450	1700	813
42	KALLADA AT PERUMTHOTTAMKADAVU, PUNALOOR, KERALA	26	30	29	6.1	8.0	7.4	6.9	7.4	7.2	39	63	49	12.0	12.0	12.0	0.8	1.4	1.1	0.10	0.70	0.32	0.10	0.10	0.10				70	800	327	140	2000	641
43	MUVATTAPUZHA AT VETTIKKATTUMUKKU, KERALA	26	30	28	6.7	7.7	7.2	6.3	7.1	6.8	38	112	58	6.4	6.4	6.4	0.9	3.6	1.5	0.10	0.50	0.32	0.10	0.10	0.10				20	530	173	120	1040	556
1154	CHALAKUDY AT PULICKALKA-DAVU, KERALA	27	31	29	5.1	8.4	6.8	6.1	7.5	6.6	45	280	115	8.0	8.0	8.0	0.6	3.0	2.0	0.10	1.50	0.47	0.10	0.10	0.10				40	570	148	180	1780	635
1155	KARAMANA AT MOONNATTUMUKKU, KERALA	26	31	28	0.0	3.2	0.8	6.0	7.7	6.8	228	9300	2156	72.0	72.0	72.0	2.1	13.2	7.4	0.10	3.50	1.03	0.10	1.80	0.40				3000	31000	14825	5000	39000	20733
1156	PAMBA AT CHENGANNUR, KERALA	25	27	26	6.3	7.6	7.1	5.5	6.5	6.1	24	45	34	8.2	8.2	8.2	0.3	0.9	0.6	0.20	0.70	0.53	0.10	0.20	0.15				1100	1600	1300	1400	2500	1975
1341	PAMBA AT THAKAZHY, KERALA	25	27	26	5.2	6.3	5.9	5.7	6.5	6.2	32	80	52	5.0	5.0	5.0	0.4	0.8	0.5	0.20	1.30	0.55	0.10	0.10	0.10				900	1300	1100	1400	2200	1775
1565	PAMBA DOWN, KERALA	26	27	26	3.7	6.6	5.1	5.6	6.5	6.2	37	88	55	5.2	5.2	5.2	0.8	1.5	1.1	0.30	0.50	0.43	0.10	0.10	0.10				900	1600	1275	1200	2800	2000
1336	MEENACHIL AT KIDANGOOR, KERALA	25	27	26	5.6	7.5	6.7	5.7	6.5	6.2	25	76	43	10.0	10.0	10.0	0.4	1.2	0.7	0.30	0.60	0.43	0.10	0.10	0.10				1100	1700	1325	1400	2800	2100
1340	MANIMALA AT KALLOOPARA, KERALA	25	27	26	0.6	7.6	5.8	5.6	6.7	6.2	31	40	34	5.2	5.2	5.2	0.3	1.0	0.6	0.10	0.50	0.33	0.10	0.10	0.10				800	1100	975	1300	2200	1625
1384	MANIMALA AT THONDRA, KERALA	26	27	26	5.4	7.2	6.4	5.8	6.5	6.2	29	49	39	6.8	6.8	6.8	0.2	1.2	0.7	0.20	0.50	0.38	0.10	0.10	0.10				800	2200	1375	1600	2400	1900
1342	ACHENKOIL AT THUMPAMON, KERALA	25	27	26	5.2	7.4	6.6	5.9	6.7	6.3	33	58	41	5.3	5.3	5.3	0.3	0.7	0.6	0.20	0.40	0.28	0.10	0.10	0.10				600	1400	1033	800	1800	1442
1443	ACHENKOIL AT CHENNITHULA, KERALA	26	28	26	4.8	5.8	5.4	5.6	6.6	6.2	41	54	47	5.0	5.0	5.0	0.4	1.1	0.7	0.30	0.60	0.50	0.10	0.10	0.10				1100	1400	1250	1600	2200	1825
1442	VAMANAPURAM, KERALA	27	30	28	5.9	7.4	6.7	6.6	6.8	6.7	47	140	80	16.0	16.0	16.0	0.2	2.4	1.3	0.10	0.90	0.50	0.10	0.10	0.10				20	4500	1655	100	9000	3050
1563	AMARAVILA, KERALA	27	28	27	6.0	7.1	6.4	6.4	7.3	7.0	80	170	112	16.0	16.0	16.0	0.1	3.5	1.4	0.10	1.70	0.73	0.10	0.50	0.23				2200	6200	3850	2400	9000	5725
1564	AYUR, KERALA	28	30	29	4.0	7.3	6.3	6.9	7.4	7.1	52	148	83	16.0	16.0	16.0	0.7	1.3	1.0	0.10	0.60	0.35	0.10	0.10	0.10				60	1800	643	100	2400	1080
1566	THIRURANGADY, KERALA	28	28	28	4.8	6.7	6.2	6.1	6.6	6.5	68	124	95	10.0	10.0	10.0	0.6	1.0	0.8	0.10	3.90	1.20	0.10	0.10	0.10				600	1700	1075	2400	3000	2550
1567	KUTTIYADY ESTATE, KERALA	27	29	28	6.3	7.1	6.9	6.1	6.7	6.4	27	80	41	4.0	4.0	4.0	0.4	0.6	0.5	0.10	0.30	0.17	0.10	0.10	0.10				0	210	83	110	600	285
1568	VALAYAM, KERALA	27	29	27	6.5	7.0	6.8	5.8	6.9	6.5	38	72	51	4.0	4.0	4.0	0.3	0.7	0.5	0.10	0.30	0.17	0.10	0.10	0.10				60	120	98	240	600	435
1569	THALIPARAMBA, KERALA	26	33	28	5.1	8.0	6.6	6.3	7.4	6.9	84	34300	11654	19.0	19.0	19.0	0.5	0.9	0.7	0.10	0.40	0.29	0.05	0.10	0.08	0.20	0.20	0.20	0	600	338	100	1500	963
1570	HOSDURG, KERALA	26	33	28	6.1	7.9	7.0	6.4	8.0	7.2	110	37600	11962	16.0	16.0	16.0	0.1	0.5	0.3	0.20	0.40	0.28	0.10	0.10	0.10	0.10	0.10	0.10	20	100	68	400	640	550
1571	KAKKADAVU, KERALA	26	33	28	6.8	8.2	7.5	6.7	7.1	6.9	41	69	52	4.0	4.0	4.0	0.1	0.8	0.5	0.10	0.30	0.17	0.10	0.10	0.10				20	250	138	40	1100	685
1572	PADIYATHADIKA, KERALA	26	33	28	6.8	8.0	7.4	6.5	7.2	6.8	40	137	68	4.0	4.0	4.0	0.2	0.4	0.3	0.10	0.50	0.23	0.10	0.10	0.10				40	300	160	60	1020	725
1573	RUMPANAM, KERALA	27	31	29	2.2	3.6	2.8	6.3	6.9	6.6	94	3100	1239	9.6	9.6	9.6	0.9	3.6	2.3	0.10	2.20	0.63	0.10	0.10	0.10				60	540	263	160	1240	645

TABLE 18.4 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN ANDHRA PRADESH, ORISSA, PONDICHERRY, TAMILNADU & KARNATAKA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1448	NAGAVALLI AT THOTAPALLI REGULATOR, A.P.	26	31	28	5.9	6.8	6.2	7.1	7.8	7.6	284	586	380	4.0	4.0	4.0	0.2	0.8	0.5	0.30	0.70	0.50	0.10	0.10	0.10	0.50	1.20	0.70	0	2600	1318	12000	35000	24583
1455	RUSHIKULYA AT GANJAM U/S, ORISSA	29	33	30	7.7	8.0	7.9	7.6	8.2	7.9	289	458	382	12.0	22.0	16.9	1.6	2.8	2.1	0.11	0.30	0.21				0.34	1.12	0.77	490	1700	993	2200	3500	2700
1456	RUSHIKULYA AT GANJAM D/S, ORISSA	27	29	28	7.0	9.6	8.1	7.8	8.2	8.0	3790	42900	21030	17.5	22.0	20.2	1.4	2.0	1.7	0.40	0.63	0.51				0.67	0.84	0.78	78	230	146	230	700	463
1642	NAGAVALLI AT JAYKAYPUR D/S, ORISSA	28	32	30	7.0	7.4	7.2	7.1	8.2	7.7	181	312	244	15.2	24.0	19.7	0.7	1.8	1.2	0.28	0.80	0.51				0.84	1.4	1.12	450	1700	980	780	3500	1793
1643	NAGAVALLI AT RAYAGADA D/S, ORISSA	28	35	32	6.2	7.2	6.7	6.7	8.0	7.6	200	263	231	18.0	28.5	21.5	0.8	1.9	1.5	0.37	0.77	0.56				0.78	1.12	1.01	780	2300	1460	2200	4900	3133
1685	ARASALAR RIVER KARAIKAL REGION, PONDICHERRY	26	30	29	6.1	7.6	7.0	7.8	8.4	8.1	395	966	637	65.0	65.0	65.0	0.0	7.0	3.5	0.10	2.30	1.20	0.10	0.10	0.10	0.20	1.00	0.60						
1159	TAMBIRAPARANI AT PAPAVINASAM,TAMILNADU	23	28	26	7.2	7.9	7.5	6.2	6.8	6.5	55	74	65	32.0	32.0	32.0	0.6	1.2	1.0	0.08	0.20	0.15	0.10	0.10	0.10	1.12	1.12	1.12	10	280	108	35	820	319
1160	TAMBIRAPARANI AT CHERANMADEVI,CAUSE WAY,TAMILNADU	26	31	28	6.6	6.9	6.8	6.1	6.9	6.5	57	118	88	16.0	16.0	16.0	0.6	1.0	0.9	0.06	0.20	0.11	0.10	0.10	0.10	0.56	0.56	0.56	35	140	111	63	350	233
1161	TAMBIRAPARANI AT TIRUNELVELI,COLLECTORATE,TAMILNADU	26	32	29	6.1	8.2	6.8	6.1	7.0	6.5	88	178	128	24.0	24.0	24.0	1.0	3.3	1.8	0.08	0.30	0.15	0.10	0.10	0.10	1.12	1.12	1.12	11	690	295	29	900	507
1162	TAMBIRAPARANI AT MURAPPANADU, TAMILNADU	31	33	32	7.3	8.8	7.8	6.6	7.6	7.2	82	542	250	144	144	144	0.7	3.4	1.9	0.09	0.20	0.15	0.10	0.10	0.10	0.56	0.56	0.56	10	360	128	35	900	249
1328	TAMBIRAPARANI AT PAPPANKULAM,TAMILNADU	25	29	28	6.2	7.8	7.2	6.0	6.8	6.4	47	94	71	40.0	40.0	40.0	0.6	1.7	1.2	0.07	0.20	0.12	0.10	0.10	0.10	0.56	0.56	0.56	10	150	67	24	350	165
1329	TAMBIRAPARANI AT RAIL BDG. NR. AMBASAMUDAM, TAMILNADU	23	30	27	7.0	8.0	7.4	6.1	6.8	6.5	56	91	71	16.0	16.0	16.0	0.6	6.0	1.5	0.03	0.20	0.12	0.10	0.10	0.10	0.56	0.56	0.56	15	350	98	55	500	189
1330	TAMBIRAPARANI AT ARUMUGANERI, TAMILNADU	29	32	31	6.5	8.3	7.6	6.8	7.4	7.1	100	694	428	40.0	40.0	40.0	1.2	4.7	2.5	0.09	0.20	0.15	0.10	0.10	0.10	0.56	0.56	0.56	35	500	226	80	900	443
1450	PALAR AT VANIYAMBADI WATER SUPPLY HEAD WORK, TAMILNADU	25	32	28	5.7	7.3	6.8	6.7	7.8	7.2	723	917	856	16.0	16.0	16.0	0.5	4.0	2.1	0.10	0.80	0.32	0.10	0.20	0.11	2.20	2.20	2.20	30	500	213	50	800	348
1444	KALI AT D/S WEST COAST PAPER MILL, KARNATAKA	25	30	27	6.9	7.8	7.3	7.1	7.4	7.3	53	296	152	8.0	8.0	8.0	1.0	3.0	2.0	0.60	1.80	1.28	0.10	0.10	0.10				80	550	333	140	1800	998
1894	KUMARADHARA - U/S OF UPPINAGADY TOWN B/C WITH RIVER NETHRAVATHI	26	32	28	6.5	7.2	6.9	6.9	7.6	7.2	46	90	58	1.1	1.1	1.1	1.0	1.0	1.0										7	25	14	2	170	55
1892	NETRAVATHI U/S OF DHARMASTALA AT WATER SUPPLY INTAKE POINT	26	35	29	6.5	7.0	7.0	6.8	7.5	7.2	30	80	56	1.2	1.2	1.2	1.0	1.0	1.0							0.00	0.00	0.00	2	8	4	4	30	16.5

TABLE 18.5 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN HIMACHAL PRADESH PUNJAB, HARYANA, CHANDIGARH & RAJASTHAN - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1871	RIVER MARKANDA AT PAONTA, DISTT. SIRMOUR, H.P.	15	30	22	7.0	8.0	7.9	7.5	8.2	7.9	128	520	385	22.4	22.0	22.4	0.2	8.2	2.5	0.10	0.40	0.25				2.20	2.20	2.20	6	18	11	12	32	24
1884	KALA AMB D/S MARKANDA RIVER	10	23	18	1.0	5.7	3.9	7.8	8.2	7.9	1053	4260	2422	200	200	200	4.5	218	74.8	0.10	1.50	0.78				0.00	3.30	1.70						
1870	RIVER SUKHANA AT PARWANOO, DISTT. SOLAN, H.P.	12	30	24	3.0	6.0	4.9	6.5	8.1	7.6	612	1361	972				6.8	36.0	19.6	1.20	2.90	1.80				11.0	11.0	10.7	90	630	328	200	1600	718
1023	GHAGGAR AT MUBARAKPUR REST HOUSE (PATIALA), PUNJAB	12	24	20	7.0	8.0	7.4	7.4	7.6	7.5	276	530	413	4.6	12.0	8.8	0.8	3.4	2.1	0.70	1.60	1.23	0.20	0.80	0.60	1.00	1.00	1.00	350	2300	1663	1100	17000	10775
1024	GHAGGAR AT 100M D/S CONF. WITH R. SARASWATI (PATIALA), PUNJAB	13	27	21	6.0	6.0	6.1	7.7	7.8	7.8	354	738	632	34.0	48.0	39.3	4.6	12.0	8.1	2.00	3.40	2.90	1.00	2.20	1.30	2.80	2.80	2.80	11000	110000	37250	50000	350000	162500
1025	GHAGGAR GH-1 AT ROAD BRDG. SIRSA,DEBWALI ROAD, HARYANA	16	32	24	1.0	7.0	4.9	7.3	8.8	8.1	434	1520	852	47.3	47.0	47.3	8.0	68.0	26.3	12.0	22.0	18.1	17.0	17.0	17.0	15.0	32.0	20.8						

1026	GHAGGAR GH-2 AT CHANDARPUR SYPHON, HARYANA	18	35	26	3.0	6.0	4.5	7.7	8.7	8.3	753	1330	996	61.5	62.0	61.5	11.0	42.0	25.3	13.0	18.0	15.8				14.0	24.0	18.7						
1295	GHAGGAR NEAR BANKARPUR,DERA BASSI,PUNJAB	12	25	21	6.0	8.0	6.7	7.5	7.7	7.6	280	560	425	20.0	39.0	29.7	4.0	12.0	7.4	1.30	4.80	2.88	0.50	1.80	1.30	1.80	1.80	1.80	5000	70000	22250	15000	170000	78750
1473	GHAGGAR AT RATANHERI, D/S OF PATIALA NADI (AC), PUNJAB	13	26	21	6.0	7.0	6.3	7.6	7.8	7.7	349	717	619	30.0	44.0	34.7	4.6	10.0	7.3	2.30	4.20	3.28	1.20	2.80	1.80	2.40	2.40	2.40	9000	70000	28250	70000	230000	125000
1698	GHAGGAR AT D/S CHHATBIR, PUNJAB	15	27	22	6.0	7.0	6.4	7.6	7.7	7.7	294	580	439	14.0	28.0	21.3	3.2	4.8	4.2	1.80	3.00	2.20	0.70	1.40	1.00	2.20	2.20	2.20	1100	230000	60275	20000	1700000	440750
1699	GHAGGAR AT U/S DHAKANSU NALLAH, PUNJAB	13	27	22	5.0	7.0	6.5	7.5	7.7	7.7	304	980	686	18.0	40.0	31.3	4.0	18.0	9.8	2.00	2.80	2.60	1.00	1.60	1.30	3.20	3.20	3.20	9000	50000	19750	50000	170000	105000
1700	GHAGGAR AT D/S DHAKANSU NALLAH, PUNJAB	13	26	21	6.0	7.0	6.4	7.6	7.8	7.8	317	990	754	38.0	58.0	46.7	8.0	20.0	13.8	2.00	3.00	2.53	1.00	1.60	1.40	2.40	2.40	2.40	23000	110000	56500	100000	500000	227500
1701	GHAGGAR AT D/S JHARMAL NADI, PUNJAB	15	26	22	5.0	7.0	6.3	7.6	7.7	7.7	317	940	615	22.0	48.0	32.0	4.2	16.0	8.2	1.80	8.00	3.70	0.80	4.60	1.90	3.00	3.00	3.00	2000	90000	34500	10000	2300000	622500
1702	GHAGGAR AT U/S JHARMAL NADI, PUNJAB	15	26	21	6.0	7.0	6.2	7.5	7.7	7.6	302	640	457	20.0	22.0	21.0	3.0	4.2	3.7	1.70	2.80	2.23	0.80	1.60	1.10	2.60	2.60	2.60	900	23000	8633	10000	1100000	49000
1703	GHAGGER AT MOONAK, PUNJAB	13	27	21	6.0	6.0	6.0	7.7	7.9	7.8	499	790	690	38.0	52.0	46.0	6.8	14.0	9.6	2.00	3.60	3.00	1.00	1.80	1.30	3.00	3.00	3.00	11000	23000	16250	50000	170000	117500
1704	GHAGGAR AT D/S SARDULGARH, PUNJAB	13	26	21	6.0	6.0	5.9	7.5	7.9	7.8	420	807	692	42.0	68.0	51.3	5.0	20.0	11.1	2.00	5.20	3.50	1.00	3.20	1.80	3.20	3.20	3.20	11000	230000	94000	90000	500000	222500
1705	GHAGGAR AT U/S SARDULGARH, PUNJAB	13	26	21	6.0	6.0	5.9	7.4	7.9	7.7	423	847	699	40.0	64.0	48.1	5.0	18.0	10.4	2.10	4.80	3.33	1.00	3.00	1.60	3.20	3.20	3.20	11000	110000	60500	70000	3500000	967500
1885	RIVER GHAGGAR AT D/S OF SURAJPUR	17	26	22	6.0	6.7	6.5	7.9	8.5	8.2	1232	1480	1315				2.2	2.3	2.2	0.10	0.10	0.05				0.00	0.00	0.00						
1887	GHAGGAR BEFORE OTTU WEIR (BEFORE MIXING OF SATLUJ CANAL WATER) (HARYANA)	16	33	25	6.0	7.0	6.6	7.4	8.6	8.2	618	1390	895	53.6	54.0	53.6	6.0	81.0	26.3	11.0	21.0	15.5				14.0	23.0	17.3						
2047	N-CHOE (ATTAWA CHOE), CHANDIGARH	27	32	29				7.1	7.2	7.2				134	152	143	50.0	50.0	50.0	0.20	0.30	0.27				15.0	15.0	15.0						
2048	PATIALA KI RAO, CHANDIGARH	27	34	30				7.3	7.5	7.4				170	200	185	50.0	50.0	50.0	0.30	0.60	0.40				15.0	15.0	15.0						
2049	SUKHNA CHOE, CHANDIGARH	27	32	29	1.0	1.0	1.0	7.2	7.4	7.3				74	142	108	49.0	50.0	49.7	0.40	0.80	0.60				15.0	15.0	15.0						
1717	KODRA DAM, MOUNT ABU, RAJASTHAN	15	22	19	4.2	8.6	5.6	6.6	7.9	7.4	50	300	168	14.2	14.2	14.2	0.9	4.8	2.2	0.16	0.70	0.38				0.02	1.00	0.39	3	7	5	7	28	16

TABLE 18.6 :- WATER QUALITY OF MEDIUM & MINOR RIVERS IN MIZORAM, MANIPUR, MEGHALAYA & TRIPURA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
2050	TLAWNG UPSTREAM AIZAWL, MIZORAM	22	30	25	4.2	8.5	6.7	7.7	8.0	7.9	75	184	135				0.1	0.8	0.4				0.10	0.10	0.10	0.10	0.10	0.10				3	3	3
2051	TLAWNG DOWNSTREAM AIZAWL, MIZORAM	21	30	25	5.5	7.6	6.5	7.6	8.1	7.9	120	250	195				0.2	1.1	0.6				0.20	0.20	0.20	0.70	0.70	0.70				3	3	3
2052	TUIRIAL UPPER CATCHMENT, MIZORAM	22	27	24	5.9	9.7	7.3	7.4	8.1	7.8	199	230	219				0.4	0.7	0.5				0.10	0.10	0.10	1.70	1.70	1.70						
2053	TUIRIAL LOWER CATCHMENT, MIZORAM	21	27	24	6.7	8.8	7.7	7.5	8.1	7.9	130	316	227				0.2	0.7	0.4				0.10	0.10	0.10							15	15	15
1424	IMPHAL AT MAHABALI, MANIPUR	19	26	23	3.4	8.5	6.2	6.7	7.2	7.0	86	193	132	1.0	15.0	7.4	0.3	2.8	1.6													45	230	102
1457	IMPHAL AT KOIRENGEI, MANIPUR	20	26	23	3.9	9.7	6.4	7.1	8.0	7.4	110	180	137	7.0	7.0	7.0	1.0	2.8	2.1													23	100	58
1458	RIL AT PORAMPET, MANIPUR	18	27	23	4.5	8.5	6.4	7.1	8.0	7.6	136	315	200	0.6	5.2	3.6	0.1	2.6	1.0													4	110	36
1624	ILONG, MANIPUR	19	28	23	5.4	8.3	7.0	7.4	8.0	7.6	131	340	210	3.8	36.0	14.6	1.2	3.0	2.4										100	100	100	27	220	137
1625	HUMP BRIDGE, MANIPUR	18	28	23	2.1	5.4	3.6	6.3	7.8	7.2	148	350	249	1.7	48.0	26.6	0.4	14.6	4.9													195	610	383
1626	HEIRANGOITHONG, MANIPUR	18	29	23	3.1	4.1	3.7	7.1	7.9	7.5	120	381	224	2.0	35.0	22.0	0.5	12	4.0													210	765	394
1627	KIYAMGI, MANIPUR	20	28	24	5.6	8.1	7.1	7.0	7.9	7.3	84	300	156	3.0	6.2	5.0	1.1	2.6	2.0													15	240	89
1628	MINUTHONG(IMPHAL RIVER, MANIPUR	18	27	23	4.8	8.9	7.1	6.7	7.4	7.2	86	176	127	2.4	6.7	4.6	0.7	3.3	2.0													25	130	60
1925	KHUGA RIVER (CHURACHANDPUR DIST.) MANIPUR	19	25	22	3.8	7.1	5.8	7.1	8.0	7.6	90	417	258	2.2	200	71.4	0.7	2.5	1.7													25	300	118
1926	KHUJAIROK RIVER, MOREH (CHANDEL DIST.) MANIPUR	20	30	24	6.5	10.5	8.4	7.1	8.3	7.9	200	570	383	2.3	6.0	4.2	0.5	1.0	0.8													10	338	180
1427	UMTREW AT BYRNIHAT EAST, MEGHALAYA	11	25	20	7.0	9.4	8.1	7.0	7.4	7.2	195	241	221	20.7	20.7	20.7	4.3	7.7	5.4	1.00	3.50	1.95							170	240	213	260	540	373
1428	KYRHUKHLA NEAR SUTNGA KHLIERIAT,JAINTIA HILLS DT., MEGHALAYA	11	24	18	4.8	7.6	6.1	2.9	3.2	3.1	500	950	738	26.0	26.0	26.0	3.0	7.0	5.5	1.00	5.20	2.73							23	46	32	31	70	45
1631	MYNTDU RIVER JOWAI, MEGHALAYA	10	19	16	7.4	8.8	8.0	7.0	7.0	7.0	140	180	164				1.4	2.0	1.7	0.20	2.70	1.60							1400	1700	1600	1800	2200	2067
1632	GANOL RIVER TURA, MEGHALAYA	10	24	19	1.4	8.2	5.4	7.0	7.4	7.2	123	196	153	10.4	10.4	10.4	1.4	2.0	1.7	0.70	4.10	1.78							140	280	213	220	350	278
1633	SIMSANG RIVER WILLIAMNAGAR, MEGHALAYA	7	23	18	2.0	10.0	7.0	6.8	7.2	7.0	125	191	161	8.4	8.4	8.4	1.0	2.4	1.7	1.00	5.50	2.43							180	350	250	280	540	375
1403	GUMTI AT U/S SOUTH TRIPURA, TRIPURA	26	28	27	4.8	6.0	5.2	7.1	7.9	7.4	78	160	120				0.9	1.9	1.4	0.05	0.05	0.05	0.05	0.05	0.05				180	230	203	240	320	280
1404	GUMTI AT D/S SOUTH TRIPURA, TRIPURA	25	28	27	3.7	5.2	4.7	7.2	7.7	7.4	120	150	139				1.6	2.2	1.9	0.05	0.20	0.11	0.05	0.05	0.05				210	380	308	350	510	440
1726	CHANDRAPUR, AGARTALA D/S OF HAORA RIVER, TRIPURA	25	29	27	4.9	5.8	5.4	7.2	7.8	7.4	110	160	128				2.5	3.9	3.0	0.02	0.09	0.06	0.05	0.05	0.05				280	440	353	480	620	565
1927	SEKMAI RIVER, KAKCHING (THOUBAL DIST.)	20	28	23	3.2	8.7	6.9	6.5	7.7	7.2	112	350	233	2.0	9.0	6.0	0.5	2.3	1.5													30	250	119

TABLE 18.7 :- WATER QUALITY OF CREEK & CANAL - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
	CREEKS																																	
1316	BASSEIN CREEK AT BASSIN IN THANE DT., MAHARASHTRA	26	29	28	3.4	5.8	4.7	7.4	7.8	7.6	16000	52980	41665	168	168	168	7.8	10.0	9.1	0.60	2.60	1.68				0.00	0.40	0.15	350	900	538	900	1600	1250
1317	THANE CREEK AT ELEPHANTA ISLAND, MAHARASHTRA	28	32	31	2.6	4.6	3.7	7.3	8.0	7.8	17990	61250	48515	224	224	224	10.0	11.0	10.5	0.70	1.40	0.95				0.00	1.30	0.35	45	170	121	250	900	531
1318	MAHIM CREEK AT MAHIM BAY, MAHARASHTRA	29	32	31	1.1	5.7	3.5	7.4	8.1	7.7	17950	60930	37703	100	100	100	9.0	19.0	13.1	0.60	3.40	1.78				0.00	6.10	1.63	80	900	439	250	1800	1188
	CANAL																																	
1886	WESTERN YAMUNA CANAL AT TAJEWALA	18	28	23	6.2	6.8	6.5	7.2	8.2	7.8	390	801	609	9.2	9.2	9.2	0.6	1.2	0.8	0.05	0.05	0.05				0.00	0.00	0.00						
1109	W.YAM. CANAL WC-1(Y.NAGAR)100M D/S AFTER RECEIVING IND.&SEW.EFFL HARYANA	24	30	27	0.2	6.2	3.4	7.0	8.1	7.6	969	4220	2517	980	980	980	4.3	396	192	0.05	1.00	0.37				0.00	48.2	21.4						
1110	W.YAM. CANAL WC-2 (NEAR KARNA LAKE)G.T.ROAD KARNAL,HARYANA.	24	27	26	6.3	6.4	6.4	7.8	8.1	7.9	529	669	599				2.2	2.3	2.2	0.05	1.00	0.53				0.00	0.00	0.00						
1114	W.YAM. CANAL WC-6 SIRSA BRANCH AT RD.BRIDGE JIND KAITHAL ROAD HARYANA	10	22	16	6.2	7.1	6.6	7.9	8.0	7.9	551	615	584				1.2	2.6	2.0	0.05	0.50	0.28				0.00	0.00	0.00						
1111	W.YAM. CANAL C-3 DELHI BRANCH AT R.D.24525 HARYANA	9	27	20	6.1	6.9	6.4	7.4	8.3	7.9	390	645	534	12.0	12.0	12.0	1.0	1.5	1.2	0.05	1.00	0.68	0.50	1.00	0.75	0.00	0.00	0.00						
1112	W.YAM. CANAL C-3 DELHI BRANCH AT R.D.24525 HARYANA	9	25	20	6.2	7.0	6.4	7.5	8.3	8.0	390	646	535	10.0	10.0	10.0	0.8	1.0	0.9	0.05	1.00	0.53				0.00	1.50	0.75						
1115	W.YAM. CANAL C-7 DELHI PARALLEL BRANCH AT KHUBRU FALL RD-14525	11	27	21	5.6	6.2	6.0	7.5	8.3	8.0	395	665	540	14.0	14.0	14.0	1.2	2.2	1.6	0.05	1.00	0.52	1.00	1.00	1.00	0.00	0.00	0.00						
1116	W.YAM. CANAL WC-4 DELHI PARALLEL BRANCH AT PANIPAT HARYANA.	18	20	19	6.2	6.5	6.3	7.6	8.2	8.0	490	668	589	12.8	12.8	12.8	1.5	2.5	2.0	0.05	1.00	0.40	0.50	1.00	0.75	0.00	0.00	0.00						
1479	HAIDERPUR	16	26	21	6.8	8.9	8.1	7.4	8.2	7.8	160	276	226				1.0	2.0	1.3	0.30	0.73	0.48	0.01	0.01	0.01				7500	19000	11633	11000	520000	264000
1419	GURGAON CANAL, GC-1,(NEAR BADARPUR BORDER), HARYANA	26	32	29	2.1	5.5	3.3	7.1	7.9	7.4	1087	1230	1139	78.0	78.0	78.0	21.0	27.0	23.7	4.00	4.50	4.27												
1729	NEAR PRAGATI VIDYABHAWAN, AGARTALA, TRIPURA	27	27	27	6.1	6.1	6.1	5.3	5.3	5.3	112	112	112				12.2	12.2	12.2	0.04	0.04	0.04							610	610	610	720	720	720

TABLE 19.1 :- WATER QUALITY OF LAKE, POND & TANK IN ANDHRA PRADESH, KARNATAKA, KERALA, TAMILNADU, PONDICHERRY & GOA- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1391	HUSSAIN SAGAR LAKE, BUDAMERU,A.P.	27	29	28	3.3	4.0	3.6	6.9	7.9	7.6	1150	1755	1481	86.0	86.0	86.0	4.1	16.0	11.5	5.00	10.5	7.20	0.10	0.30	0.17				0	15	8	790	1380	1073
1447	DHARMASAGAR TANK NEAR WARANGAL, A.P.	26	30	28	5.7	8.4	6.9	7.8	8.6	8.1	265	672	401	8.0	18.0	13.0	2.4	8.0	3.8	0.10	0.30	0.20	0.10	0.10	0.10				0	3	1	16	460	172
1464	BIBINAGAR TANK, A.P.	27	30	28	4.2	6.0	4.9	7.8	8.1	8.0	150	474	378	9.0	9.0	9.0	0.6	4.8	1.7	0.10	1.10	0.46	0.10	0.10	0.10	0.00	4.20	1.40	3	20	6	98	425	165
1783	KISTAREDDYPET TANK , MEDAK DIST., A.P.	27	28	28	5.7	5.7	5.7	7.5	8.1	7.8	2830	2980	2905				0.2	0.8	0.5	10.4	27.0	18.7	0.10	0.10	0.10				3	3	3	100	100	100
1788	SAROONAGAR , RANGA REDDY DIST., A.P	22	29	25	3.1	4.6	3.6	7.4	8.1	7.8	1565	1983	1844	134	134	134	14.1	24.0	18.8	3.7	22.0	12.2	0.80	1.30	0.95	15.0	15.0	15.0	0	22	14	352	2050	1353
1780	GANDIGUDEM ,MEDAK DISTRICT, A.P	27	30	28	4.2	5.7	5.0	7.3	7.5	7.4	1130	2540	1953	21.0	21.0	21.0	0.4	3.0	1.3	1.50	10.8	6.60	0.10	0.10	0.10				3	3	3	95	100	99

1788	HIMAYAT SAGAR LAKE , R.R DIST., A.P	25	29	27	6.9	7.1	7.0	8.2	8.3	8.3	268	351	323	13.0	13.0	13.0	1.1	2.0	1.7	0.80	1.10	1.00	0.10	0.10	0.10				0	3	1	40	210	101
1790	PULICATE LAKE , NELLORE DIST., A.P.	31	31	31	3.0	6.6	4.5	6.9	7.5	7.1	29300	49800	38950	52.0	52.0	52.0	2.0	4.8	2.8	0.40	3.60	1.40	0.10	0.10	0.10				2	8	4	2200	2550	2338
1388	ULSOOR LAKE, BANGALORE,KARNATAKA	29	30	29	5.0	6.9	6.0	7.0	8.9	8.2	390	400	398				4.0	9.0	6.0	0.30	1.40	0.85							0	900	285	370	1600	957
1446	HEBALLA VALLEY LAKE, MANDYA KARNATAKA	24	26	25	0.0	10.0	5.0	6.9	8.3	7.5	392	760	551				1.0	18.0	6.6	0.30	1.30	0.73							84	1000	318	1600	2000	1700
1383	ORUVATHILKOTTA LAKE, KERALA	26	32	29	5.8	7.6	6.9	6.6	7.3	6.9	418	3530	1657	24.4	24.4	24.4	1.9	12.2	5.5	0.50	2.40	1.60	0.10	1.10	0.43	0.10	0.10	0.10	1900	13200	4950	2800	17800	7275
1385	SASTHAMCOTTA LAKE, KERALA	29	30	29	6.1	7.5	6.7	6.7	7.8	7.2	51	118	70	24.0	24.0	24.0	0.8	1.8	1.1	0.10	0.10	0.10	0.10	0.10	0.10				40	240	168	60	340	225
1441	ASHTHAMUDI LAKE AT QUILON, KERALA	28	30	29	3.0	5.7	4.8	7.3	7.8	7.6	20500	34000	28150	28.0	28.0	28.0	0.8	1.6	1.2	0.10	0.30	0.23	0.10	0.30	0.20				90	310	160	160	400	245
1574	PARAVUR, KERALA	27	29	28	5.6	6.7	6.2	7.3	7.9	7.6	5050	32800	17740	12.0	12.0	12.0	0.8	1.3	1.0	0.10	0.20	0.17	0.10	0.10	0.10				50	320	190	80	480	280
1575	KOCHI (OIL TANKER JETTY), KERALA	27	31	29	4.2	6.8	5.1	7.1	7.9	7.6	310	35000	18028	44.0	44.0	44.0	2.0	3.7	2.6	0.10	0.40	0.25	0.10	0.10	0.10	0.10	0.10	0.10	30	940	268	200	2500	840
1576	THEKKADY, KERALA	22	27	25	6.2	7.6	7.0	5.9	6.7	6.4	28	44	34	6.2	6.2	6.2	0.4	0.9	0.7	0.10	0.40	0.25	0.10	0.10	0.10				900	1200	1075	1300	2100	1650
1577	KODUNGALLOOR, KERALA	26	31	28	5.3	7.3	6.6	7.1	7.9	7.5	300	30000	12450	24.0	24.0	24.0	1.4	3.0	2.3	0.10	0.30	0.20	0.10	0.10	0.10	1.10	1.10	1.10	40	210	165	230	810	493
1578	KAYAMKULAM, KERALA	30	31	30	3.0	7.1	4.9	6.8	7.9	7.3	590	36000	19798	24.0	24.0	24.0	2.8	5.0	4.2	0.10	0.10	0.10	0.10	0.10	0.10	1.80	1.80	1.80	60	320	198	100	1750	810
1579	ALAPPUZHA, KERALA	28	31	29	5.9	7.6	6.5	6.7	7.3	6.9	57	2800	837	28.0	28.0	28.0	1.4	4.5	2.4	0.10	0.10	0.10	0.10	0.10	0.10				70	240	163	460	730	598
1580	POOKOTE, KERALA	27	28	27	5.0	7.0	6.4	5.9	6.5	6.3	28	39	32	4.0	4.0	4.0	0.4	0.6	0.5	0.10	0.10	0.10	0.10	0.10	0.10				0	0	0	20	170	98
1420	KODAI KANAL LAKE, TAMILNADU	18	18	18	6.8	7.0	6.9	6.4	7.9	7.4	81	160	104	16.0	16.0	16.0	1.9	5.2	3.2	0.07	0.10	0.09	0.10	0.10	0.10	5.00	5.00	5.00	4	40	18	17	60	32
1421	UDHAGAMADALEM LAKE (OOTY), TAMILNADU	12	16	15	5.9	8.4	7.2	6.1	8.9	7.4	336	540	399	64.0	64.0	64.0	1.5	21.0	7.6	0.10	2.50	0.79				5.00	5.00	5.00	220	1100	730	500	1700	1225
1452	PERCAUD LAKE, SALEM, TAMILNADU	27	28	28	7.6	8.5	8.1	7.8	8.4	8.0	216	280	259				0.8	1.6	1.1	0.10	0.20	0.13	0.10	0.10	0.10				170	500	313	330	700	457
1396	OSTERI LAKE, PONDICHERRY	29	32	30	8.3	9.8	9.3	7.0	10.0	8.4	233	412	326	76.0	76.0	76.0	0.0	12.0	7.0	0.10	0.70	0.30				0.10	0.40	0.30						
1686	BAHOUR LAKE, PONDICHERRY	29	32	30	5.3	6.8	5.9	7.5	7.9	7.7	400	765	522	86.0	86.0	86.0	4.0	14.0	9.0	0.10	0.10	0.10				0.00	0.20	0.10						
1549	SALAULIM LAKE AT SALAULIM , SANGUEM, GOA	28	32	29	5.5	7.7	6.7	6.2	7.1	6.7	36	59	48	1.6	6.8	4.2	0.2	0.8	0.6	0.01	0.09	0.10							0	8	3	0	13	5

TABLE 19.2 :- WATER QUALITY OF LAKE, POND & TANK IN MADHYA PRADESH, RAJASTHAN, & GUJARAT - 200

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1373	UPPER LAKE AT BHOPAL (INTAKE POINT), M.P.	22	29	27	7.5	8.4	7.7	8.1	8.6	8.2	284	328	314	27.2	27.2	27.2	2.1	2.9	2.3	0.10	0.40	0.20	0.10	0.10	0.10	0.10	0.10	0.10				64	1600	1140
1374	LOWER LAKE AT BHOPAL OUTLET M.P.	23	31	28	7.9	9.2	8.6	7.6	8.3	8.0	452	584	528	45.8	45.8	45.8	3.4	4.8	4.1	0.10	1.20	0.50	0.10	0.40	0.20	0.10	0.10	0.10				2400	2400	2400
1466	MULTAI TANK LAKE AT VILLA. KHARI ON BETUL-AMRAVATI ROAD M.P.	23	23	23	7.4	8.4	7.8	7.1	8.0	7.5	220	284	251				0.9	1.4	1.1													86	2400	860
1285	PICHOLA LAKE AT UDAIPUR (WATER INTAKE POINT), RAJASTHAN	19	30	26	3.6	9.4	6.4	8.2	8.6	8.5	520	730	588	3.3	3.3	3.3	1.4	2.7	2.0	0.32	0.72	0.56				0.00	0.08	0.05	4	9	7	20	150	55
1286	UDAISAGAR LAKE AT UDAIPUR (INTAKE PT.) RAJASTHAN	19	31	27	1.0	8.5	4.4	7.2	8.7	8.2	1270	1530	1448	39.2	39.2	39.2	5.0	10.8	7.8	0.14	3.60	1.24				0.10	0.30	0.20	4	14	11	28	2400	682
1414	PUSHKAR LAKE, RAJASTHAN	22	28	25	1.2	6.7	3.5	7.4	7.9	7.7	320	860	535	41.7	41.7	41.7	5.2	13.3	8.7	0.22	1.70	0.68				0.12	4.00	1.83	3	20	10	4	150	46
1481	FATEH SAGAR LAKE AT UDAIPUR INTAKE POINT OF PIHED,RAJASTHAN	20	31	27	2.8	8.6	6.0	8.1	8.6	8.4	460	610	510	13.3	13.3	13.3	1.6	3.3	2.2	0.14	1.10	0.40				0.00	0.12	0.07	4	14	10	20	210	100
1714	KAYALANA JHEEL JODHPUR, RAJASTHAN	16	26	21	6.5	9.0	7.6	7.6	8.7	8.1	230	340	275	10.0	10.0	10.0	0.3	4.1	1.9	0.22	0.38	0.32				0.08	5.70	1.51	4	9	6	14	150	50
1716	NAKKI LAKE, MT. ABU, RAJASTHAN	12	22	18	3.1	7.8	5.3	7.4	8.2	7.8	180	410	280	55.0	55.0	55.0	0.8	6.1	2.7	0.14	1.10	0.46				0.08	0.40	0.24	3	14	6	4	150	47
1343	KANKORIA LAKE AT AHMEDABAD, NR. BALVATIKA, GUJARAT	25	27	26	3.5	5.5	4.5	7.4	7.6	7.5	1010	1300	1155	18.0	18.0	18.0	2.0	6.0	4.0	0.10	0.40	0.25				0.60	2.24	1.42	150	210	180	200	1500	850
1345	AJWAH LAKE AT SRI SAYAJI SABVAR,BARODA,GUJARAT	21	27	25	7.2	9.6	8.6	8.0	8.6	8.3	220	244	234	17.0	17.0	17.0	2.8	3.0	3.0	0.05	0.09	0.07				0.05	0.05	0.05	2	9	5	11	21	16
1346	SURSAGAR LAKE AT BARODA, GUJARAT	22	26	25	8.1	12.1	9.8	7.2	8.5	7.8	1442	1710	1587	50.0	50.0	50.0	6.9	11.1	8.4	0.08	0.09	0.09				0.23	0.23	0.23	2	7	4	9	28	19
1972	NALSAROVAR LAKE (SANAND), DIST.AHMEDABAD	23	27	25	6.4	8.4	7.4	7.3	7.9	7.6	511	3670	2091	21.0	21.0	21.0	3.0	5.0	4.0	0.20	0.50	0.35				0.23	0.60	0.42	15	4300	2158	150	9300	4725
1973	BINDUSAROVAR, SIDDHPUR (DIST.PATAN)	26	28	27	6.6	12.8	9.7	7.5	7.5	7.5	238	631	435	20.0	20.0	20.0	3.0	12.0	7.5	0.10	0.40	0.25				0.29	0.30	0.30	150	210	180	750	930	840
1977	KHETA TALAV,NADIAD	21	31	27	2.2	8.4	5.8	7.5	8.3	7.9	505	1765	1144	50.0	50.0	50.0	1.6	8.0	4.1	0.26	1.34	0.57				0.20	0.20	0.20	2	28	9	9	150	52
1971	THOL TANK (KALOL) (DIST: MEHASANA)	26	29	28	6.0	8.6	7.3	7.7	8.4	8.1	485	710	598	67.0	67.0	67.0	8.0	10.0	9.0	0.10	0.20	0.15				0.60	3.36	1.98	15	210	113	75	430	253
1974	SAHSTRALING SAROVAR, PATAN, GUJARAT	32	32	32	6.5	6.5	6.5	7.5	7.5	7.5							2.0	2.0	2.0	0.10	0.10	0.10	0.10	0.10	0.10	0.30	0.30	0.30	4300	4300	4300	7500	7500	7500
1975	LAKHOTA TALAV, JAMNAGAR	27	30	28	6.9	7.2	7.0	7.0	7.9	7.6	312	480	419	38.0	38.0	38.0	4.9	4.9	4.9	0.20	0.30	0.24				0.28	1.12	0.56	3	15	8	7	43	26
1976	NARSIMEHTA TALAV- JUNAGADH	26	27	27	5.2	10.8	7.5	6.7	8.1	7.6	844	1540	1139	11.0	61.0	39.5	3.8	7.4	5.0	0.10	0.10	0.10				0.20	1.10	0.50	4	8	6	26	27	27
1979	OLPAD, VILLAGE POND-OLPAD, SURAT	24	24	24	6.5	6.5	6.5	7.8	7.8	7.8	612	612	612	11.0	11.0	11.0	3.1	3.1	3.1	0.14	0.14	0.14				0.60	0.60	0.60	20000	20000	20000	20000	20000	20000

TABLE 19.3 :- WATER QUALITY OF LAKE, POND & TANK IN HARYANA, HIMACHAL PRADESH, PUNJAB, CHANDIGARH, UTTAR PRADESH, UTTARANCHAL & WEST BENGAL - 20(

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1349	BRAHMSAROVAR LAKE AT KURUKSHETRA, HARYANA	22	36	27	6.3	6.7	6.5	7.7	8.1	7.9	490	1251	765	13.2	13.0	13.0	1.5	2.3	1.91	0.05	0.05	0.05												
1291	GOBINDSAGAR LAKE AT BILASPUR, H.P.	10	21	17	8.2	10.0	9.2	7.7	8.0	7.9	281	353	319	3.6	3.6	3.6	0.5	1.2	0.8	0.05	0.20	0.13							7	27	14	27	2400	926
1292	PONGDAM LAKE AT PONG VILLAGE,H.P.	17	26	21	6.8	8.6	7.8	8.0	8.9	8.3	129	186	168	3.0	3.0	3.0	0.2	0.7	0.4	0.10	0.45	0.23				2.00	2.00	2.00	4	17	9	9	34	27
1429	RENUKA LAKE , 35 KM FROM PATNA,SAHIB NORTH , H.P	12	32	22	0.2	6.8	4.6	7.8	8.2	8.1	178	585	459	30.4	30.0	30.0	0.6	1.8	1.1	0.10	0.10	0.10				3.00	3.00	3.00	4	18	12	9	33	22
1297	HARIKE LAKE AT HARIKE VILLAGE, PUNJAB	15	15	15	7.0	7.0	7.0	7.7	7.7	7.7	428	428	428	8.2	8.2	8.2	1.2	1.2	1.2	2.00	2.00	2.00	0.80	0.80	0.80				0	0	0	350	350	350
1382	HARIKE LAKE D/S FROM CANAL, PUNJAB	6	22	16	6.0	7.1	6.4	7.6	7.7	7.7	356	464	403	6.0	20.0	13.0	1.2	1.8	1.4	1.80	2.60	2.35	1.00	1.40	1.30	1.20	1.20	1.20	0	110	53	500	500	500
2046	SUKHNA LAKE	27	32	30	6.4	6.5	6.5	8.0	8.2	8.1	233	285	254	20.0	20.0	20.0	1.1	1.6	1.3	0.10	0.10	0.10				0.00	0.10	0.10						
1364	RAMGARH LAKE, U.P.	26	28	27	9.2	9.8	9.5	8.0	8.2	8.1	504	516	510	40.0	42.0	41.0	4.4	5.2	4.8	2.40	3.40	2.90				0.80	0.90	0.80	160	190	175	340	380	360
1362	NAINI LAKE AT NAINITAL (WATER INTAKE POINT), UTTARANCHAL	13	17	15	0.4	8.8	5.6	7.5	8.1	7.8	460	560	513	4.0	12.0	8.7	1.6	3.8	3.0										0	20	9	17	920	257
1765	RABINDRASAROVAR NATIONAL LAKE, CALCUTTA, WEST BENGAL	21	32	28	7.8	10.0	9.1	7.0	8.7	8.0	318	476	417	16.0	23.9	20.0	2.1	4.8	3.5	0.10	0.20	0.10				0.10	0.30	0.20	8000	35000	21000	17000	55000	37333

TABLE 19.4 :- WATER QUALITY OF LAKE, POND & TANK IN ASSAM, MANIPUR, MEGHALAYA & TRIPURA - 200

STATION CODE	LOCATIONS	TEMPERATURE °C			D.O. (mg/l)			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1532	"GOYSAGAR TANK, SIBSAGAR, ASSAM	20	22	21	7.0	7.4	7.2	7.5	8.0	7.7	20	86	43	12.0	12.0	12.0	1.8	3.5	2.7	0.10	0.10	0.10				0.40	0.40	0.40	0	1100	367	1	3500	1287
1263	ELANGABEEL SYSTEM POND (CONNECTED TO R. KOLANG),	25	30	27	0.0	0.0	0.0	6.9	7.5	7.3	342	3770	1985	200	200	200	50	174	91.3	0.10	0.60	0.40				12.1	12.1	12.1	0	2000	787	1500	46000	20833
1425	LOKTAK LAKE AT THANA, MANIPUR	20	30	25	3.8	9.3	6.5	7.4	7.7	7.5	120	231	190	1.9	200	69.3	0.5	1.7	1.2													95	145	127
1426	LOKTAK LAKE AT BISHNUPUR, MANIPUR	20	29	24	3.0	8.9	5.9	7.1	7.7	7.3	198	241	220	1.5	5.2	3.2	0.1	1.8	0.9													89	200	130
1629	SENDRA (LOKTAK LAKE),MANIPUR	20	29	25	3.8	8.9	7.1	6.7	7.6	7.3	148	231	179	2.1	200	69.0	0.5	3.5	2.1													130	350	198
1630	KARANG ISLAND(LOKTAK LAKE),MANIPUR	21	30	25	3.3	6.6	5.2	7.1	7.9	7.4	177	300	221	0.8	35.0	14.6	0.1	2.7	1.4													30	165	115
1347	UMIAM LAKE AT BARAPANI, MEGHALAYA	13	21	17	6.4	8.6	7.8	6.5	7.2	6.9	230	299	267				6.0	9.7	7.9	1.30	5.20	2.60	0.05	0.05	0.05				2700	3300	2900	3400	4600	3725
1348	WARD LAKE AT SHILONG EAST,KHASI HILL DT., MEGHALAYA	14	20	17	6.2	8.8	7.1	6.8	7.5	7.1	249	300	270				5.2	8.6	7.3	1.20	1.50	1.30	0.05	0.05	0.05				1700	3100	2167	2200	4600	3000
1459	THADLASKEIN LAKE, MEGHALAYA	11	19	16	6.2	8.2	7.4	7.0	7.2	7.1	73	93	81	7.0	7.0	7.0	1.5	2.4	1.9	0.20	2.70	1.80	0.05	0.05	0.05				17	33	26	26	63	42
1727	LAXMI NARAYAN BARI PALACE COMPOUND, TRIPURA	14	28	23	5.0	9.8	8.0	7.8	8.2	8.0	490	516	503				3.8	5.2	4.5	2.40	3.40	2.90							17	190	122	340	920	547

TABLE 20.1 :- WATER QUALITY OF GROUND WATER IN ANDHRA PRADESH - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
15	WELL AT KUYYURA, A.P.	28	28	28	7.6	7.8	7.7	141	209	175	6.0	6.0	6.0	0.4	1	0.7	0.10	0.30	0.20	0.10	0.10	0.10				0	3	2	16	23	20			

16	WELL AT TADAVAI A.P.	26	26	26	7.2	7.9	7.6	242	1018	630	8.0	8.0	8.0	0.2	0.5	0.4	0.10	8.10	4.10	0.10	0.10	0.10				0	3	2	12	23	18
26	WELL AT VIJAYWADA, A.P.	28	29	29	7.6	7.6	7.6	1428	1743	1586	26.0	26.0	26.0	0.8	1.7	1.3	2.20	2.40	2.30	0.10	0.10	0.10				2	2	2	220	480	350
27	WELL AT PEDDAVOORA, A.P.	30	30	30	7.1	7.1	7.1	1650	1650	1650	6.0	6.0	6.0	0.6	0.6	0.6	3.80	3.80	3.80	0.10	0.10	0.10				3	3	3	90	90	90
1791	B/W. - EAST OF SAICHERUVU PADIPALLY (V),WARANGAL DIST., A.P.	29	30	30	7.0	8.1	7.6	752	1128	940	14.0	14.0	14.0	2.0	4.8	3.4	5.30	10.3	7.80	0.10	0.10	0.10				0	3	2	0	9	5
1792	B/W -NEAR CKM COLLEGE , ENUMAMULA (V) ,WARANGAL DIST., A.P.	29	30	30	6.3	7.7	7.0	2400	3590	2995	10.0	10.0	10.0	0.9	2.4	1.7	11.2	11.6	11.4	0.10	0.10	0.10				0	3	2	4	152	78
1793	O/W - BHOOMAIAH NEAR ASHPONDS OF NTPC, KUNDANPALLY (V) , RAMAGUNDAM , KARIMNAGAR, A.P.	27	28	28	7.9	8.6	8.3	1243	1826	1535	18.0	18.0	18.0	0.8	4.0	2.4	1.60	7.00	4.30	0.10	0.10	0.10				0	3	2	9	64	37
1794	B/W - MANAKONDUR (V) , KARIMNAGAR DIST., A.P.	28	28	28	8.3	8.3	8.3	1080	1080	1080	11.0	11.0	11.0	1.0	1.0	1.0	9.30	9.30	9.30	0.10	0.10	0.10				3	3	3	7	7	7
1795	B/W. - PANCHAYAT OFFICE , BOLLARAM (V) MEDAK DIST., A.P.	28	29	29	6.6	6.9	6.8	3004	5720	4362	4.0	4.0	4.0	0.3	0.8	0.6	3.30	3.50	3.40	0.10	0.10	0.10				3	3	3	90	98	94
1525	B/W - IDA , NEAR CHAITANYA CHLORIDES ,PASHAMAYLAM , MEDAK DIST.	30	30	30	7.6	7.6	7.6	446	446	446	3.0	3.0	3.0				0.20	0.20	0.20	0.10	0.10	0.10				3	3	3	85	85	85
1811	B/W. - PRIMARY SCHOOL - RUDRAVELLI (V) , BIBINAGAR (M), NALGONDA DIST., A.P	27	29	28	7.6	7.8	7.7	1133	1134	1134	12.0	12.0	12.0	0.1	1.1	0.6	0.80	0.90	0.90	0.10	0.10	0.10				3	3	3	96	100	98
1810	B/W - SRI RAMNAGAR COLONY, SAKKAR NAGAR, BODHAN, NIZAMABAD DIST. , A.P	28	30	29	7.4	7.5	7.5	835	1465	1150	18.0	18.0	18.0	0.2	0.2	0.2	0.60	2.60	1.60	0.10	0.10	0.10				3	3	3	96	100	98
1513	B.W. - KRISHNA MURTHY, D.NO. 48-16-43 AUTONAGAR VIJJAYAWADA, KRISNA DIST., A.P.	31	31	31	7.8	7.8	7.8	1180	1180	1180	22.0	22.0	22.0	1.7	1.7	1.7	20.1	20.1	20.1	0.10	0.10	0.10				2	2	2	1100	1100	1100
1514	B/W. - VIJAY KUMAR AUTONAGAR VIJAYAWADA, KRISHNA DIST., A.P.	28	30	29	7.8	8.0	7.9	1174	1903	1539	24.0	24.0	24.0	0.8	1.7	1.3	2.40	27.4	14.9	0.10	0.10	0.10				2	2	2	300	1100	700
1515	B/W. - NAGARAM(V), PALVONCHA, KHAMMAM DIST., A.P.	30	30	30	7.5	8.0	7.8	1106	1820	1463	10.0	10.0	10.0	1.0	1.4	1.2	2.20	3.90	3.10	0.10	0.10	0.10				2	2	2	280	800	540
1516	B W OF NAVLOK GARDENS NELLORE AP	31	31	31	7.6	7.6	7.6	584	584	584	20.0	20.0	20.0	1.6	1.6	1.6	0.50	0.50	0.50	0.10	0.10	0.10				2	2	2	2400	2400	2400
1517	B/W. - TUNGBHADRA RIVER NEAR KURNOOL, A.P.	26	28	27	7.5	7.8	7.7	1437	2080	1677	10.0	10.0	10.0	1.2	1.3	1.2	5.70	14.0	11.2	0.10	0.10	0.10				4	11	8	17	160	79
1518	B/W. - NANDYAL, KURNOOL DIST., A.P.	26	29	28	7.4	7.5	7.5	1628	1645	1637	10.0	10.0	10.0	1.0	1.0	1.0	13.6	28.0	20.8	0.10	0.10	0.10				4	16	10	14	100	57
1519	B/W. - NAGIRI, CHITTOOR DIST., A.P.	22	25	23	7.7	7.8	7.8	1860	2350	2105	10.0	10.0	10.0	1.2	1.2	1.2	6.30	11.2	8.80	0.10	0.10	0.10				2	6	4	14	27	21
1520	B/W. - SWARNAMUKHI RIVER, SRIKALAHASTI, CHITTOOR DIST., A.P.	24	25	25	7.7	7.8	7.8	2030	2330	2180	10.0	10.0	10.0	1.0	1.4	1.2	8.40	9.50	9.00	0.10	0.10	0.10				2	4	3	12	26	19
1521	O/W. - NEAR RAMA TEMPLE , WARD No.2 , MINDI , VISAKHAPATNAM, A.P.	28	28	28	7.3	7.6	7.5	5040	7380	6210	3.0	3.0	3.0	0.4	0.5	0.5	5.10	6.50	5.80	0.10	0.10	0.10	4.20	4.20	4.20	0	0	0	4000	5000	4500
1522	O/W. PEDDANUYYI - MIZIANAGARAM, A.P	29	29	29	7.3	7.3	7.3	1056	2350	1703	4.0	4.0	4.0	0.2	0.2	0.2	31.6	42.7	37.2	0.10	0.10	0.10	1.50	1.50	1.50	0	0	0	5000	8000	6500
1523	B/W. - NEAR M/S ANDHRA SUGARS LTD. , KOVVUR , W.G.DIST., A.P	28	28	28	6.9	7.2	7.1	280	2040	1160	2.0	2.0	2.0	0.0	0.2	0.1	0.10	45.8	23.0	0.10	0.10	0.10	0.50	0.50	0.50	0	9	5	250	10000	5125
1524	O/W. -NEAR PARTAP NAGAR BRIDGE -KAKINADA , E.G.DIST., A.P	27	27	27	7.3	7.3	7.3	2040	3120	2580	3.0	3.0	3.0	0.2	0.2	0.2	10.6	16.8	13.7	0.50	0.50	0.50	1.80	1.80	1.80	0	0	0	6000	12000	9000

TABLE 20.2 :- WATER QUALITY OF GROUND WATER IN ASSAM, MEGHALAYA, MIZORAM & TRIPURA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1533	*DIGBOI, TINSUKIA DISTT., ASSAM	7	26	16	6.6	7.2	6.9	338	355	347	19.5	19.5	19.5	0.6	1.5	1.1	0.20	0.30	0.30				0.50	0.50	0.50				0	360	180
1534	*KARBI ANGLONG DISTT., ASSAM	23	23	23	6.8	6.8	6.8	309	309	309	4.4	4.4	4.4	1.6	1.6	1.6	0.10	0.10	0.10				0.90	0.90	0.90							
1535	*SIBSAGAR , ASSAM	23	25	24	6.6	6.8	6.7	240	469	355	16.5	16.5	16.5	0.2	4.5	2.4	0.10	0.30	0.20				0.50	0.50	0.50	0	730	365	0	1500	750
1536	*SIBSAGAR, ASSAM	21	23	22	6.8	6.9	6.9	238	270	254	6.0	6.0	6.0	2.5	4.3	3.4	0.10	0.10	0.10				0.10	0.10	0.10	0	2100	1050	0	9300	4650
1537	*JORHAT, ASSAM	20	26	23	6.9	7.4	7.2	97	360	229	2.8	2.8	2.8	0.8	1.1	1	0.30	1.00	0.70							0	910	455	360	1400	880
1538	*SILCHAR, ASSAM	26	28	27	6.0	6.7	6.4	316	405	361	9.3	9.3	9.3	0.5	1.6	1.1	0.10	0.70	0.40							1500	1500	1500	2800	240000	121400
1539	*BARPETA, ASSAM	28	29	29	7.2	8.1	7.7	441	538	490	11.0	11.0	11.0	0.3	6.8	3.6	0.10	0.10	0.10				0.40	0.40	0.40	720	1500	1110	2700	9300	6000
1540	*BONAIGAON, ASSAM	26	27	27	6.8	6.8	6.8	492	1294	893	3.1	3.1	3.1	0.2	0.9	0.6	0.40	0.40	0.40							910	4300	2605	4300	9300	6800
1541	*GUWAHATI, ASSAM	19	30	26	6.4	7.8	7.3	142	454	288	6.8	12.6	9.6	1.1	2.4	1.78	0.10	0.86	0.39				0.10	1.12	0.60	330	4300	1230	790	9300	2664
1542	*GUWAHATI, ASSAM	25	29	27	6.1	6.5	6.3	157	329	243	5.6	5.6	5.6	1.0	12.0	6.5	0.10	2.50	1.30				0.40	0.40	0.40	360	2100	1230	910	15000	7955
1634	POLICE BAZAR, SHILLONG, MEGHALAYA	17	19	18	7.2	7.5	7.4	160	183	172	6.0	6.0	6.0	2.8	3	2.9	6.70	8.20	7.50	0.10	0.10	0.10				23	33	28	46	70	58
1635	MAWLAI, SHILLONG, MEGHALAYA	17	20	18	6.9	7.1	7.0	235	245	240				2.5	2.8	2.7	9.20	12	10.6	0.10	0.10	0.10				23	140	82	43	170	107
1636	INDUSTRIAL ESTATE, BYRNIHAT, MEGHALAYA	20	25	23	7.0	7.2	7.1	236	250	243	10.8	10.8	10.8	1.2	1.7	1.5	1.20	9.10	5.20	0.10	0.10	0.10				17	23	20	26	33	30
1637	SOHRA CHERRAPUNJEE, MEGHALAYA	20	24	22	6.5	6.8	6.7	109	145	127	6.4	6.4	6.4	0.3	0.4	0.4	2.80	7.20	5.00	0.10	0.10	0.10				17	21	19	26	33	30
1638	SHANGPUNG, MEGHALAYA	15	19	17	7.0	7.1	7.1	125	137	131	9.6	9.6	9.6	0.6	1.1	0.9	0.20	4.20	2.20	0.10	0.10	0.10				21	22	22	26	33	30
2054	RAMHLUM (NORTHERN PART), MIZORAM	19	25	22	6.0	6.8	6.4	318	474	415				0.3	1.2	0.7				0.20	0.20	0.20							7	7	7
2055	MISSION VENGTHLANG (SOUTHERN PART), MIZORAM	19	24	21	6.6	7.6	7.1	394	740	594				0.2	2	0.9				0.10	0.10	0.10							3	3	3
1405	WELL AT UDAIPUR (TUBEWELL), TRIPURA	25	28	26	6.8	8.0	7.3	470	513	490							0.05	1.70	1.03	0.10	0.10	0.10									
1406	WELL AROUND UDAIPUR (TUBEWELL), TRIPURA	25	28	26	7.1	8.0	7.6	280	350	308							0.03	1.40	0.62	0.10	0.10	0.10									
1730	KUNJBAN, AGARTALA, TRIPURA	27	27	27	5.6	5.6	5.6	130	130	130							0.05	0.05	0.05												
1731	LANKAMURA, TRIPURA	28	28	28	6.5	6.5	6.5	48	48	48							0.05	0.05	0.05	0.10	0.10	0.10									
1732	A.D.NAGAR, AGARTALA, TRIPURA	26	26	26	5.9	5.9	5.9	62	62	62							0.05	0.05	0.05												
1733	SHIBNAGAR, AGARTALA, TRIPURA	26	26	26	6.6	6.6	6.6	110	110	110							0.05	0.05	0.05												
1734	GANDHIGRAM, AGARTALA, TRIPURA	27	27	27	7.2	7.2	7.2	85	85	85							0.05	0.05	0.05												

TABLE 20.3 :- WATER QUALITY OF GROUND WATER IN CHATTISGARH & MADHYA PRADESH - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - N (mg/l)			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	MIN	MAX	MEAN
1620	AT RAIPUR REGION, CHHATISSGARH.	25	30	28	7.1	7.9	7.5	426	788	610	19.2	38.4	27.7	0.2	0.8	0.7	2.70	2.80	2.74				0.10	0.40	0.30	2	9	5
1621	AT RAIPUR REGION,CHHATISSGARH	25	30	29	6.8	8.9	7.6	438	1398	760	19.2	40.0	28.8	0.2	2.8	1.2	2.50	8.50	4.53	0.70	0.70	0.70	0.10	0.70	0.40	2	12	5
1622	AT BILASPUR REGION, CHHATISSGARH	28	30	29	7.0	7.9	7.5	738	1869	1304				0.1	0.6	0.4	1.27	4.00	2.64	0.05	0.05	0.05	0.10	1.20	0.60	0	8	4
1623	AT BILASPUR REGION, CHHATISSGARH	28	30	29	7.1	7.8	7.5	210	1939	1075				0.1	0.5	0.3	1.19	3.00	2.09	0.05	0.05	0.05	1.20	1.30	1.30	0	6	3
52	WELL: SHRI RAO PRAJAPATI WELL , M. P.	25	25	25	7.5	7.8	7.6	866	1049	942	10.0	10.0	10.0	0.3	0.9	0.7	0.60	1.80	1.33	0.10	0.10	0.10	0.10	0.10	0.10	70	120	95
1616	OPEN WELL/TUBE WELL INDUSTRIAL AREA, GOVINDPURA, BHOPAL, M.P				6.1	6.7	6.5	1262	2225	1657	36.6	36.6	36.6	1.4	3	2.2	1.10	2.50	1.60	0.20	0.60	0.40	0.10	0.10	0.10	104	1600	704
1617	OPEN WELL/TUBE WELL INDUSTRIAL AREA MANDIDEEP, DISTT. RAISEN, M.P	30	30	30	7.3	8.2	7.7	576	888	783	29.0	29.0	29.0	1.2	2.5	2	0.10	0.60	0.35	0.20	0.20	0.20	0.10	0.10	0.10	32	980	415
1618	GROUND WATER SAMPLING AT TWO POINTS IN INDUSTRIAL AREA MALANPUR, M.P	25	27	26	6.6	7.8	7.3	1280	1290	1285	33.6	33.6	33.6	2.7	2.7	2.7	0.10	5.50	1.98									
1619	GROUND WATER SAMPLING AT TWO POINTS IN INDUSTRIAL AREA MALANPUR, M.P	18	28	22	7.2	7.9	7.7	1300	1480	1370	37.8	37.8	37.8				0.20	5.50	1.56									

TABLE 20.4:- WATER QUALITY OF GROUND WATER IN HIMACHAL PRADESH, CHANDIGARH AND PUNJAB - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1555	AT KALA AMB, H.P	24	24	24	8.0	8.7	8.3	810	976	893	58.2	97.0	77.6																		
1556	AT PAONTA SAHIB, H.P	21	27	24	6.8	7.5	7.2	700	812	750	32.6	54.0	43.3				0.50	0.60	0.55												
1557	AT PARWANOO, H.P	24	25	25	6.9	7.6	7.3	671	676	674	38.0	43.0	40.5				0.20	0.20	0.20												

1558	AT BADDI, H.P	27	28	28	7.3	7.8	7.5	455	457	456	5.7	6.0	5.9				0.60	0.70	0.70										
1559	AT BAROTIWALA, H.P	27	27	27	7.1	7.1	7.1	465	465	465	9.0	9.0	9.0				0.70	0.70	0.70										
1560	AT NALAGARH, H.P	27	33	30	6.9	7.8	7.3	1335	1337	1336	92.6	107	99.8				1.10	1.20	1.20										
1561	AT DAMTAL, H.P	16	28	22	7.2	8.0	7.6	373	823	598	86.5	86.5	86.5	0.1	0.1	0.1	0.30	5.10	2.70							2	2	2	4	4	4
1562	AT UNA, H.P	26	27	27	7.4	8.0	7.7	735	1047	891	110	114	112				0.60	0.80	0.70										
1872	SHIMLA D/S OF MSW DUMPING SIOT	15	15	15	8.8	8.8	8.8	578	578	578				10.0	10.0	10.0	0.70	0.70	0.70							80	80	80	390	390	390
1873	DHARAMSHALA KANGRA D/S OF MSW DUMPING SIOT	12	21	17	6.3	7.8	7.1	327	336	332	35.4	35.4	35.4	0.2	0.2	0.2	0.40	3.40	1.90							2	2	2	11	11	11
1875	MANDI-D/S OF MSW DUMPING SIOT	18	18	18	7.8	7.8	7.8	304	304	304	19.0	19.0	19.0				0.40	0.40	0.40										
1876	PARWANOO INDUSTRIAL AREA	24	24	24	7.7	7.7	7.7	771	771	771	82.0	82.0	82.0				0.30	0.30	0.30										
1877	BADDI INDUSTRIAL AREA	27	29	28	7.3	7.8	7.6	613	1327	970	42.4	273	158				0.90	1.20	1.10										
1878	BAROTIWALA INDUSTRIAL AREA	27	27	27	7.0	7.8	7.4	538	564	551	17.3	20.0	18.7				1.10	1.30	1.20										
1879	NALAGARH INDUSTRIAL AREA	29	32	31	7.3	7.3	7.3	1310	1481	1396	166	202	184				1.20	1.40	1.30										
1880	KALA AMB INDUSTRIAL AREA	24	24	24	7.7	8.0	7.8	629	790	710	34.0	59.6	46.8				0.10	0.10	0.10										
1881	PAONTA SAHIB INDUSTRIAL AREA	27	27	27	7.6	7.6	7.6	555	555	555	19.8	19.8	19.8				0.60	0.60	0.60										
1882	MEHATPUR INDUSTRIAL AREA	27	27	27	7.8	8.1	7.9	447	708	578	35.6	42.0	38.8				0.70	0.80	0.80										
1883	UNA INDUSTRIAL AREA	27	27	27	7.7	7.8	7.7	384	599	492	17.0	37.6	27.3				0.30	0.40	0.40										
2039	SECTOR 15, CHANDIGARH	25	28	27	6.8	6.9	6.9	842	852	847	28.0	28.0	28.0	0.0	0.1	0.1	4.30	4.80	4.55				0.10	0.10	0.10				
2040	SECTOR 22, CHANDIGARH	27	27	27	7.1	7.1	7.1	838	838	838	22.0	22.0	22.0	0.1	0.1	0.1	4.90	4.90	4.90										
2041	SECTOR 34, CHANDIGARH	25	26	26	7.0	7.1	7.1	670	899	785	40.0	40.0	40.0	0.1	0.2	0.2	4.60	6.30	5.45										
2042	SECTOR 47, CHANDIGARH	25	26	26	7.2	7.4	7.3	650	670	660	40.0	40.0	40.0	0.0	0.1	0.1	0.10	6.30	3.20										
2043	PALSORA VILLAGE, CHANDIGARH	25	27	26	6.9	7.3	7.1	1095	1476	1286	28.0	28.0	28.0	0.6	1.3	1	0.10	0.40	0.25										
2044	DHANAS VILLAGE, CHANDIGARH	25	25	25	6.9	7.1	7.0	867	950	909	14.0	14.0	14.0	0.1	0.2	0.2	1.10	6.30	3.70										
2045	DADU MAJRA, CHANDIGARH	25	27	26	6.8	7.2	7.0	842	871	857	26.0	26.0	26.0	0.0	0.3	0.2	1.70	4.80	3.25										
1898	PETROL PUMP OPP. HERO CYCLE, LUDHIANA	20	20	20	7.2	7.2	7.2	1290	1346	1318							0.10	0.20	0.15	0.10	0.10	0.10							
1899	BHAGWAN SINGH, H.NO.907, DASMESH NAGAR, GALI NO. 6, LUDHIANA	21	21	21	4.2	7.2	5.7	1360	1467	1414							2.20	2.20	2.20										
1900	GURCHHARAN SINGH HAIBOWAL DAIRY COMPLEX, LUDHIANA	20	20	20	7.1	7.1	7.1	422	711	567							1.10	1.10	1.10										
1901	DUSSHERA GROUND INDUSTRIAL ESTATE, LUDHIANA	21	21	21	7.4	7.4	7.4	428	569	499							2.10	2.10	2.10										
1902	SHUKLA TEA STAL POINT, LUDHIANA	19	19	19	7.3	7.3	7.3	1437	1520	1479							2.40	2.40	2.40										
1903	PUNJAB AGRICULTUREAL UNIVERSITY, LUDHIANA	20	20	20	7.2	7.2	7.2	461	478	470							2.60	2.60	2.60										

TABLE 20.5 :- WATER QUALITY OF GROUND WATER IN KERALA - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
19	WELL AT ELOOR, KERALA	24	28	25	5.6	7.1	5.8	146	330	181	3.2	3.2	1.6	0.3	2.0	0.8	1.80	10.6	4.28	0.10	0.10	0.09				0	140	30	12	960	280
22	WELL AT CHUNGAPALLY, KERALA	27	29	28	5.3	6.6	6.0	94	117	106	4.0	4.0	4.0	0.6	1.0	0.8	0.30	1.40	0.85	0.10	0.10	0.10				0	60	30	110	140	125
35	WELL AT PUNALUR, KERALA	28	28	28	6.6	6.9	6.8	242	457	350	16.0	16.0	16.0	1.0	1.1	1.1	4.70	7.50	6.10	0.10	0.10	0.10	4.50	4.50	4.50	40	70	55	80	100	90
1581	PAPPANAMKODE,THIRUVANANTHAPURAM, KERALA	27	30	29	5.3	5.7	5.5	138	330	234	8.0	8.0	8.0	0.5	2.8	1.7	0.40	0.50	0.45	0.10	0.10	0.10				0	90	45	0	220	110
1582	NEDUMANGAD,THIRUVANANTHAPURAM, KERALA	27	29	28	5.7	6.4	6.1	240	700	470	8.0	8.0	8.0	1.8	3.0	2.4	0.50	1.20	0.85	0.10	0.10	0.10				0	80	40	0	170	85
1583	KUNDARA,KOLLAM DISTT. , KERALA	28	28	28	4.0	4.7	4.4	178	190	184	6.0	6.0	6.0	0.8	1.2	1.0	4.10	5.80	4.95	0.10	0.10	0.10				80	1280	680	120	1700	910
1584	CHERTHALA,ALLEPPY, KERALA	27	28	27	6.0	6.7	6.4	120	220	170	3.2	3.2	3.2	1.0	1.0	1.0	0.20	0.30	0.25	0.10	0.10	0.10				190	240	215	800	1670	1235
1585	VYTTILA,ERNAKULAM DISTT. , KERALA	26	28	27	6.7	7.6	7.2	310	515	413	3.2	3.2	3.2	0.8	1.2	1.0	0.70	1.40	1.05	0.10	0.20	0.15				60	60	60	310	540	425
1586	EDAYAR ERNAKULAM DISTT., KERALA	28	28	28	5.8	6.6	6.2	141	200	171	1.6	1.6	1.6	0.4	0.5	0.5	2.50	4.60	3.55	0.10	0.10	0.10				0	30	15	3	120	62
1587	KALAMASSERY ERNAKULAM DISTT., KERALA	27	27	27	4.5	5.1	4.8	123	193	158	3.2	3.2	3.2	0.5	0.5	0.5	8.00	8.40	8.20	0.10	0.10	0.10				10	50	30	100	100	100
1588	PUNKUNNAM TRISSUR DISTT. , KERALA	28	28	28	5.6	5.8	5.7	181	190	186	3.2	3.2	3.2	1.2	1.6	1.4	3.20	4.60	3.90	0.05	0.10	0.08				4	10	7	40	90	65
1589	MALAPURAM , KERALA	26	27	27	5.8	6.0	5.9	320	420	370	6.0	6.0	6.0	0.7	1.0	0.9	3.20	4.40	3.80	0.05	0.10	0.08	0.10	0.10	0.10	80	120	100	300	400	350
1590	MAVOOR, KOZHIKKODE DISTT., KERALA	28	28	28	5.5	6.2	5.9	112	156	134	6.0	6.0	6.0	0.4	1.0	0.7	2.30	2.70	2.50	0.10	0.10	0.10				0	170	85	140	400	270
1591	KANNUR (MUNICIPALITY) KANNUR DISTTM , KERALA	26	30	28	4.6	5.1	4.9	90	123	107	8.0	8.0	8.0	1.0	1.6	1.3	2.70	4.30	3.50	0.10	0.10	0.10				0	80	40	160	200	180
1592	PAYYANNUR, KANNUR DISTT. , KERALA	26	30	28	6.0	6.1	6.1	168	204	186	10.0	10.0	10.0	0.3	0.4	0.4	2.30	3.40	2.85	0.10	0.10	0.10				0	20	10	80	200	140

TABLE 20.6:- WATER QUALITY OF GROUND WATER IN TAMILNADU & PONDICHERRY - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1449	COLLECTOR WELL AT THIRUPUVANAM FOR MADURAI WAT. SUPPLY SCHEME, TAMILNADU	27	28	28	7.1	7.6	7.4	792	1068	930	16.0	16.0	16.0	2.3	3.2	2.8	0.09	0.10	0.09	0.10	0.10	0.10	5.00	5.00	5.00	2	7	5	6	21	14
1397	WELL AT MUTHIALPET AREA(I). PONDICHERRY	29	29	29	7.9	7.9	7.9	1565	1565	1565							0.10	0.10	0.10												
1398	WELL AT THENGAITHITTU AREA,(II) PONDICHERRY	29	31	30	6.2	7.7	7.0	1301	1544	1423	23.0	23.0	23.0	0.0	1.0	0.5	0.10	0.10	0.10												
1453	WELL AT MUTHARAPLATYAM (PWD), PONDICHERRY	28	31	29	6.3	8.1	7.2	666	781	724	14.0	14.0	14.0	0.0	2.0	1.0	0.10	0.20	0.15	0.10	0.10	0.10									
1454	WELL AT KALAPET,PONDI. UNIVER. ADMN. BLOCK,PONDICHERRY	20	32	26	5.9	6.6	6.3	82	256	169	12.0	39.0	25.5	0.0	1.3	0.7	0.10	0.30	0.20	0.10	0.10	0.10							2	2	2
1687	NEHRU STATUE, PONDICHERRY	28	31	30	6.7	7.8	7.2	1490	5240	3365	32.0	32.0	32.0	0.0	8.0	4.0	0.08	0.10	0.09												
1688	KATTERIKUPPAM, PODICHERRY	27	31	29	7.3	8.9	8.1	767	925	846	41.0	41.0	41.0				0.08	0.10	0.09												
1689	CHUNMBAR RIVER, PONDICHERRY	30	35	32	7.5	8.8	8.1	1153	37650	18672	48.0	48.0	48.0	0.0	9.0	5.7	0.10	0.10	0.10				0.20	1.00	0.70						
2009	KURUMBAPET, PONDICHERRY	28	31	30	6.3	7.6	6.9	467	560	514	12.0	12.0	12.0				0.09	0.10	0.10												
2010	METTUPALAYAM, PONDICHERRY	28	31	30	6.1	7.8	7.0	614	782	698	6.0	6.0	6.0				0.10	2.80	1.45												
2011	URUVAIYAR, PONDICHERRY	29	33	31	6.9	8.4	7.7	1472	1632	1552	22.0	22.0	22.0				0.10	2.00	1.05	1.00	1.00	1.00									
2012	KARUVADIKUPPAM, PONDICHERRY	30	31	30	7.0	7.2	7.1	330	708	519	38.0	38.0	38.0				0.10	2.00	1.05	1.00	1.00	1.00									
2013	T.R.PATTINAM, KARAIKAL, PONDICHERRY	26	30	28	7.6	9.0	8.3	2070	2526	2298	41.0	41.0	41.0	0.0	3.0	1.5	2.90	2.90	2.90	1.10	1.10	1.10									
2014	VADAMATTAM, KARAIKAL, PONDICHERRY	25	30	28	7.1	8.4	7.8	1344	4120	2732	32.0	32.0	32.0				2.70	2.70	2.70	1.30	1.30	1.30									

TABLE 20.7:- WATER QUALITY OF GROUND WATER IN DAMAN, MAHARASHTRA & GUJARAT - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1440	WELL AT SOMNATH INDUSTRIAL ESTATE, DAMAN				7.0	7.5	7.2	990	1740	1398							11.1	35.0	19.4	3.30	8.90	6.70									
1984	INDL. ESTATE TARAPUR	26	29	28	7.5	7.6	7.6	1312	1980	1646	28.0	28.0	28.0	6.5	8.0	7.3	5.00	8.00	6.50	0.10	0.10	0.10	0	110	55	13	1800	907			
1985	MIRA-BHAYANDER	23	29	26	7.3	7.8	7.6	3725	6424	5075	28.0	28.0	28.0	7.0	7.0	7.0	2.10	2.20	2.15	0.00	0.10	0.10	45	550	298	550	1800	1175			
1986	DAHANU	28	29	29	7.2	7.4	7.3	1511	2017	1764	24.0	24.0	24.0	4.4	5.0	4.7	0.80	2.40	1.60	0.00	0.30	0.20	21	25	23	80	130	105			
1987	VASAI	24	28	26	7.1	7.8	7.5	1089	1127	1108	28.0	28.0	28.0	5.0	7.0	6.0	0.80	1.00	0.90	0.50	0.70	0.60	25	350	188	900	1600	1250			
1988	PALGHAR	27	28	28	7.2	7.7	7.4	687	2424	1526	28.0	28.0	28.0	4.4	6.0	5.2	0.10	4.50	2.30	0.00	0.40	0.20	7	14	11	80	85	83			
1989	MSW SITE, TALOJA, RAIGAD	23	23	23	7.6	7.8	7.7	185	185	185	24.0	24.0	24.0	3.0	7.0	5.0	0.40	0.40	0.40	1.30	1.30	1.30	0	0	0	13	13	13			
1990	BMW SITE, BURUDGAON, AHMEDNAGAR	27	28	28	8.4	8.5	8.5	105	300	182	28.0	28.0	28.0	5.5	12.0	7.7	0.04	0.40	0.18	2.80	3.30	3.00	5	7	6	14	30	25			
1991	MSW SITE, PATHARDI, NASIK	25	29	27	7.6	7.7	7.7	178	1555	867	56.0	56.0	56.0	23.0	28.0	25.5	0.40	3.30	1.85	3.90	3.90	3.90	9	14	12	40	70	55			
1992	MSW SITE, PIMPRI-CHINCHWAD, PUNE	29	29	29	7.1	7.1	7.1	972	972	972				6.8	6.8	6.8	0.10	0.10	0.10	0.20	0.20	0.20	17	17	17	425	425	425			
1993	PHANDARPUR, GANGAPUR, AURANGABAD	28	32	30	7.6	7.8	7.7	1714	1976	1845				4.4	5.0	4.7	0.60	11.80	6.20	0.00	0.10	0.10	6	9	8	220	280	250			
1994	TPS-DURGAPUR, CHANDRAPUR	17	25	22	6.7	8.2	7.5	297	787	582	28.0	28.0	28.0	1.6	8.0	5.2	1.20	2.60	1.70	0.10	4.00	1.60	4	9	7	6	130	68			

1995	KHAPERKHEDA, NAGPUR	29	29	29	7.2	8.2	7.7	815	869	842	28.0	28.0	28.0	5.9	6.0	6.0	3.30	6.10	4.70	0.80	4.90	2.90	11	11	11	27	27	27
1996	KORADI, NAGPUR	27	29	28	7.2	7.8	7.5	1438	1507	1473	40.0	40.0	40.0	6.5	9.0	7.8	11.5	11.9	11.7	0.70	4.50	2.60	4	4	4	21	21	21
1997	RAIPUR, NAGPUR	27	28	28	7.0	8.2	7.6	1110	1857	1484	22.0	22.0	22.0	5.5	5.6	5.6	10.0	12.6	11.3	0.40	3.80	2.10	4	4	4	33	33	33
1998	BHAMNI, KALMESHWAR, NAGPUR	17	29	23	7.4	7.5	7.5	1675	2594	2135	36.0	36.0	36.0	8.0	10.0	9.0	2.40	3.30	2.85	0.80	4.60	2.70	9	11	10	12	25	19
1999	SANGERA GONDIA	27	32	30	7.4	7.9	7.7	410	1248	829	24.0	24.0	24.0	4.5	6.5	5.5	0.10	9.30	4.70	0.40	4.70	2.60	17	17	17	30	30	30
2000	BHANDEWARI, NAGPUR	29	29	29	7.8	8.0	7.9	1301	1346	1324	32.0	32.0	32.0	5.0	6.5	5.8	0.80	2.90	1.85	0.70	5.90	3.30	25	350	188	170	900	535
2001	SUKALI, AMRAVATI	27	27	27	7.5	8.3	7.9	458	1329	894	5.5	5.5	5.5	5.5	6.2	5.9	1.00	12.80	6.90	0.00	3.30	1.70	2	2	2	4	4	4
2002	AKOT, AKOLA	27	32	30	8.2	8.5	8.4	543	688	616	16.0	16.0	16.0	4.0	6.1	5.1	2.90	4.00	3.45	0.40	5.40	2.90	8	110	59	17	280	149
2003	SAWARGAON, YAVATMAL	20	27	24	7.4	8.2	7.8	357	1355	856	14.0	14.0	14.0	4.0	5.8	4.9	1.30	1.40	1.35	1.20	3.60	2.40	4	4	4	11	12	12
2004	PARVATI INDL. ESTATE, YADRAV, SHIROL	28	28	28	6.3	6.3	6.3	3562	3562	3562				2.2	2.2	2.2	0.20	0.20	0.20	0.10	0.10	0.10	2	2	2	4	4	4
2005	KHANJIRENAGAR, ICHALKARANJI	28	28	28	6.1	6.1	6.1	3812	3812	3812				2.0	2.0	2.0	0.10	0.10	0.10	0.70	0.70	0.70	2	2	2	6	6	6
2006	MIDC, SHINOLI, CHENDGAD	27	27	27	6.3	6.3	6.3	1531	1531	1531				2.2	2.2	2.2	0.10	0.10	0.10	0.70	0.70	0.70	2	2	2	4	4	4
2007	SAVALI, SANGLI	22	32	27	6.3	6.9	6.6	3240	3673	3457	16.0	16.0	16.0	1.4	2.2	1.8	1.70	5.20	3.45	0.10	0.20	0.20	1	2	2	2	9	6
2008	RASULWADI-SAMBARWADI, SANGLI	22	30	26	6.3	7.2	6.8	3295	4278	3787	24.0	24.0	24.0	1.8	3.4	2.6	2.10	5.20	3.65	0.20	0.20	0.20	17	17	17	130	280	205
3	WELL AT AHMEDABAD, GUJARAT	27	28	28	7.0	7.4	7.2	1600	1920	1760	8.0	8.0	8.0	1.0	3.0	2.0	3.20	3.50	3.35	0.10	0.10	0.10	2	2	2	5	5	5
1226	WELL AT NAROL, AHMEDABAD, GUJARAT	28	30	29	7.0	7.4	7.2	2190	2450	2320	16.0	16.0	16.0	1.0	2.0	1.5	0.40	4.60	2.50	0.10	0.10	0.10	2	2	2	5	5	5
1950	JUNAGADH	25	28	27	6.9	7.0	7.0	1590	1690	1640	15.0	28.0	21.5	1.3	1.3	1.3	0.10	0.10	0.10	0.20	0.50	0.40						
1951	RAJKOT	27	30	29	6.9	7.0	7.0	1540	1630	1585	4.0	26.0	15.0	1.0	1.5	1.3	0.10	0.10	0.10	0.20	0.20	0.20						
1952	SURENDRANAGAR	33	33	33	7.1	7.1	7.1	2420	2420	2420				1.0	1.0	1.0				0.20	0.20	0.20						
1953	JAMNAGAR	28	29	29	7.3	7.9	7.6	1430	1612	1521	6.0	6.0	6.0				2.23	4.54	3.39	0.28	0.56	0.42	3	3	3	7	7	7
1954	BHUJ	27	27	27	7.4	8.3	7.9	2210	2270	2240	6.0	6.0	6.0				0.10	0.29	0.20	0.56	0.56	0.56	3	4	4	7	15	11
1955	PALANPUR	28	29	29	7.5	7.6	7.6	1060	1700	1380	18.0	18.0	18.0	2.0	3.0	2.5	8.40	16.00	12.20	0.20	0.40	0.30	2	2	2	5	5	5
1956	MEHASANA	26	27	27	7.5	7.7	7.6	2250	2480	2365	16.0	16.0	16.0	1.0	2.0	1.5	1.20	4.00	2.60	0.10	0.20	0.10	2	2	2	5	5	5
1957	SIDDHPUR (DIST.PATAN)	27	27	27	7.8	7.8	7.8	1940	1940	1940	16.0	16.0	16.0	2.0	2.0	2.0	15.0	15.0	15.0	0.20	0.20	0.20	2	2	2	5	5	5
1958	HIMATNAGAR	26	27	27	7.3	8.0	7.6	728	1280	1004	12.0	12.0	12.0	0.9	2.0	1.5	4.00	6.30	5.15	0.10	0.20	0.10	2	2	2	5	5	5
1959	BOREWELL AT NADIAD	22	30	26	7.5	7.8	7.6	2360	2420	2390	7.0	7.0	7.0	1.8	3.8	2.8	0.08	1.56	0.82	0.18	0.18	0.18	2	3	3	4	9	7
1962	BOREWELL NO-3,GIDC-NANDESARI	21	30	26	7.5	7.7	7.6	1927	2360	2144	3.0	3.0	3.0	1.3	3.8	2.5	0.08	0.80	0.44	0.15	0.15	0.15	2	3	3	4	7	6
1961	BOREWELL AT GODHRA	26	27	27	7.0	7.7	7.4	1214	1619	1417				1.4	2.4	1.9	0.13	1.95	1.04				3	4	4	3	20	12
1960	WELL WATER AT DAHOD	27	27	27	7.4	8.0	7.7	753	1803	1278				1.0	2.0	1.5	0.31	3.99	2.15				2	3	3	4	14	9
1964	PANDESARA (INDSTRIAL) SURAT	29	29	29	8.5	8.5	8.5	2000	2000	2000	11.0	11.0	11.0	2.7	2.7	2.7	3.22	3.22	3.22	0.60	0.60	0.60	150	150	150	430	430	430
1965	MORA-HAJIRA (INDUSTRIAL), HAJIRA	28	28	28	8.0	8.0	8.0	1900	1900	1900	8.0	8.0	8.0	3.4	3.4	3.4	11.1	11.1	11.1	0.60	0.60	0.60	430	430	430	750	750	750
1966	GABHENI VILLAGE, SURAT (INDUSTRIAL)	32	32	32	8.4	8.4	8.4	760	760	760	6.0	6.0	6.0	1.2	1.2	1.2	0.12	0.12	0.12	0.80	0.80	0.80	430	430	430	750	750	750

TABLE 20.8:- WATER QUALITY OF GROUND WATER IN RAJASTHAN - 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1415	WELL OF LOOMJI, CHAUDHARY, NEAR NAYAGAON, PALI, (UIS 1 KM. FROM PALI TOWN), RAJASTHAN	21	23	22	8.0	8.1	8.1	5900	6500	6200	36.7	36.7	36.7	0.3	2.5	1.4	0.14	0.58	0.36				0.20	0.40	0.30	4	7	6	20	1100	560
1416	WELL OF BHOPAL SINGH, 24 Km. FROM PALI TOWN, RAJASTHAN	20	22	21	8.2	8.6	8.4	4600	16900	10750	118	118	118	0.6	6.5	3.6	0.14	0.58	0.36				0.20	3.10	1.60	3	7	5	14	150	82
1417	WELL (UIS 1 KM FROM JODHPUR TOWN), RAJASTHAN	17	25	21	7.5	7.9	7.7	15000	15700	15350	36.7	36.7	36.7	2.1	4.6	3.3	0.14	0.58	0.36				0.40	7.20	3.80	7	11	9	150	210	180
1706	RICO PUMP HOUSE NEAR MONTO MOTORS, MIA, ALWAR, RAJASTHAN	29	29	29	7.3	7.4	7.4	1160	1160	1160	10.4	10.4	10.4	0.6	1.2	0.9	0.16	0.38	0.27				0.20	0.80	0.50	4	4	4	9	9	9
1707	BORE WELL IN MODI ALKALIS & CHEMICALS, MIA, ALWAR, RAJASTHAN	29	29	29	7.3	7.4	7.4	890	960	925	11.2	11.2	11.2	0.8	1.1	0.9	0.22	0.58	0.40				0.40	0.40	0.40	3	3	3	4	4	4
1708	WELL KOTHI IN VILLAGE BAGAR RAJPUT, ALWAR, RAJASTHAN	24	26	25	7.4	7.4	7.4	4100	5300	4700	88.8	88.8	88.8	0.6	0.9	0.8	0.32	0.48	0.40				0.00	0.10	0.10	3	3	3	4	4	4
1709	WELL AT VILLAGE SANTHLA VERY NEAR BHIWADI INDUSTRIAL AREA, BHIWADI, RAJASTHAN	27	29	28	7.6	8.2	7.9	2000	2400	2200	13.3	13.3	13.3	0.7	1.8	1.2	0.30	0.38	0.34				0.30	0.40	0.40	4	4	4	9	20	15
1710	WELL AT VILLAGE ALUPUR, VERY NEAR BHIWADI INDUSTRIAL AREA, BHIWADI, RAJASTHAN	26	29	28	7.8	8.0	7.9	700	910	805	20.0	20.0	20.0	1.1	1.8	1.4	0.38	0.58	0.48				0.10	0.20	0.10	4	4	4	11	21	16
1711	WELL AT VILLAGE HARCHANDPUR, VERY NEAR, BHIWADI TO BHIWADI INDUSTRIAL AREA, BHIWADI, RAJASTHAN	28	29	29	7.8	7.9	7.8	1350	2900	2125	5.0	5.0	5.0	0.8	1.2	1	0.14	0.48	0.31				0.10	10.00	5.10	3	4	4	4	20	12
1712	WELL AT VILLAGE BHIWADI , VERY NEARTO BHIWADI INDUSTRIAL AREA, BHIWADI, RAJASTHAN	27	29	28	7.9	8.4	8.2	1110	1140	1125	3.3	3.3	3.3	0.2	1.1	0.6	0.14	0.48	0.31				0.10	0.10	0.10	4	4	4	4	14	9
1713	WELL AT VILLAGE GATTAL, NEAR BHIWADI TO BHIWADI INDUSTRIAL AREA, BHIWADI, RAJASTHAN	27	29	28	8.0	8.4	8.2	750	1150	950	5.8	5.8	5.8	0.4	1.2	0.8	0.14	0.48	0.31				0.00	0.00	0.00	3	4	4	4	14	9
1715	HAND PUMP NEAR SECONDARY SCHOOL ABOUT 300mt. FROM KANSUA NALLAH KOTA, RAJASTHAN	28	30	29	7.5	8.2	7.9	2100	3100	2600	2.5	2.5	2.5	0.4	0.4	0.4	0.74	0.74	0.74				0.20	7.20	3.70	3	4	4	7	14	11
1720	CHAUDHARY KA WELL VILLAGE PANIALA, KOTAPUTALI NEAR ASSOCIATED ALCOHOL BREVERIES LTD JAIPUR, RAJASTH	19	19	19	7.8	7.8	7.8	1000	1000	1000	8.3	8.3	8.3	1.7	1.7	1.7	0.16	0.16	0.16				0.00	0.00	0.00	4	4	4	14	14	14
1721	PHED WELL NEAR RAILWAY LINE JHOTAWARA, JAIPUR, RAJASTHAN	26	29	28	7.5	8.2	7.8	600	680	640	2.5	2.5	2.5	0.6	1.7	1.2	0.14	0.58	0.36				0.00	0.00	0.00	3	3	3	4	7	6
1722	PHED WELL NEAR NEI, KHATIPURA, RAJASTHAN	25	26	26	7.3	8.3	7.8	700	750	725	35.0	35.0	35.0	0.6	0.7	0.6	0.38	0.42	0.40				0.00	0.10	0.10	3	4	4	4	9	7
1723	HAND PUMP OF VIDHANI VILLAGE GONER ROAD JAIPUR, RAJASTHAN	27	28	28	7.4	8.1	7.8	2800	2900	2850	3.3	3.3	3.3	0.7	1.1	0.9	0.22	0.48	0.35				0.00	0.20	0.10	3	4	4	7	9	8
1724	WELL OF GOOJARON KI TALAI, MOHANA ROAD SANGANER JAIPUR, RAJASTHAN	27	28	28	8.0	8.5	8.2	1150	1500	1325	10.0	10.0	10.0	0.6	2.1	1.3	0.32	0.38	0.35				0.00	0.60	0.30	3	4	4	4	75	40
1725	PUBLIC HAND PUMP BEFORE SANGANER PULIA, RAJASTHAN	25	26	26	7.5	7.6	7.5	1300	1680	1490	30.9	30.9	30.9	0.3	1	0.7	0.16	0.58	0.37				0.10	0.40	0.30	3	3	3	7	9	8
2015	PABUPURA ROAD NEAR CIVIL AIR PORT, JODHPUR (MANGILAL RATHOR)	17	24	21	7.5	7.9	7.7	3600	4500	4050	88.4	88.4	88.4	1.7	4	2.8	0.74	1.66	1.20				0.40	3.90	2.20	20	28	24	460	1100	780
2016	VILLAGE VINAYAKIA, JODHPUR (HIRALAL KUMHAR)	17	24	21	7.2	7.5	7.4	2800	3000	2900	82.6	82.6	82.6	1.4	2.7	2	0.30	0.58	0.44				1.40	2.40	1.90	7	7	7	28	28	28
2017	VILLAGE VINAYAKIA, JODHPUR (BADRI KUMHAR)	17	24	21	7.2	7.4	7.3	3200	3500	3350	118	118	118	0.5	2	1.3	0.14	0.48	0.31				0.60	0.70	0.70	7	14	11	93	93	93
2018	VILLAGE VINAYAKIA, JODHPUR (HUKUM SINGH RATHORE)	17	24	21	7.4	7.6	7.5	7400	10200	8800	47.5	47.5	47.5	1	2.5	1.7	10.0	11.8	10.9				0.80	1.50	1.20	7	11	9	150	150	150
2019	NEAR UIT BRIDGE, UDAIPUR	26	29	28	7.1	8.6	7.8	1000	1500	1250	37.5	37.5	37.5	0.5	0.7	0.6	0.74	1.02	0.88				0.10	0.50	0.30	4	4	4	14	14	14
2020	NEW FATEHPURA, 200 FT.FROM PANCHWATI NALLAH, UDAIPUR	25	29	27	6.9	8.5	7.7	1300	1800	1550	40.0	40.0	40.0	0.5	1.2	0.9	0.74	1.02	0.88				0.00	2.10	1.10	3	7	5	4	14	9
2021	NEAR ARVIND GENERAL STORE, ALOO FACTORY, KACCHI BASTI, SARDARPURA, UDAIPUR	26	27	27	7.0	8.8	7.9	1180	1800	1490	35.9	35.9	35.9	0.7	0.9	0.8	0.48	0.48	0.48				0.00	0.50	0.30	3	4	4	7	7	7
2022	NEAR RANA PRATAP NAGAR, RAILWAY STATION, UDAIPUR	27	28	28	7.0	8.4	7.7	2000	2100	2050	40.9	40.9	40.9	0.4	0.6	0.5	0.30	0.48	0.39				0.20	0.60	0.40	3	3	3	4	7	6
2023	HOTEL ORIENT PLACE, SUBHAS NAGAR, UDAIPUR	25	28	27	7.0	7.7	7.4	2700	2800	2750	11.7	11.7	11.7	0.1	1	0.5	0.22	0.58	0.40				0.70	0.90	0.80	4	4	4	14	20	17
2024	IN SIDE SHIV TEMPLE NEAR AIR FORCE STATION AMER ROAD, JAIPUR	25	26	26	7.1	7.2	7.1	2300	2400	2350	36.7	36.7	36.7	0.3	0.9	0.6	0.38	0.38	0.38				0.00	1.00	0.50	3	7	5	4	20	12
2025	NEAR SHREE KALYANESHWAR MAHADEV TEMPLE, JAI SINGH PURA KHURD, JAIPUR.	25	25	25	7.4	7.5	7.5	200	2500	1350	39.2	39.2	39.2	0.2	0.9	0.6	0.16	0.58	0.37				0.00	0.40	0.20	3	3	3	7	14	11
2026	NEAR FOJI NAGAR, KACCHI BASTI, AMBABARI, JAIPUR	26	28	27	7.4	8.0	7.7	770	800	785	18.4	18.4	18.4	0.2	0.4	0.3	0.32	0.32	0.32				0.00	0.10	0.10	3	3	3	4	4	4
2027	NEAR ABN CENTRAL ACADEMY, SUSILPURA, SODALA, JAIPUR.	25	27	26	7.8	8.6	8.2	500	540	520	22.5	22.5	22.5	0.6	0.7	0.7	0.16	0.32	0.24							3	3	3	4	4	4
2028	NEAR SAMSHAN VISHWAKARMA NAGAR, MAHARANIFARM, JAIPUR	21	28	25	7.5	8.3	7.9	700	780	740	38.4	38.4	38.4	0.3	0.5	0.4	0.16	0.38	0.27				0.10	0.10	0.10	3	3	3	4	4	4
2029	NEAR GANDHI BHWAN, AJMER	22	25	24	7.7	7.9	7.8	810	1210	1010	30.0	30.0	30.0	0.4	1	0.7	0.48	15.60	8.04	0.10	0.10	0.10	0.00	0.10	0.10	3	4	4	14	20	17
2030	OPPOSITE PRIVATE BUS STAND, AJMER	21	25	23	7.5	7.7	7.6	2000	2700	2350	136	136	136	0.8	2.3	1.5	0.62	1.66	1.14	0.10	0.10	0.10	0.20	0.30	0.20	3	3	3	4	11	8
	NEAR 9 NO. PETROL PUMP, NEAR																														

2032	NEAR KHANPURA TALAB, AJMER	21	27	24	7.1	7.6	7.3	5200	9100	7150	151	151	151	1.5	1.5	1.5	1.02	2.76	1.89	0.10	0.10	0.10	0.20	0.50	0.30	4	4	4	14	20	17
2033	OUTSIDE JLN HOSPITAL, AJMER	21	25	23	7.3	7.7	7.5	2000	2900	2450	40.9	40.9	40.9	0.4	1.1	0.7	0.74	1.40	1.07				0.20	0.40	0.30	3	4	4	4	14	9

TABLE 20.9 :- WATER QUALITY OF GROUND WATER IN UTTAR PRADESH & UTTARANCHAL- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			NITRITE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN	MIN	MAX	MEAN
1736	GROUND WATER QUALITY STATION SARDARNAGAR, U.P	27	27	27	6.6	6.6	6.6	1280	1280	1280	62.0	62.0	62.0	6.2	6.2	6.2	3.60	3.60	3.60				2.10	2.10	2.10	100	100	100	220	220	220
1737	GROUND WATER QUALITY STATION CAPTANGANJ, U.P	26	26	26	6.9	6.9	6.9	794	794	794	38.0	38.0	38.0	4.0	4.0	4.0	3.00	3.00	3.00				1.30	1.30	1.30	60	60	60	100	100	100
1738	SITE 1, INDUSTRIAL AREA NEAR M/S WOODWARM CHEMICAL LTD., UNNAO, U.P	20	20	20	7.6	7.9	7.8	728	894	811							1.80	1.80	1.80	0.10	0.10	0.10									
1739	SITE 2, INDUSTRIAL AREA NEAR M/S AMIN SONS, UNNAO,U.P	20	20	20	7.5	7.9	7.7	1080	1092	1086							9.80	9.90	9.85	0.40	0.50	0.45									
1740	AT ROADWAYS BUS STATION, UNNAO, U.P				7.1	7.1	7.1	2439	2439	2439							24.2	24.2	24.2	0.50	0.50	0.50									
1741	MAGAWARA INDUSTRIAL AREA NEAR M/S JAMJAM TANNERS, UNNAO, U.P	20	20	20	7.6	7.8	7.7	762	795	779							8.90	9.10	9.00	0.40	0.40	0.40									
1742	CHINHAT INDUSTRIAL AREA IN LUCKNOW NEAR M/S INDIA PESTICIDES LUCKNOW, U.P				7.0	7.9	7.5	656	860	758							8.20	8.40	8.30	0.20	0.20	0.20									
1743	AISHBAGH INDUSTRIAL AREA AT LUCKNOW NEAR M/S EVEREADY INDUSTRIES LTD. LUCKNOW, U.P				7.3	7.3	7.3	884	1390	1137							12.1	13.2	12.7	0.20	0.20	0.20									
1744	JAJMAU INDUSTRIAL AREA No. 6 KANPUR, U.P				7.9	7.9	7.9	650	650	650																					
1745	PANKI INDUSTRIAL AREA NEAR INDUSTRY OF AMMONIA FERTIZER KANPUR, U.P				8.1	8.1	8.1	757	757	757																					
1746	NAGAR PALIKA TUBE WELL, SULTANPUR, U.P	27	32	30	7.5	7.5	7.5	655	1145	900							0.30	0.30	0.30				0.10	0.10	0.10						
1747	INDIA MARKA HAND PUMP IN SAROWNI BLOCK AT RAIBAREILLY, U.P	26	30	28	7.5	8.5	8.0	737	1260	999							0.20	0.20	0.20												
1749	TUBE WELL AT MEERUT CITY, U.P	20	24	22	7.7	7.8	7.8	740	748	744	24.0	28.0	26.0																8	12	10
1750	TUBE WELL AT BAGPAT CITY, U.P	20	25	23	7.7	7.8	7.8	860	872	866	32.0	36.0	34.0	0.4	0.6	0.5													9	17	13
1752	SAHIBABAD INDUSTRIAL AREA, GHAZIABAD, U.P				7.5	7.5	7.5	2260	2260	2260																					
1753	MEERUT ROAD INDUSTRIAL AREA GHAZIABAD, U.P				7.5	7.5	7.5	960	960	960																					
1754	HAPUR ROAD INDUSTRIAL AREA GHAZIABAD, U.P				7.5	7.5	7.5	680	680	680																					
1755	PILKHUA INDUSTRIAL AREA GHAZIABAD, U.P				7.5	7.5	7.5	1280	1280	1280																					
1757	MIRZAPUR INDUSTRIAL AREA, U.P	25	26	26	6.5	7.2	6.9	754	780	767																					
1759	PFCO, PHOOLPUR,ALLAHABAD, U.P	25	26	26	6.9	7.1	7.0	833	1313	1073																					
1760	M/S KANORIA CHEMICAL SONBHADRA, U.P.	26	26	26	6.2	7.1	6.7	693	791	742																					
1761	TUBE WELL IN SINGRAULI INDUSTRIAL AREA, U.P.	24	26	25	6.5	7.2	6.9	499	762	631																					
1748	HANDPUMP IN VILLAGE DAMAUDA AT KASHIPUR NEAR M/S INDIA GLYCOLES LTD., U.P	21	22	22	7.4	7.8	7.6	410	410	410	3	4	3.5	1.2	1.4	1.3													10	22	16

TABLE 20.10 :- WATER QUALITY OF GROUND WATER IN WEST BENGAL- 2007

STATION CODE	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - 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	MIN	MAX	MEAN
1813	RISHRA, NEAR ICI COMPLEX,WEST BENGAL	30	30	30	7.2	7.2	7.2	873	873	873				1.1	1.1	1.1	0.10	0.10	0.10	0.15	0.15	0.15						
1766	MINE PIT WATER ASSANSOL, WEST BENGAL	30	30	30	8.1	8.1	8.1	783	783	783				2.3	2.3	2.3	0.30	0.30	0.30	0.20	0.20	0.20	130	130	130	300	300	300
1767	DURGAPUR TOWN,NEAR IISCO, BURDWAN, WEST BENGAL	27	29	28	7.2	7.2	7.2	904	1025	965	8.8	8.8	8.8	0.3	0.3	0.3	0.20	0.65	0.42	0.20	0.50	0.35						
1768	DURGAPUR TOWN, BURDWAN, WEST BENGAL	28	29	29	6.6	6.8	6.7	818	855	837	8.6	8.6	8.6	0.3	0.3	0.3	6.99	9.60	8.30	0.30	0.49	0.40	0	700	350	0	900	450
1769	INSIDE HINDUSTAN LIVER FACTORY, HALDIA, WEST BENGAL	31	35	33	7.5	7.8	7.7	2070	2130	2100	7.3	7.3	7.3	1.2	4.0	2.6	0.10	1.00	0.55	0.50	0.60	0.55				0	2	1
1770	NEAR IOC REFINERY HALDIA, WEST BENGAL	27	36	31	7.6	7.8	7.7	1662	1938	1800	17.8	17.8	17.8	0.8	1.4	1.1	0.30	1.00	0.65	0.30	0.40	0.35				0	4	2
1771	KALYANI INDUSTRIAL AREA, NADIA, WEST BENGAL	29	29	29	7.3	8.0	7.6	496	695	596	4.9	4.9	4.9	0.2	1.6	0.9	0.10	0.11	0.11	0.20	0.62	0.41						
1772	BARSAT MUNICIPALITY NORTH 24 P, WEST BENGAL	27	27	27	7.8	8.3	8.1	890	2060	1475	6.1	6.1	6.1	0.2	0.8	0.5	0.10	0.31	0.21	0.20	0.25	0.23						
1773	TANGRA, CALCUTTA ,WEST BENGAL	31	37	34	7.3	7.3	7.3	2000	2010	2005	5.5	5.5	5.5	0.4	0.7	0.6	0.10	0.10	0.10	0.40	0.50	0.45	0	2	1	0	4	2
1774	TOPSIA CALCUTTA, WEST BENGAL	29	30	30	7.3	7.5	7.4	1847	1870	1859	5.5	5.5	5.5	1.6	1.7	1.7	0.10	0.10	0.10	0.20	0.40	0.30	22	400	211	80	900	490
1775	DHAPA CALCUTTA, WEST BENGAL	27	28	28	7.6	7.7	7.7	1691	1721	1706	3.7	3.7	3.7	0.8	0.9	0.9	0.03	0.10	0.07	0.20	0.55	0.38						
1776	GARIA CALCUTTA, WEST BENGAL	29	29	29	7.4	8.2	7.8	1035	1060	1048	2.0	2.0	2.0	0.2	1.3	0.8	0.10	0.10	0.10	0.30	0.40	0.35	2	13	8	4	23	14
1777	BEHALA CALCUTTA, WEST BENGAL	29	29	29	7.5	7.6	7.6	847	958	903	1.6	1.6	1.6	0.6	1.1	0.9	0.10	1.00	0.55	0.20	0.60	0.40	0	80	40	0	170	85
1778	DOMJUR HOWRAH, WEST BENGAL	28	29	28	7.6	7.7	7.7	1113	1131	1122	2.0	2.0	2.0	0.6	0.6	0.6	0.10	1.00	0.55	0.60	0.70	0.65	2	7	5	4	11	8
1779	DANKUNI (NEAR COAL COMPLEX), WEST BENGAL	29	29	29	7.2	7.4	7.3	952	998	975	1.0	1.0	1.0	0.5	1.2	0.9	0.10	0.10	0.10	0.10	0.10	0.10						
1931	COSSIPORE - NORTH KOLKATA	26	27	27	7.6	7.8	7.7	2420	2420	2420	7.0	7.0	7.0	0.2	0.8	0.5	0.10	0.10	0.10	0.60	0.90	0.75						
1932	CENTRAL KOLKATA	25	29	27	8.0	8.2	8.1	2540	2590	2565	2.0	2.0	2.0	0.2	0.6	0.4	0.10	0.10	0.10	0.40	0.90	0.65	0	2	1	0	4	2
1933	NEAR GALVANISATION UNIT, HOWRAH	26	27	27	7.8	7.8	7.8	1159	1229	1194	3.2	3.2	3.2	0.6	3.9	2.3	0.10	0.10	0.10	0.30	0.80	0.55	0	4	2	0	7	4
1934	CENTRAL HOWRAH-RESIDENTAIL AREA	25	28	26	7.5	7.8	7.7	2540	2570	2555	6.4	6.4	6.4	1.2	1.2	1.2	0.10	0.10	0.10	0.60	0.60	0.60						
1935	INSIDE KOLKATA LEATHER COMPLEX	27	28	27	7.6	7.9	7.8	1476	1491	1484	4.0	4.0	4.0	0.1	0.5	0.3	0.10	0.10	0.10	0.30	0.60	0.45						
1936	RESIDENTIAL AREA - SONARPUR	26	30	28	7.6	8.1	7.9	875	908	892	3.2	3.2	3.2	0.2	0.3	0.3	0.10	0.10	0.10	0.30	0.60	0.45	2	8	5	4	17	11
1937	RAJARHAT - NEW TOWNSHIP	26	28	27	7.5	7.8	7.7	2140	2160	2150	3.0	3.0	3.0	0.3	1.0	0.7	0.10	0.10	0.10	0.40	0.50	0.45						
1938	BASIRHAT MUNICIPALITY	32	32	32	8.2	8.4	8.3	1098	2140	1619	7.4	7.4	7.4	0.3	0.9	0.6	0.10	0.21	0.16	0.40	0.65	0.53	0	1	1	0	2	1
1939	BARRACKPORE MUNICIPALITY	28	28	28	7.7	8.2	8.0	443	448	446	6.8	6.8	6.8	0.1	0.3	0.2	0.10	0.24	0.17	0.31	0.60	0.46						
1940	NEAR PHOSPHATE COMPANY,M.G SARANI,RISHRA,WEST BENGAL	30	30	30	7.3	7.6	7.5	781	789	785	1.0	1.0	1.0	0.1	1.1	0.6	0.10	0.10	0.10	0.10	0.42	0.26						
1941	NEAR FLY ASH DUMPING SITE-KUNTIGHAT, BANDEL	29	34	31	7.3	7.4	7.4	461	464	463	1.0	1.0	1.0	0.6	0.8	0.7	0.10	0.10	0.10	0.10	0.50	0.30						
1942	NEAR EXIDE INDUSTRIES-HALDIA	31	35	33	7.8	7.9	7.9	1430	1521	1476	4.2	4.2	4.2	0.1	0.3	0.2	0.10	0.10	0.10	0.50	1.00	0.75						
1943	INSIDE TATA METALIKS, KHARAGPUR	31	31	31	7.5	7.9	7.7	529	619	574	3.3	3.3	3.3	0.0	1.0	0.5	0.10	0.10	0.10	0.30	0.50	0.40						
1944	KHARAGPUR INDUSTRIAL AREA	30	31	31	6.5	7.4	7.0	135	157	146	8.7	8.7	8.7	0.2	0.9	0.6	0.10	0.10	0.10	0.10	0.50	0.30						
1945	ENGLISH BAZAR- MALDAH	29	29	29	7.3	7.3	7.3	668	668	668	8.0	8.0	8.0	0.4	0.4	0.4	0.10	0.10	0.10	0.40	0.40	0.40	14	14	14	17	17	17

TABLE 20.11 :- WATER QUALITY OF GROUND WATER IN ORISSA- 2007

Station Code	LOCATIONS	TEMPERATURE °C			pH			CONDUCTIVITY (µmhos/cm)			C.O.D. (mg/l)			B.O.D. (mg/l)			NITRATE (mg/l)			AMMONIA - N (mg/l)		
		MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
1644	JAGATPUR INDUSTRIAL AREA, CUTTACK ORISSA	28	28	28	7.8	7.8	7.8	1266	1266	1266	3.0	3.0	3.0	0.4	0.4	0.4	8.76	8.76	8.76	0.60	0.60	0.60
1645	MADHUPATNA- KALYAN NAGAR AREA, CUTTACK, ORISSA	28	28	28	8.2	8.2	8.2	1606	1606	1606	3.0	3.0	3.0	0.8	0.8	0.8	6.28	6.28	6.28	0.60	0.60	0.60
1646	BIDANASHI - TULASIPUR AREA, CUTTACK, ORISSA	28	28	28	8.0	8.0	8.0	120	120	120	6.0	6.0	6.0	0.8	0.8	0.8	0.63	0.63	0.63	0.60	0.60	0.60
1647	BADAMBARI AREA, CUTTACK, ORISSA	28	28	28	8.3	8.3	8.3	408	408	408	3.0	3.0	3.0	0.4	0.4	0.4	2.41	2.41	2.41	0.60	0.60	0.60
1648	RANIHAT- MANGALABAGH AREA, CUTTACK, ORISSA	28	28	28	8.0	8.0	8.0	301	301	301	10.0	10.0	10.0	2.0	2.0	2.0	1.53	1.53	1.53	0.80	0.80	0.80
1649	KHANDAGIRI AREA, BHUBANESWAR, ORISSA	27	27	27	7.1	7.1	7.1	228	228	228	3.0	3.0	3.0	0.2	0.2	0.2	7.92	7.92	7.92	0.80	0.80	0.80

1650	CAPITAL HOSPITAL AREA, BHUBANESWAR, ORISSA	25	25	25	8.0	8.0	8.0	330	330	330	9.0	9.0	9.0	0.2	0.2	0.2	0.82	0.82	0.82	0.80	0.80	0.80
1651	OLD TOWN- SAMANTARAAIPUR AREA, BHUBANESWAR,ORISSA	25	25	25	8.2	8.2	8.2	213	213	213	6.0	6.0	6.0				0.36	0.36	0.36	0.60	0.60	0.60
1652	KALPNA - LAXMINAGAR AREA, BHUBANESWAR, ORISSA	25	25	25	7.0	7.0	7.0	157	157	157	3.0	3.0	3.0	0.2	0.2	0.2	6.22	6.22	6.22	0.60	0.60	0.60
1653	MANCHESWAR INDUSTRIAL AREA, BHUBANESWAR, ORISSA	27	27	27	7.0	7.0	7.0	196	196	196	6.0	6.0	6.0				3.72	3.72	3.72	1.10	1.10	1.10
1654	SECRETARIAT- GOVERNOR HOUSE- OLDBUS STAND AREA, BHUBANESWAR, ORISSA	26	26	26	8.0	8.0	8.0	507	507	507	6.0	6.0	6.0				8.68	8.68	8.68	1.70	1.70	1.70
1655	NEAR SEA BEACH, PURI, ORISSA	29	29	29	8.2	8.2	8.2	1003	1003	1003	6.0	6.0	6.0	0.6	0.6	0.6	14.7	14.7	14.7	0.80	0.80	0.80
1656	NEAR JAGANNATH TEMPLE, PURI, ORISSA	29	29	29	8.4	8.4	8.4	1299	1299	1299	3.0	3.0	3.0	0.2	0.2	0.2	22.0	22.0	22.0	0.60	0.60	0.60
1657	HOSPITAL - BUSSTAND-MAUSHIMA TEMPLE AREA, PURI, ORISSA	30	30	30	7.8	7.8	7.8	785	785	785	3.0	3.0	3.0	0.4	0.4	0.4	7.48	7.48	7.48	0.60	0.60	0.60
1658	NEAR RIVER KUSHABHADRA, PURI, ORISSA	28	28	28	8.3	8.3	8.3	448	448	448	3.0	3.0	3.0	0.2	0.2	0.2	0.25	0.25	0.25	0.60	0.60	0.60