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Assessment of Domestic Pollution Load from Urban Agglomeration in Ganga Basin: Rajasthan

GRBMP: Ganga River Basin Management Plan

by

Indian Institutes of Technology

IIT Bombay | IIT Delhi | IIT Guwahati | IIT Kanpur | IIT Kharagpur | IIT Madras | IIT Roorkee

Preface

In exercise of the powers conferred by sub-sections (1) and (3) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government has constituted National Ganga River Basin Authority (NGRBA) as a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the Central and State Government for effective abatement of pollution and conservation of the river Ganga. One of the important functions of the NGRBA is to prepare and implement a Ganga River Basin Management Plan (GRBMP).

A Consortium of 7 Indian Institute of Technology (IIT) has been given the responsibility of preparing Ganga River Basin Environment Management Plan (GRBMP) by the Ministry of Environment and Forests (MoEF), GOI, New Delhi. Memorandum of Agreement (MoA) has been signed between 7 IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and MoEF for this purpose on July 6, 2010.

This report is one of the many reports prepared by IITs to describe the strategy, information, methodology, analysis and suggestions and recommendations in developing Ganga River Basin Management Plan (GRB EMP). The overall Frame Work for documentation of GRBMP and Indexing of Reports is presented on the inside cover page.

There are two aspects to the development of GRB EMP. Dedicated people spent hours discussing concerns, issues and potential solutions to problems. This dedication leads to the preparation of reports that hope to articulate the outcome of the dialog in a way that is useful. Many people contributed to the preparation of this report directly or indirectly. This report is therefore truly a collective effort that reflects the cooperation of many, particularly those who are members of the IIT Team. Lists of persons who have contributed directly and those who have taken lead in preparing this report is given on the reverse side.

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1. Introduction

Rajasthan, largest State in India by area constituting 10.4 percent of the total geographical area of India, is located in the northwestern part of Indian subcontinent. It accounts for 5.5 percent of population of India (RSPCB, 2010). The state administratively divided into 33 districts, 244 Tehsils and 249 Panchayat Samities. It is bounded to the north and northeast by the states of Punjab and Haryana, to the east and southeast by the states of Uttar Pradesh and Madhya Pradesh, to the southwest by the state of Gujarat, and to the west and northwest by Pakistan. The geographic features of Rajasthan are the Thar Desert and the Aravalli Range. The rivers flow through eastern part of Aravalli and take their water to Bay of Bengal are Chambal, Kali Sindh, Parvati, Banas and their tributaries. Mahi, Luni, Sabarmati, Paschim Banas and their tributaries drain their water to the Arabian sea. The rivers *i.e.,* Ghagghar, Ban Ganga, Kantli, Sabi, Ruparel and Mendha, are flowing through the North Rajasthan and forms inland drainage system.

The Ganga River Basin (GRB) has a total catchment area of 1,086,000 sq km across India, China, Nepal and Bangladesh. The river basin nearly covers 26% (861,404 sq km) of the total geographical area of the country. Rajasthan is one of the 11 states (Uttarakhand, Uttar Pradesh, Bihar, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Rajasthan, Madhya Pradesh, Jharkhand and West Bengal) of the entire GRB in India through which the river Ganga or her tributaries flows. The state has most of the interstate rivers. The rivers contributing in Ganga River Basin are Banas, Kali Sindh, Parbati, Utangan and Chambal. The first three rivers meet with River Chambal (major tributary of river Yamuna) while Utangan river merges in River Yamuna which directly meet into river Ganga (Figure 1 and 2). The rivers of Rajasthan, except for the Chambal, are ephemeral and flow only during the rainy season.

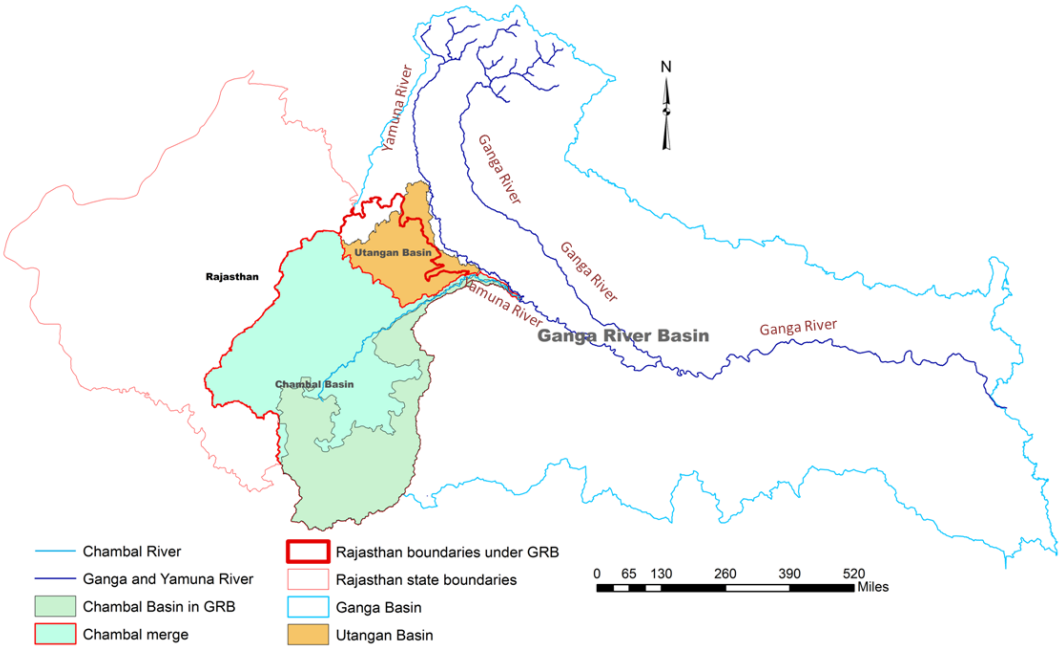

Figure 1: Major Sub-Basins of the State under Ganga River Basin

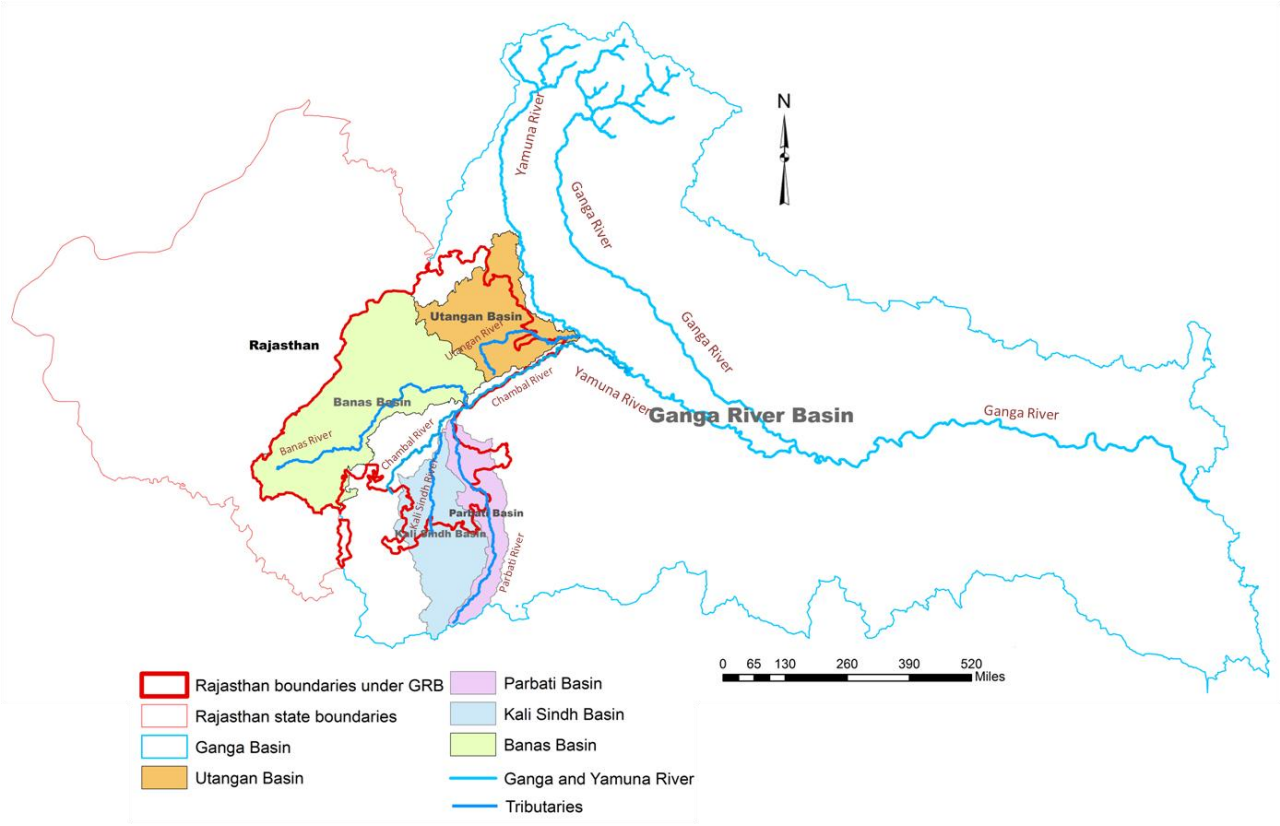

Figure 2: Major Sub-Basins of the State under Chambal River Basin

A comparison of state wise distribution of GRB area with the geographical area of different states is presented in Table 1. The salient features of the major tributaries of river Ganga flowing through the state are depicted in Table 2.

Table 1: State-wise Distribution of the Ganga River Basin Area

State/ Union Territory	Total Geographical Area (sq km)	Percentage of the Basin Area (%)
Uttarakhand	53,483	6.4
Uttar Pradesh	243,290	29.1
Bihar	94,163	11.2
Chhattisgarh	135,194.5	2.2
Delhi	1,484	0.2
Haryana	44,212	2.2
Himachal Pradesh	55,673	0.7
Rajasthan	**342,239**	**13.1**
Madhya Pradesh	308,245	21.7
Jharkhand	79,714	6.1
West Bengal	88,752	7.2

Table 2: The Salient Features of Tributaries of the Ganga River Basin Contributing to the River Ganga in the State of Rajasthan

	Major Tributaries/ Sub-tributaries of the state contributing to GRB				
Characteristics	**Kali Sindh**	**Chambal**	**Parbati**	**Banas**	**Utangan/ Gambhir**
Position	Right bank	Right bank	Right bank	Left bank	Right bank
Region of origin	Northern slopes of the Vindhyan mountains near Bagli village (District Dewas) in M.P.	North wards slope of the Vindhyan mountains in native state of Indore (M.P.)	North wards slope of the Vindhyan mountains	Khamnor hills of the Aravalli range near to Kumbhalgarh, Rajasthan	Hills near Hindaun Rural in Hindaun Subdivision in Karauli, Rajasthan
Mouth	Chambal	Yamuna	Chambal	Chambal	Yamuna
Total length (km)	278	960	436*	512	288*
Total catchment area (sq km)	7,944	143,219	15,861*	45,833	4,174
Percent catchment area in Rajasthan	-	40	-	-	-
River bed/ Soil texture	-	Stony rapid, sand banks and gravel bars	-	-	-

*Details of the river adopted from WRD, Rajasthan (2013); Gopal and Sah (1993); Dwivedi (2006)

2. Major Obstruction and Abstraction Projects on the Tributaries of the River Ganga Executed in the State

The natural flow regime in the rivers and their tributaries in the state have been altered due to construction of a number of dams, barrages and reservoirs for water conservation and irrigation. The details of the major projects on the rivers in the state are depicted in Table 3. The two main rivers of Rajasthan are Chambal and Luni. Chambal enters in the state at Chaurasigarh and flows along the eastern border between Rajasthan and Madhya Pradesh. Luni is the only river that flows across the western part of Rajasthan. The river flows to Gujarat, where it drains at the Rann of Kutch. Apart of these two river system the state has numerous seasonal rivers which disappear in the inland drainage system. The state has a huge area of the Thar Desert and river play a major role in the irrigation system of the state. Most of the dams and barrages in the state suffice the need of irrigation and only few of them (Jawahar Sagar Dam and Ranapratap Sagar Dam) are used for Hydroelectric purposes. According to the report

published by NRLD (2015), the state having 211 large dams (Dams with a maximum height of more than 15 metres from its deepest foundation to the crest) obstructed the flow of numerous rivers (Chambal, Unli, Tidi, Som, Wagon, Ara, Kali, Banas, Banganga, Parvati, Gambhiri, Mahi, Kakni, Jokham, Sabarmati, Katli, Sabi, Orai, Mantha and others) in the state. The list of the dams comes under GRB, its purpose for construction in the state and its current status are presented underneath (Table 3).

Table 3: Details of the Major Dams/ Barrages/ Weirs on the Tributaries of River Ganga in the State

Projects	Year	River	Purpose	Status
Abhaypura Dam	1976	Bhimlat	Irrigation	Completed
Aklera Sagar Dam	-	Chambal	Irrigation, Water Storage	Completed
Alnia Dam	1960	Alnia Hukud	Irrigation	Completed
Anwasa Dam	1981	Local Nallah	Irrigation	Completed
Arwar Dam	1957	Khari	Irrigation	Completed
Atawara Dam	1961	Banas	Irrigation	Completed
Badgaon Dam	1973	Berach	Irrigation	Completed
Bagolia Dam	1956	Berach	Irrigation	Completed
Bajrang Garh Dam	-	Sivani	Irrigation	Completed
Banakiya Dam	1962	Local Nallah	Irrigation	Completed
Baradpura/ Baradapura Dam	-	Banas	Irrigation	-
Baretha Bund Dam	-	Yamuna/ Gambhiri	Irrigation	Completed
Bari Mansarowar Dam	2000	Local Nallah	Irrigation	Completed
Barkheri Dam	1985	Local Nallah	Irrigation	Completed
Bassi Dam	1987	-	Irrigation	Completed
Basundni Dam	1981	Khari	Irrigation	Completed
Benthali/ Bethli/ Bethali Dam	1965	Bethali/ Benthali	Irrigation	Completed
Bhimlat Dam	1958	Bhimlat	Irrigation	Completed
Bhimsagar Dam	1997	-	Drinking / Water Supply, Irrigation	Completed
Bhopal Sagar Dam	1936	Berach	Irrigation	Completed
Bilas Dam	1996	Bilas	Irrigation	Completed
Bisalpur Dam	1999	Banas	Drinking / Water Supply, Irrigation	Completed
Borda Dam	1979	Local Nallah	Irrigation	Completed
Buchara Dam	1889	-	Irrigation	Completed
Bundika Gothra Dam	1957	Mej River	Irrigation	Completed
Burdha Dam	1904	Telera	Irrigation	Completed
Chacha Kheri Dam	2006	Sivani	Irrigation	Completed
Chandrabhaga Dam	1958	Chandrabhaga	Irrigation	Completed
Chandrana Dam	1871	Banganga	Irrigation	Completed
Chandsen/ Chandsen Bheru Dam	-	-	Irrigation	-

Chaparwara Dam	1894	Banas/ Local Nallah	Irrigation	Completed
Chauli Dam	2006	Chauli	Drinking / Water Supply, Irrigation	Completed
Chhapi Dam	2005	Chhapi	Drinking / Water Supply, Irrigation	Completed
Chikalwar Dam	-		Irrigation	-
Chittoli Dam	1950	Sabi/ Local Nala	Irrigation	Completed
Deopura Dam	1981	Nahari	Irrigation	Completed
Devliya/ Deolia/ Deoriya Dam	1982	Local Nallah	Irrigation	Completed
Dheel Dam	1911	Morel	Irrigation	Completed
Dindoli Dam		Banas	Irrigation	Completed
Domti Kokra Dam	1989	Moral/ Gandi/ Ganoli	Irrigation	-
Dorai Dam	1995	Brahmani	Irrigation	Completed
Dugari Dam	-	-	Irrigation	-
Fateh Sagar Dam	1889	Berach	Irrigation	Completed
Gadola Dam	1964	Local Nala	Irrigation	Completed
Gagrin Dam	-	Ahu	Irrigation	Under Construction
Galai Sagar Dam	-	-	Irrigation	-
Galwa Dam	1960	Galwa	Irrigation	Completed
Galwania Dam			Irrigation	
Gambhiri Dam	1958	Gambhiri	Irrigation	Completed
Gararda Dam	2010	Gararda	Irrigation	Completed
Gopalpura Dam	1980	Chambal/ Kul	Irrigation	Completed
Gosunda Dam	-	Banas	Irrigation	Completed
Govta Dam	1955	Manali	Irrigation	Completed
Gudha Dam	1958	-	Irrigation	Completed
Gulandi Dam	-	Gulandi	Irrigation	Under Construction
Hamja Kheri Dam	2002	Sivani	Irrigation	Completed
Harish Chandra Sagar Dam	-	-	Irrigation	-
Harsora/ Harsora Bund Dam	-	-	Irrigation	-
Hindlot Dam	-	Local Nallah	Irrigation	Completed
Hingonia Dam	1862	Banas/ Bandi	Irrigation	Completed
Jaisamand Dam	1910	Banganga/ Ruparail	Irrigation	Completed
Jawahar Sagar Dam	1973	Chambal	Hydroelectric, Irrigation	Completed
Jetpura Dam	1978	Unli	Irrigation	Completed
Jhadol Dam	1980	Local Nallah	Irrigation	Completed
Juggar Dam	1957	Juggar Banas	Irrigation	Completed
Kala Bhata Dam	1958	Khari	Irrigation	Completed
Kaladeh Dam	1964	Local Nallah	Irrigation	Completed
Kalakh Sagar Dam	1883	Local Nallah	Irrigation	Completed
Kalakho Dam	-		Irrigation	-

Kalisil Dam	1956	Kalisil Banas/ Kalisindh	Irrigation	Completed
Kalisindh Dam			Irrigation	
Kanota Dam	2001	Dhoond/ Dhundh	Irrigation	Completed
Kanyakheri Dam	1987	Local Nallah	Irrigation	Completed
Karoli Dam	1985	Local	Irrigation	Completed
Kharad Dam	1877	Banganga/ Local Nallah	Irrigation	Completed
Khari Dam	1957	Khari	Irrigation	Completed
Kothari Stage I Dam	1984	Kothari (Banas)	Irrigation	Completed
Ladki/ Larki Dam	1966	Kothari	Irrigation	Completed
Lassaria Dam	1982	Dai	Irrigation	Completed
Lhasi Dam	-	Lhasi	Irrigation	Under Construction
Luharia/ Loharia Dam	1984	Local Nallah	Irrigation	Completed
Madho Sagar Dam	1887	Banganga/ Local Nallah	Irrigation	Completed
Man Sarowar Dam	1957	Chambal/ Local Nallah	Irrigation	Completed
Mandal Dam	1973	Local Nallah	Irrigation	Completed
Mangalsar Dam	-	-	Irrigation	-
Manohar Thana Dam	-	-	Irrigation	-
Maoroli Bund Dam	-	-	Irrigation	-
Mashi Dam	1969	Bandi/ Mashi	Irrigation	Completed
Mata Ji Ka Kheda/ Khera Dam	-	-	Irrigation	-
Matrakundia/ Matrikundia/ Matrikundial Dam	1991	Banas	Irrigation	Completed
Meja Dam	1958	Kothari	Irrigation	Completed
Modia Mahadev Dam	1980	Local Nallah	Irrigation	Completed
Morasagar Dam	1978	Banas/ Local Nallah	Irrigation	Completed
Morel Dam	1959	Morel	Irrigation	Completed
Moti Sagar Dam	-	-	Irrigation	-
Motipura Dam	1999	Local Nallah	Irrigation	Completed
Mundliya Kheri Dam	1950	Local Nallah/ C. Bhaga	Irrigation	Completed
Murliya Dam	1968	Local Nallah	Irrigation	Completed
Nagdi Dam	1959	Nagdi	Irrigation	Completed
Nahar Sagar Dam	1909	Local Nallah	Irrigation	Completed
Nand Samand Dam	1958	Banas	Irrigation	Completed
Narayan Sagar Dam	-	-	Irrigation	-
Navratan Sagar Dam	2000	Local Nallah	Irrigation	Completed
Needar Dam	1990	Odher/ Local Nallah	Irrigation	Completed
Orai Dam	1973	Orai	Irrigation	Completed
Pachanpura Dam	1990	Erau	Irrigation	Completed

Pachki Baori Dam	1957	Began	Irrigation	Completed
Paibala Pura Dam	1957	Mej River	Irrigation	Completed
Panchana Dam	1977	Gambhiri/ Panchana	Irrigation	Completed
Parbati Dam	1963	Parbati	Irrigation	Completed
Patan (Deosagar) Dam	1956	Local Nallah	Irrigation	Completed
Patiyal Dam	1992	Banas	Irrigation	Completed
Piplad Dam	2011	Piplad	Drinking / Water Supply, Irrigation	Completed
Rajsamand Dam	1676	Gomti Banas	Irrigation, Water Storage	Completed
Ram Garh Dam	1903	Banqanga	Drinking / Water Supply, Irrigation	Completed
Ram Sagar Dam	1905	Parbati	Irrigation	Completed
Ranapratap Sagar Dam	1970	Chambal	Hydroelectric, Irrigation	Completed
Rondh Dam			Irrigation	
Ruparel Dam	2004	Ruparel	Irrigation	Completed
Sainthal Sagar/ Sainthal/ Sinthalsagar Dam	1898	Banganga/ Sawa	Irrigation	Completed
Sankal Khera Dam	-	Local Nallah	Irrigation	Completed
Sanwaria Sarover/ Sanwaryasrowar/ Sanwariya Dam	1997	Local Nallah / Erau	Irrigation	Completed
Saran Kheri Dam	1983	Local Nallah / Jahugiya	Irrigation	Completed
Sareri/ Sareru Dam	1957	Mansi	Irrigation	Completed
Sawan Bhado Dam	2001	-	Irrigation	Completed
Shakargarh Dam	2000	Local Nallah	Irrigation	Completed
Sheel Ki Dungri/ Dogri Dam	1990	Banas/ Dundh	Irrigation	Completed
Shiv-Sagar Dam	1993	Local Nallah	Irrigation	Completed
Silibari Dam	1956	Roop Rail/ Siliberi	Irrigation	Completed
Silised Dam		-	Irrigation	
Soniyana Dam		Local Nallah	Irrigation	Completed
Surwal Dam	1958	Gambhir/ Local Nala	Irrigation	Completed
Sushil Sagar/ Soshila Sagar Dam	1991	Local Nallah/ Tributaries of Mej	Irrigation	Completed
Swaroop Sagar Dam	1560	Sisarma	Water Storage	Completed
Takli Dam	-	Takli	Drinking / Water Supply, Irrigation	Under Construction
Tasai Dam		-		
Titora Dam	1982	Local Nallah	Irrigation	Completed
Tordi Sagar Dam	1887	Sohadra	Irrigation, Pisciculture	Completed
Udai Sagar Dam	1585	Berach	Irrigation	Completed
Ummed/ Umaid Sagar (Baran) Dam	-	Khari	Irrigation	Completed

Ummed/ Umed/ Umaid Sagar (Bhilwara) Dam	1917	Local Nallah	Irrigation	Completed
Uncha Dam	1984	Local Nallah	Irrigation	Completed
Urmila Sagar Dam	1905	Parbati	Irrigation	-
Utawali Dam	-		-	-
Wagon Dam	1984	Wagon	Irrigation	Completed

Adopted from India-WRIS (2015)

3. Demographic Profile of Ganga Basin in the State

Rajasthan in total has 16 Class I cities, 9 Class II towns and 58 Class III towns in catchment of Ganga River as per estimate (based on Census-2011). The total population of the state according to Census 2011 is 68 million out of which 24.87% belong to the urban area. The population density in the state is about 200 people per square kilometer. Some of the Class I cities of Rajasthan in GRB are Alwar, Baran, Bharatpur, Bhilwara, Bhiwadi, Bundi, Chittaurgarh, Dhaulpur, Gangapur, Hindaun, Jaipur, Kota, Kishangarh, Sawai Madhopur, Tonk and Udaipur. Among all the cities Jaipur and Kota are the most populated cities having more than 1 million resident people according to the Population Census 2011.

The population resident under major sub-basins (Banas, Chambal, Kali Sindh, Parbati and Utangan basin) lying in the state has also been estimated for both Class I and Class II cities/ towns. The river Chambal during its course in the state merges with number of tributaries and sub-tributaries and its basin covers three major sub-basins (river Banas, Kali Sindh and Parbati). Population of all the three sub-basins have been excluded from the Chambal basin to estimate the population distribution and pollution load of Class I Cities and Class II, Class III Towns resides in these sub-basin.

The largest population reside in Banas Basin (Class I: 50.43%) and least (Class I: 1.31%) in Parbati Basin in the state comes under GRB. Kali Sindh basin is the only sub-basin completely lacking with Class I town while Chambal and Parbati sub-basins are devoid of Class II towns. The least population of Class II town also belongs to Kali Sindh basin (0.74%) while maximum to Banas basin (4.11%). The total population resident outside the selected basins for Class I cities in the state is 1.17%. The overall share of Class III population in the state is 18.99%. Figure 3 shows the population distribution of Class I cities, Class II and III towns in the major sub-basins of GRB in the state.

The details of the area, population and the major river systems of all the Class I, II and III cities are presented in Tables 4-6, respectively. The average population of class I town in the state is 0.4 million, which is approximately six times and fourteen times higher than the population of class II and class III towns, respectively. Jaipur is the most populated class I city having the population of the order of 3.0 million while Bundi is the least populated (0.1 million) class I city. Dausa and Nasirabad are the cities having maximum and minimum population under class II towns of 0.08 and 0.05 million, respectively. In class III towns where the population is less than 0.05 million, the maximum population reside in the Kotputli town (0.049 million) while minimum is in Manoharpur (0.02 million).

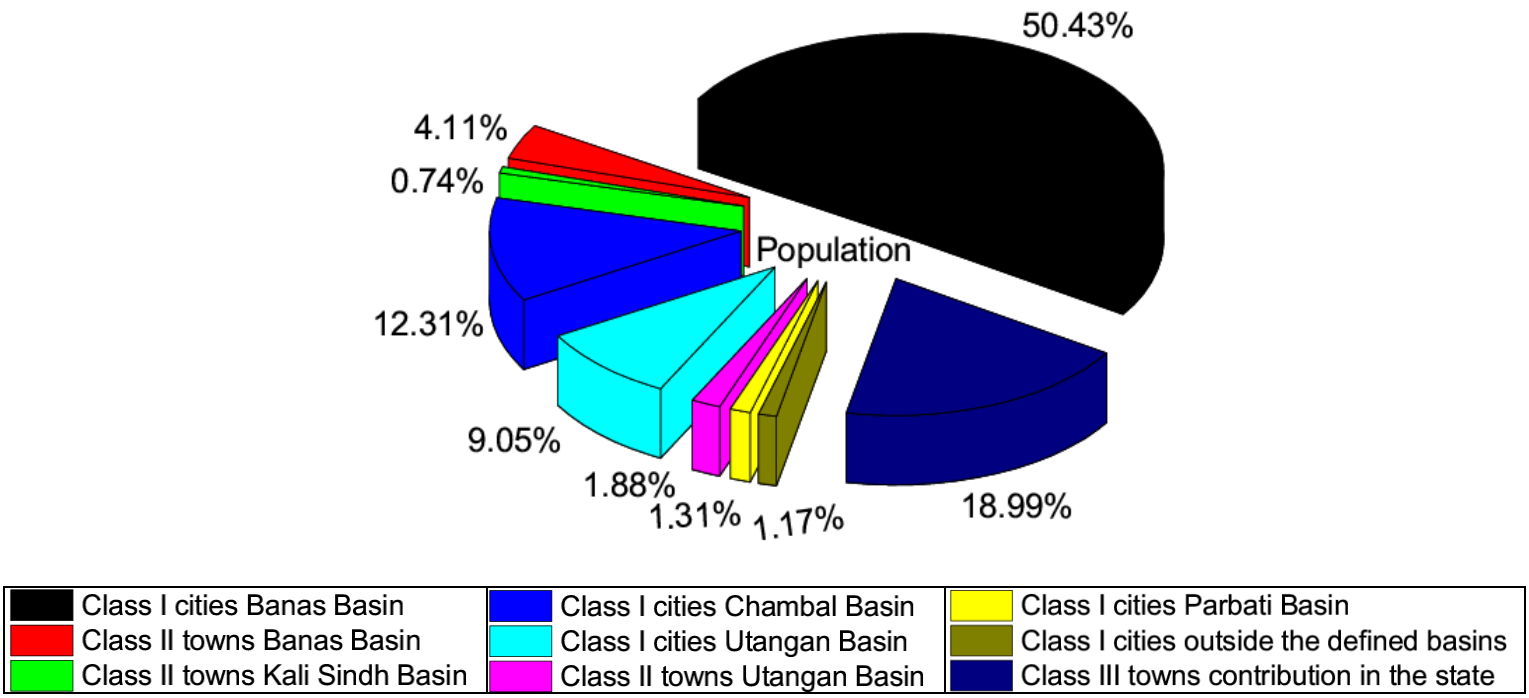

Figure 3: Population Distribution of Class I Cities and Class II, Class III Towns in the Major Basins in the State

Table 4: Demography of Major Class I Cities in the state of Rajasthan under GRB

S. No.	Place Name	River System	Area (Sq. Km.)	Population (Census 2011)
1	Alwar	Yamuna River	48.40	322,568
2	Baran	Parbati, Kali Sindh, Parvan River	72.36	117,992
3	Bharatpur	Yamuna River	57.77	252,838
4	Bhiwadi	Sahibi River	44.06	104,921
5	Bhilwara	Kothari, Banas River	118.49	359,483
6	Bundi	Mez, Chambal River	27.79	104,919
7	Chittaurgarh	Banas, Gambhiri River	41.76	116,406
8	Dhaulpur	Chambal, Utangan River	32.03	133,075
9	Gangapur	Kothari, Banas River	52.31	119,090
10	Hindaun	Utangan River	48.00	105,452
11	Jaipur	Banas River	484.64	3,046,163
12	Kishangarh	Luni River	45.49	154,886
13	Kota	Chambal, Kali Sindh, Parvan, Mez River	527.03	1,001,694
14	Sawai Madhopur	Parbati, Banas River	59.00	121,106

15	Tonk	Banas River	60.50	165,294
16	Udaipur	Sabarmati, Ayad River	56.92	451,100

Table 5: Demography of Major Class II Cities in the state of Rajasthan under GRB

S. No.	Place Name	River System	Area (Sq. Km.)	Population (Census 2011)
1	Bari	Sabarmati, Ayad River	22.27	62,721
2	Chomun	-	22.53	64,417
3	Dausa	Utanganga, Banganga River	16.00	85,960
4	Jhalawar	Kali Sindh, Ahu River	12.95	66,919
5	Karauli	Chambal, Utanganga River	35.00	82,960
6	Kuchaman	Luni River	12.50	61,969
7	Nasirabad	Luni, Khari River	22.93	50,804
8	Nimbahera	Banas River	12.74	61,949
9	Rajsamand	Banas, Gomati, Rajpura River	55.00	67,798

Table 6: Demography of Major Class III Cities in the state of Rajasthan under GRB

S. No.	Place Name	River System	Area (Sq. Km.)	Population (Census 2011)
1	Aklera	Choti Nadi,Chapi River	5.00	26,240
2	Antah	Parvan, Kali Sindh, Parbati River	23.48	32,377
3	Bagru	-	10.00	26,091
4	Bandikui	Banganga River	5.00	44,664
5	Bassi	Banganga River	20.40	26,029
6	Bayana	Utangan River	5.68	38,502
7	Begun	Brahmini River	6.62	20,705
8	Behror	-	15.12	29,531
9	Bhawani Mandi	Piplaad, Ahu River	40.00	42,283
10	Borawar	Khari RIver	24.00	24,975
11	Chaksu	Banas River	13.25	33,432
12	Chhabra	Parbati River	9.00	32,285
13	Deeg	Yamuna River	3.29	44,999
14	Deoli	Banas, Khari River	3.75	22,065
15	Fatehnagar	Banas River	15.00	22,812
16	Gulabpura	Khari River	12.00	27,215
17	Jahazpur	Banas, Khari River	5.00	20,586
18	Jhalrapatan	Kali Sindh, Ahu River	20.17	37,506
19	Kaithoon	Chandrelohi, Chambal, KaliSindh, Parvan River	17.23	24,260

20	Kaman	Yamuna River	6.00	38,040
21	Kapasan	Banas, Berach River	26.75	20,869
22	Kaprain	Chambal, Mez, Kali Sindh River	64.00	20,748
23	Karanpur	Banas River	4.85	21,297
24	Kekri	Banas, Khari River	7.00	41,890
25	Keshoraipatan	Chambal, Mez River	25.90	24,627
26	Khairthal	-	21.09	38,298
27	Kishangarh Renwal	-	25.94	29,201
28	Kotputli	-	36.00	49,202
29	Kumher	Yamuna River	19.62	23,540
30	Lakheri	Mez, Parbati, Chambal River	25.00	29,572
31	Lalsot	Banas River	9.42	34,363
32	Mahwa	Banganga, Utangan River	3.06	24,846
33	Malpura	Banas River	45.35	36,028
34	Mangrol	Parbati, KaliSindh River	27.45	25,073
35	Manoharpur	-	12.11	20,287
36	Nadbai	Utangan River	14.91	26,411
37	Nagar	Banganga River	3.61	25,572
38	Nandri	Banganga, Utangan River	6.90	20,827
39	Nathdwara	Banas River	24.00	42,016
40	Nawa	-	24.00	22,088
41	Niwai	Banas River	48.00	37,765
42	Phulera	-	10.00	26,091
43	Rajakhera	Utangan, Chambal River	10.00	33,666
44	Rajgarh	Banganga Rivver	25.00	26,631
45	Ramganj Mandi	Ahu, Kali Sindh RIver	10.82	41,328
46	Ramgarh	-	2.57	33,024
47	Rawatbhata	Chambal River	21.53	37,699
48	Reengus	-	30.00	26,139
49	Sambhar	-	12.50	22,327
50	Sangod	Sangod, Kali Sindh, Parvan River	14.89	21,846
51	Sarwar	Khari River	5.00	20,372
52	Shahpura (Bhilwara)	Banas, Khari, Maansi, Kothari River	56.52	30,320
53	Shahpura (Jaipur)	-	64.00	33,895
54	Shri Madhopur	-	16.00	31,366
55	Suket	Ahu, Kali Sindh River	9.52	22,319
56	Tijara	-	21.00	24,747
57	Todabhim	Banganga, Utangan River	5.00	22,977
58	Todaraisingh	Banas, Khari River	54.14	23,559

4. Pollution Load

The major pollution load in the area of basin under the state is due to point and nonpoint sources. Discharges of untreated/partially treated sewage from urban centres, discharge from open drain carrying sewage, discharges from the tributaries and discharge of untreated/partially treated wastewater from industrial units are the major point sources that contribute to the pollution load in the state. Chambal, Utangan, Banas, Kali Sindh and Parbati are the major river basins under GRB in the state.

The total sewage generation of Class I cities & Class II towns (MLD) in the state is 1382.37 and 147.79 MLD, respectively while the treatment capacity of the respective cities/towns is 3.9% of the total sewage generated for Class I cities and no sewage treatment units are available for Class II cities sewage treatment (CPCB, 2009) (Figure 4). According to the same report, the total sewage generation of the Class I cities under GRB (Tonk, Kota, Udaipur, Bhilwara and Alwar) are in the state is 313.3 MLD while the treatment capacity of the cities in the state under GRB is negligible. The complete discharge of sewage generated through Class I cities is in the tributaries and sub-tributaries of river Ganga *i.e.,* Banas, Chambal, Arvari, Kothari and Yamuna, as no town comes in direct contact with the river Ganga. Jaipur is the only Class I town where the disposal is on land (367.2 MLD) with 14.7% of the sewage treatment capacity. The sewage generated by Class II towns (Chittaurgarh, Baran, Gangapur city, Bundi, Dhaulpur and Sawai Madhopur) in the state under GRB is 37.5 MLD, discharge directly into the tributaries/ subtributaries (Berach and Chambal). Other Class II towns (Jhunjhunun, Kishangarh, Bharatpur, Makrana, Nawalgarh, Hindaun and Nimbahera) under GRB disposed their generated sewage (85.0 MLD) on the land. According to the other report published by CPCB (2009), the total waste water, 460.3 MLD is generated in the state which either disposes directly into the tributaries or subtributaries (210.7 MLD) of the Ganga or in the land/low lying areas (249.6 MLD).

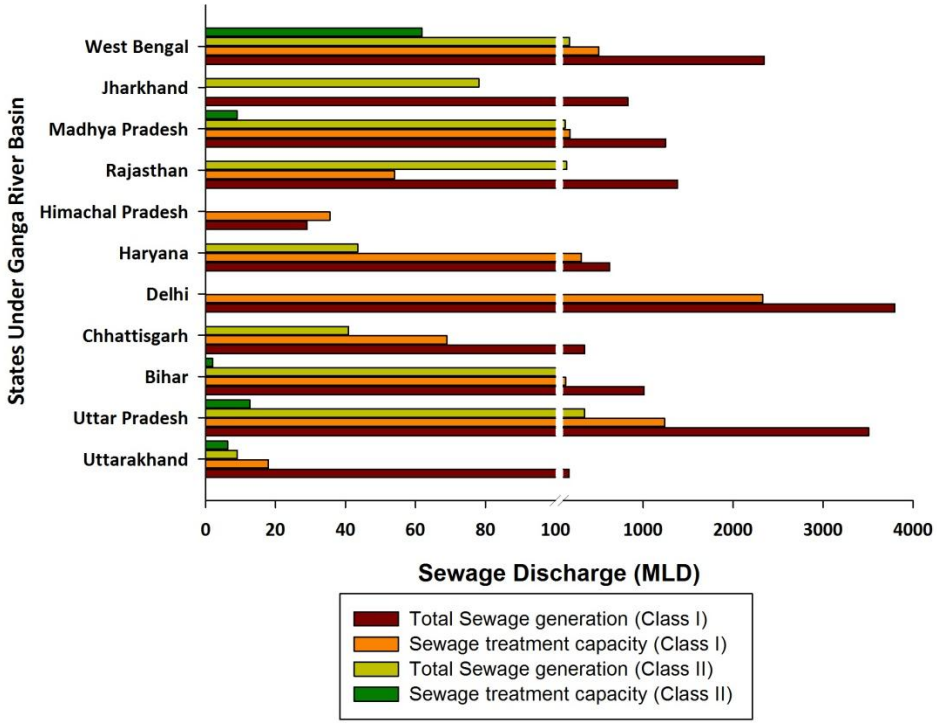

Figure 4: Assessment of Total Sewage Generation (MLD) and Sewage Treatment Capacity of Class I and II Cities in the States under Ganga River Basin

The pollution load for Class I cities, Class II and III towns have been estimated by the data received through rigorous field survey of almost all the major cities and towns in the state (Figure 5). The maximum sewage generation is in the Class I cities (75.32%) followed by Class III (17.81%) and Class II towns (6.87%). The BOD and COD load for Class I cities, Class II and Class III towns are in the range of 74, 7 and 19%, respectively. The TKN load almost showing the same trend as BOD and COD load. The BOD, COD and TKN load of all the Class I cities, Class II and Class III towns are estimated on per capita basis by using standard values.

The assessment of the total water supply and total sewage generation of class I cities in the state revealed that the maximum sewage generation is in Jaipur 321.6 MLD, approximately 80% of the water supply. In case of the class II towns the sewage generation in Dausa is maximum 11.6 MLD, approx 80% of its total water supply. The total BOD and COD load in tons/day has been estimated for Class I towns and its average are approximately 11.3 and 19.2 tons/day, respectively. The average BOD and COD load from the Class II towns is 1.82 and 3.10 tons/day, respectively whereas Class III towns contribute approximately 0.8 tons/day and 1.4 tons/day of BOD and COD, respectively. The maximum and minimum BOD, COD and TKN contributing cities in Class I towns are Jaipur and Bundi, respectively. In Class II towns, maximum BOD, COD and TKN load is from Dausa, whereas minimum is from Nasirabad. In class III towns, maximum and minimum BOD, COD and TKN load is from Kotputli and Manoharpur, respectively. The

estimates of total water supply, total sewage generated, BOD, COD and TKN loads are summarized and illustrated in Figures (6-11) for class I cities and class II towns. The comparative account of all the classes (I, II and III) for its population, sewage generation, water supply and BOD, COD and TKN load are presented in Figure 12.

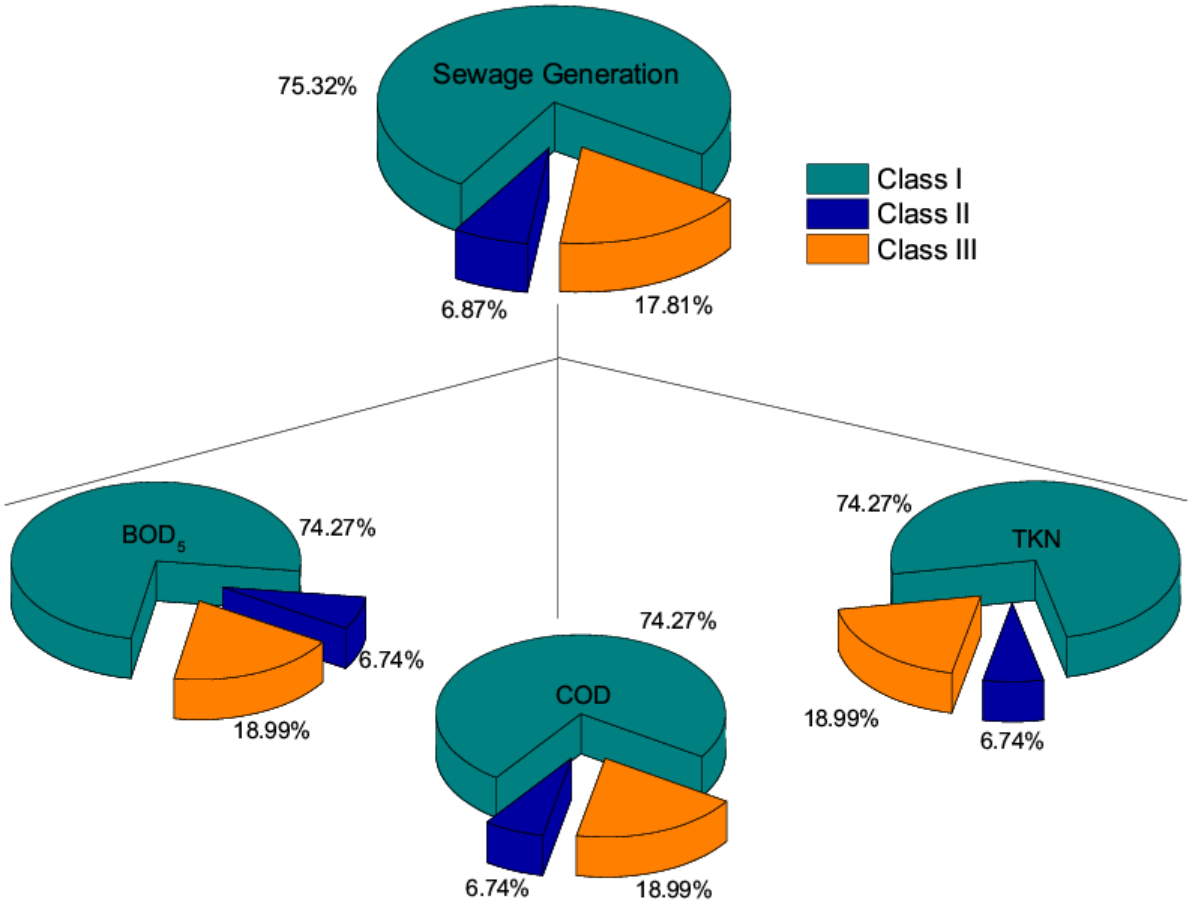

Figure 5: Distribution of Pollution Load of Class I Cities and Class II, Class III Towns in the State of Rajasthan

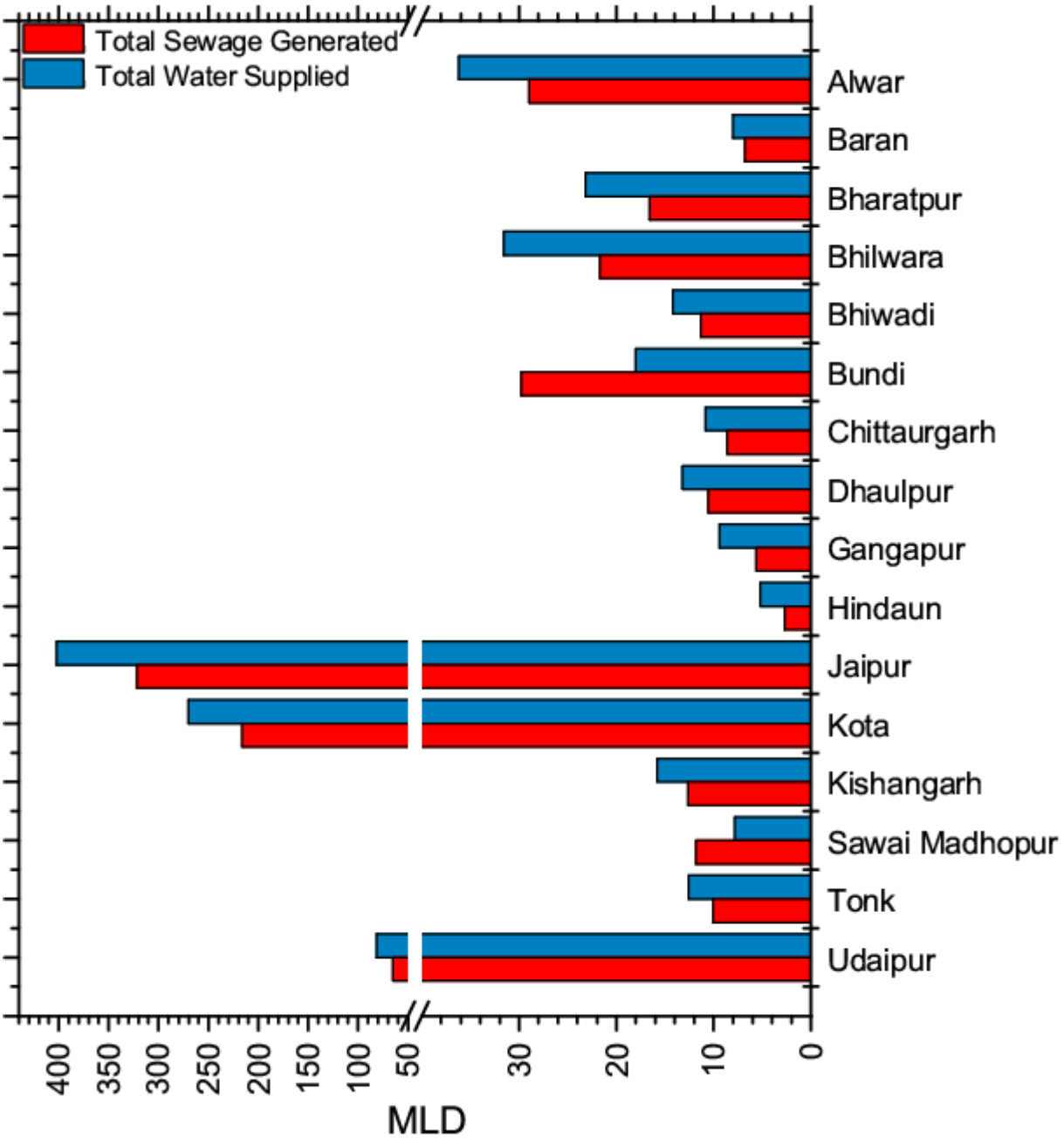

Figure 6: **Assessment of Water Supply and Sewage Generation (MLD) in Class I Cities in the State of Rajasthan**

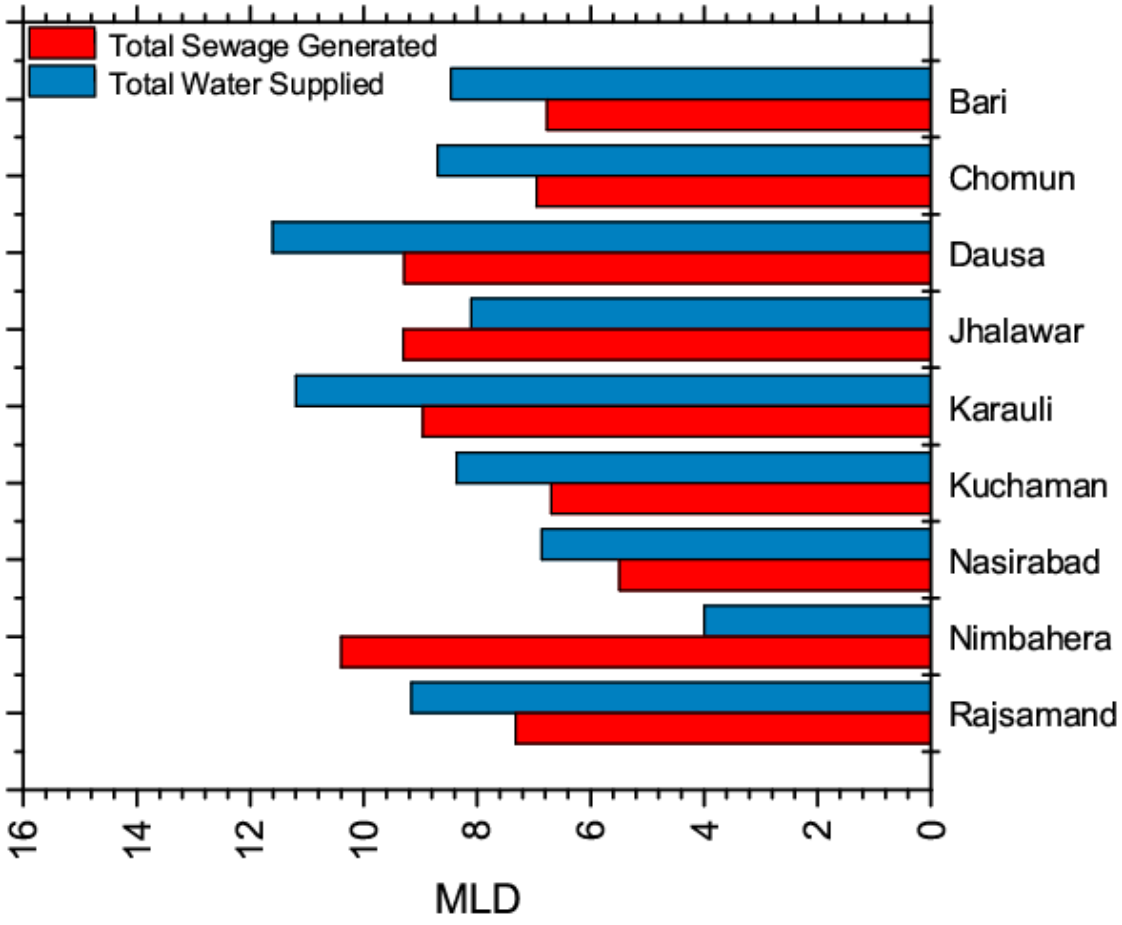

Figure 7: **Assessment of Water Supply and Sewage Generation (MLD) in Class II Towns in the State of Rajasthan**

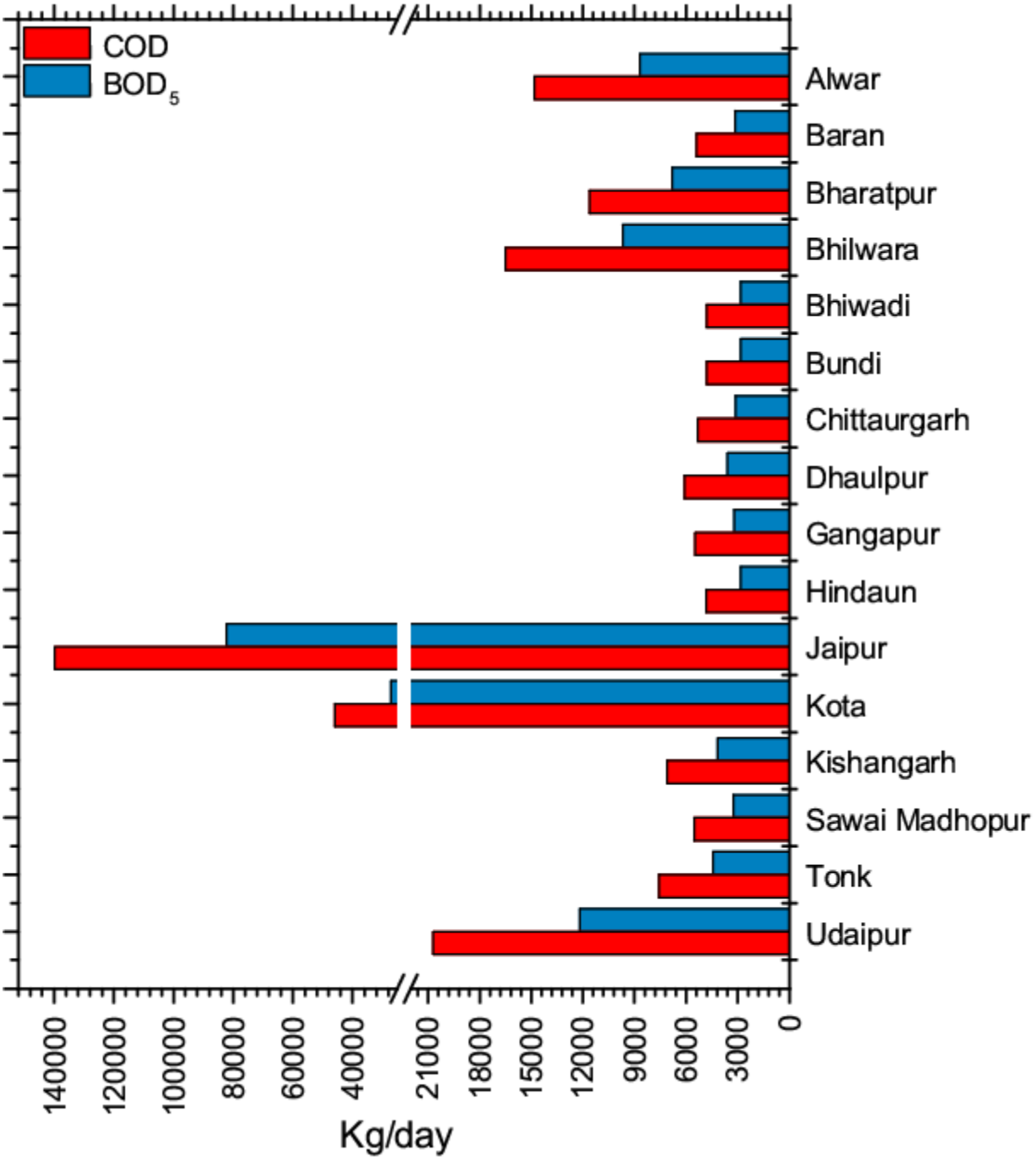

Figure 8: **Assessment of Organic Pollution Load (kg/day) from Class I Cities in the State of Rajasthan**

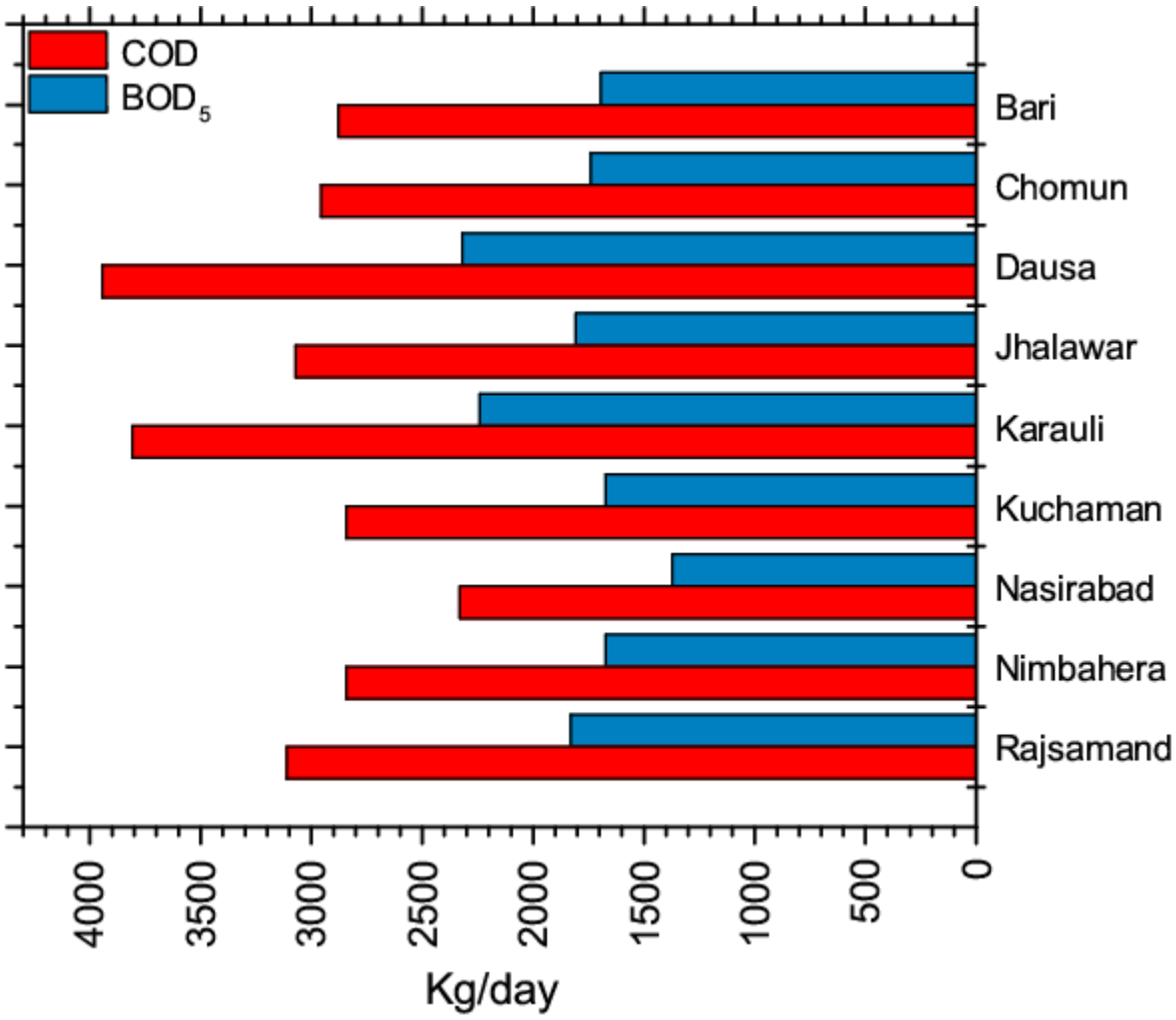

Figure 9: Assessment of Organic Pollution Load (kg/day) from Class II Towns in the State of Rajasthan

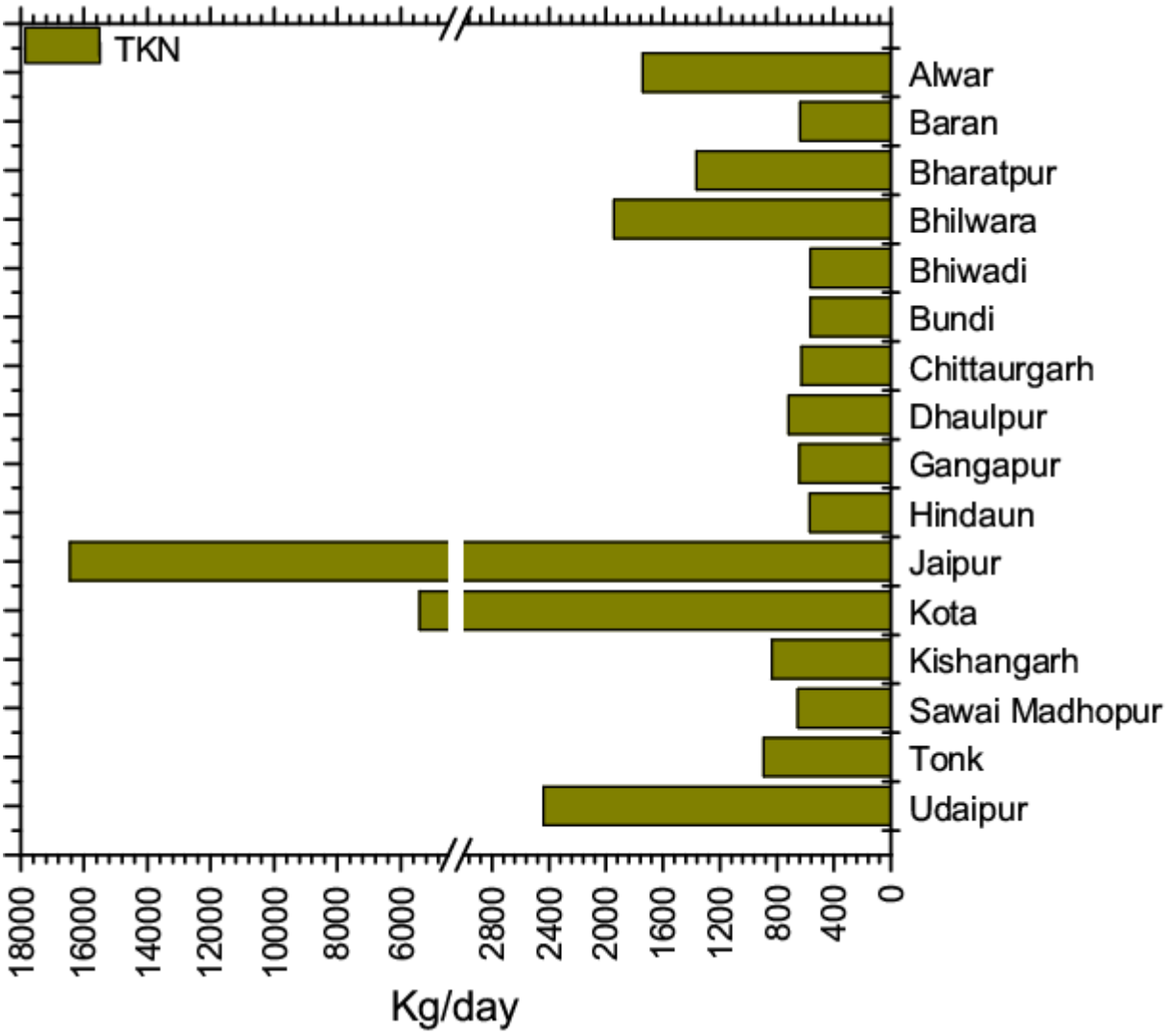

Figure 10: Assessment of TKN Load (kg/day) from Class I Cities in the State of Rajasthan

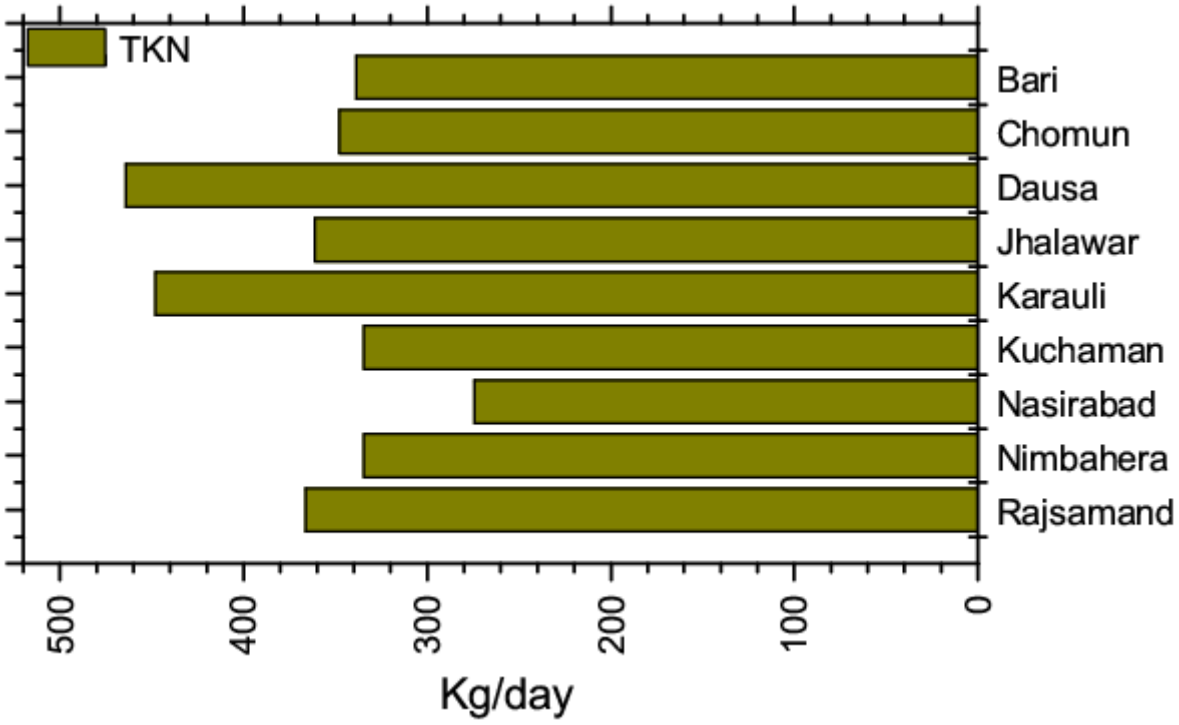

Figure 11: Assessment of TKN Load (kg/day) from Class II Towns in the State of Rajasthan

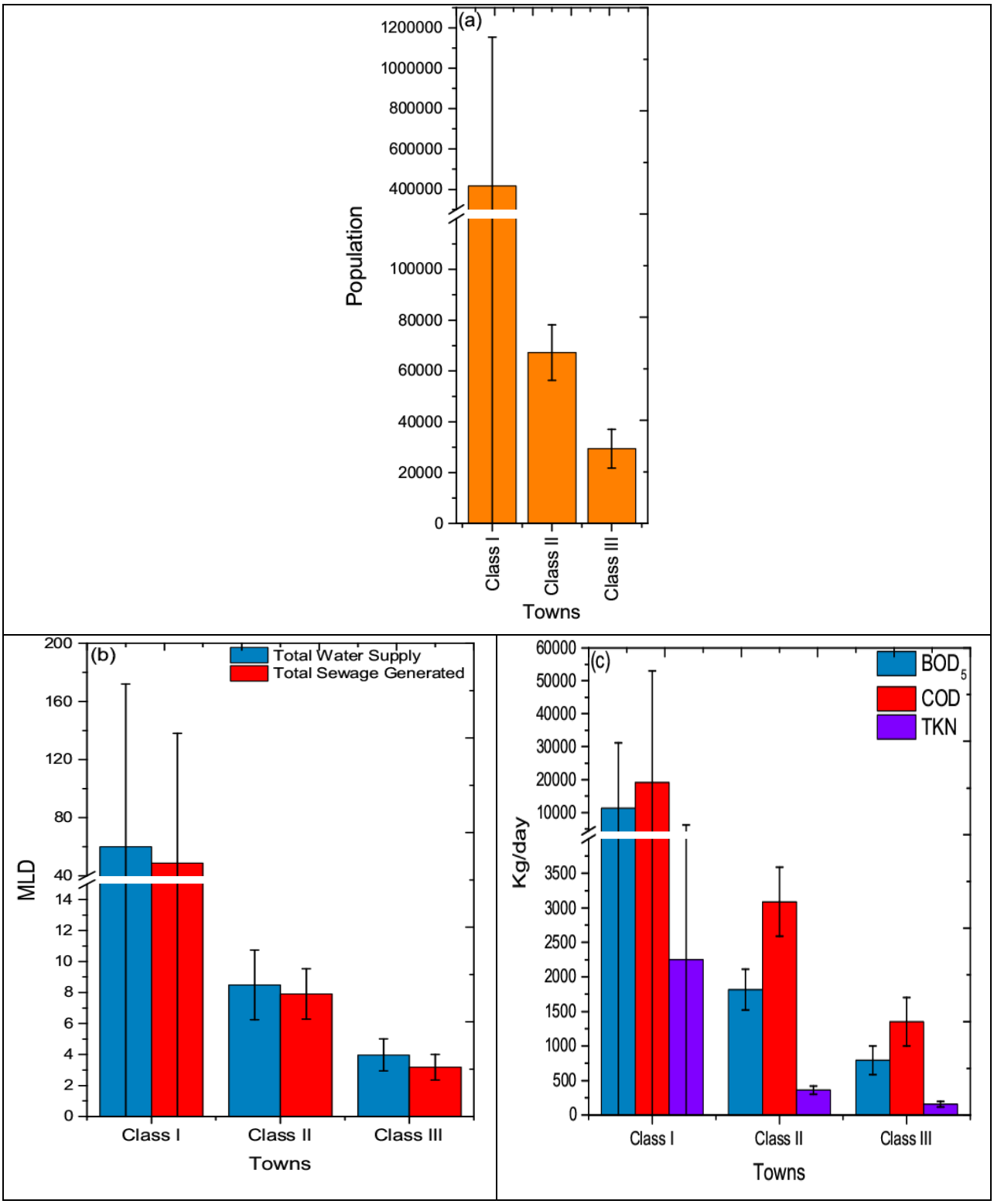

Figure 12: Comparative Analysis of Class I, Class II and Class III Cities/Towns Lying Under the State: (a) Population (b) Total Water Supply and Sewage Generation (c) Pollution Load

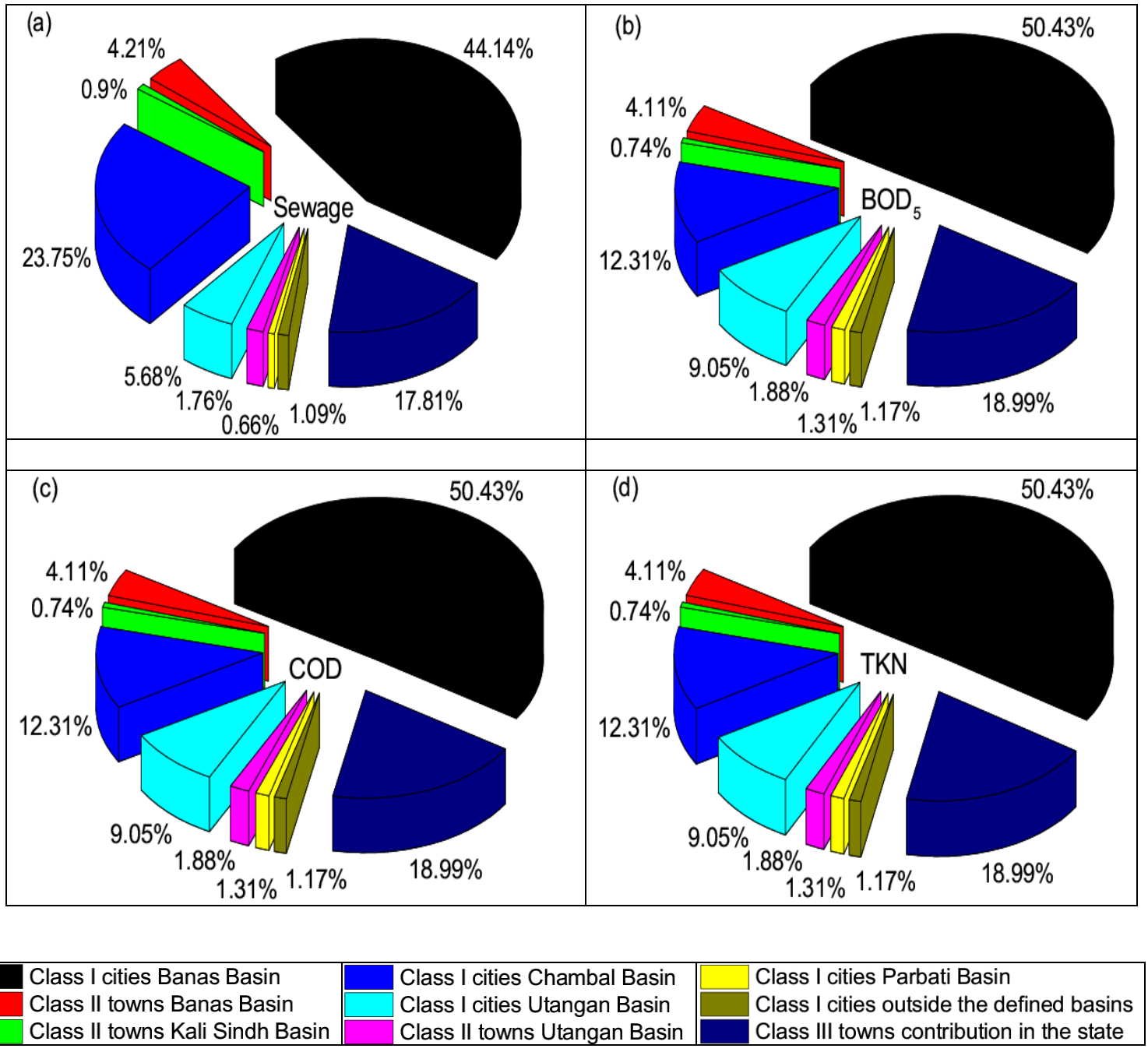

Figure 13 (a-d): Pollution load of Class I Cities and Class II, Class III Towns in the Major Basins in the State: (a) Sewage Generation; (b) BOD_5 ; (c) COD; (d) TKN

The results of the pollution load of Class I cities, Class II and Class III towns under the major basins of river Ganga in the state has been evaluated (Figure 13a) and the results revealed that the percentage of the total sewage generation is maximum in Class I cities situated in the Banas basin (44.14%) which is approx two times higher than the total percent contribution of Class I

cities placed in the Chambal basin (23.75%). The percent sewage generation in Class I cities of the other major basins in the state *i.e.,* Utangan and Parbati are 5.68, and 0.66%, respectively. Kali Sindh basin is devoid of any Class I cities in its territory in the state. The Class I cities outside the major defined basins combinedly contributed 1.09% of waste water. The percentage sewage generation by Class III towns of the entire state is 17.81% of the total sewage generated by the state. The Class II towns of each basin separately contributing less than 7.0% of the total sewage generation with the maximum contribution by Banas (4.21%) and the minimum by towns under Kali Sindh basin (0.90%).

The Class III towns of the state impart around 19.0% of the total BOD, COD and TKN load. The basin wise major contributors of Class I cities for BOD, COD and TKN load are Banas (50.43%), Chambal (12.31%), Utangan (9.05%) and Parbati (1.31%). The organic load of Class II towns in the basins is not more than 4.11% (Banas basin) while is least (0.74%) in Kali Sindh basin. BOD, COD and TKN loads are not very significant for the Class I cities lying outside the selected basins (1.17%). The details of the BOD and COD load in the state are presented in Figure 13b and c while the TKN load is presented in Figure 13d.

5. Conclusions

Rajasthan is having nearly 10.41% area of India, 5.5% population of India but only 1% water quantity of India (RSPCB, 2010). The major portion of the Banas, Kali Sindh and Parbati sub-basin as a part of Chambal basin are lie in the state. Another important sub-basin in the state is river Utangan sub-basin which merges directly into the river Yamuna. The catchments of these sub-basins bear the load of 16 Class I cities, 9 Class II and 58 Class III towns which indirectly play a role in increasing pollution load on the main stem of river Ganga. The scenario of water quality in the system fluctuates from bad to worse based on the spatial and temporal alterations. Multitudinous problems also arise during lean season due to the continuous discharge of untreated and/or partially treated sewage and industrial wastewater.

The maximum sewage generation is in the Class I cities (75.32%) followed by Class III (17.81%) and Class II towns (6.87%). The BOD and COD load for Class I cities, Class II and Class III towns are in the range of 74, 7 and 19%, respectively. Jaipur and Dausa are the Class I and Class II towns showing maximum amount of sewage generation in comparison to their water supply. The maximum BOD, COD and TKN contributing Class I cities, Class II and III towns in the state are Jaipur, Dausa and Kotputli while the minimum load is from Bundi (Class I), Nasirabad (Class II) and Manoharpur (Class III).

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Appendix-1

Compilation of Fact Sheets of Water Balance & Pollution Load (Domestic) of Major Class I Cities in State Rajasthan

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Alwar		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	48.40
2	Population as in 2011		:	322568
3	Population Growth Rate as in 2011 (%)		:	21.17
4	Total Number of Wards		:	52
5	Population per Ward (Thousands)		:	6203
6	Total Number of Household as in 2011		:	62776
7	Number of Household per Ward		:	1207
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	350
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	36.20
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	112.20
19	Total Sewage Generation (MLD)*		:	29.00
20	Per Capita Sewage Generation (lpcd)		:	89.80
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	8709.30
		COD	:	14805.90
		TKN	:	1741.90
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	2
33	Number of Water Bodies		:	0
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Baran		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	72.36
2	Population as in 2011		:	117992
3	Population Growth Rate as in 2011 (%)		:	49.99
4	Total Number of Wards		:	35
5	Population per Ward (Thousands)		:	3371
6	Total Number of Household as in 2011		:	23277
7	Number of Household per Ward		:	665
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.50
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	71.80
19	Total Sewage Generation (MLD)*		:	6.80
20	Per Capita Sewage Generation (lpcd)		:	57.60
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	3185.80
		COD	:	5415.80
		TKN	:	637.20
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Parbati, Parvan, Kali Sindh River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	3
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Bharatpur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	57.77
2	Population as in 2011		:	252838
3	Population Growth Rate as in 2011 (%)		:	23.19
4	Total Number of Wards		:	53
5	Population per Ward (Thousands)		:	4771
6	Total Number of Household as in 2011		:	45914
7	Number of Household per Ward		:	9866
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	131
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	23.30
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	92.00
19	Total Sewage Generation (MLD)*		:	16.60
20	Per Capita Sewage Generation (lpcd)		:	65.70
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	6826.60
		COD	:	11605.30
		TKN	:	1365.30
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	8
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Bhilwara		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	118.49
2	Population as in 2011		:	359483
3	Population Growth Rate as in 2011 (%)		:	28.33
4	Total Number of Wards		:	50
5	Population per Ward (Thousands)		:	7,190
6	Total Number of Household as in 2011		:	74184
7	Number of Household per Ward		:	1484
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	1600
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	32.40
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	90.10
19	Total Sewage Generation (MLD)*		:	21.70
20	Per Capita Sewage Generation (lpcd)		:	60.40
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	9706.00
		COD	:	16500.30
		TKN	:	1941.20
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Kothari, Banas River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	9
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Bhiwadi		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	44.06
2	Population as in 2011		:	104921
3	Population Growth Rate as in 2011 (%)		:	209.71
4	Total Number of Wards		:	35
5	Population per Ward (Thousands)		:	2998
6	Total Number of Household as in 2011		:	24449
7	Number of Household per Ward		:	699
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	NA
13	Ground Water Extraction per Hand Pump (lpd)		:	NA
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	14.20
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	NA
19	Total Sewage Generation (MLD)*		:	11.30
20	Per Capita Sewage Generation (lpcd)		:	107.70
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	2832.90
		COD	:	4815.90
		TKN	:	566.60
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	NA
33	Number of Water Bodies		:	1
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Bundi		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	27.79
2	Population as in 2011		:	104919
3	Population Growth Rate as in 2011 (%)		:	18.06
4	Total Number of Wards		:	41
5	Population per Ward (Thousands)		:	2559
6	Total Number of Household as in 2011		:	20555
7	Number of Household per Ward		:	501
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	372
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	1
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	18.00
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	171.60
19	Total Sewage Generation (MLD)*		:	29.80
20	Per Capita Sewage Generation (lpcd)		:	284
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	2832.80
		COD	:	4815.80
		TKN	:	566.60
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Mez River
32	Number of Drains/Nallah for Wastewater Disposal		:	4
33	Number of Water Bodies		:	7
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Chittaurgarh		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	41.76
2	Population as in 2011/2001		:	116406
3	Population Growth Rate as in 2011 (%)		:	20.98
4	Total Number of Wards		:	40
5	Population per Ward (Thousands)		:	2,910
6	Total Number of Household as in 2011		:	24739
7	Number of Household per Ward		:	618
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	513
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	11.10
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	95.00
19	Total Sewage Generation (MLD)*		:	8.60
20	Per Capita Sewage Generation (lpcd)		:	74.20
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	3143.00
		COD	:	5343.00
		TKN	:	628.60
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Gambhiri River
32	Number of Drains/Nallah for Wastewater Disposal		:	2
33	Number of Water Bodies		:	18
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Dhaulpur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	32.03
2	Population as in 2011		:	133075
3	Population Growth Rate as in 2011 (%)		:	36.08
4	Total Number of Wards		:	42
5	Population per Ward (Thousands)		:	3168
6	Total Number of Household as in 2011		:	22563
7	Number of Household per Ward		:	537
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	320
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	13.40
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	100.40
19	Total Sewage Generation (MLD)*		:	10.60
20	Per Capita Sewage Generation (lpcd)		:	79.40
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	3593.00
		COD	:	6108.10
		TKN	:	718.60
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Chambal, Utangan River
32	Number of Drains/Nallah for Wastewater Disposal		:	1
33	Number of Water Bodies		:	5
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Gangapur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	52.31
2	Population as in 2011		:	119090
3	Population Growth Rate as in 2011 (%)		:	22.97
4	Total Number of Wards		:	20
5	Population per Ward (Thousands)		:	5955
6	Total Number of Household as in 2011		:	21068
7	Number of Household per Ward		:	1053
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	5242
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	12.00
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	100.90
19	Total Sewage Generation (MLD)*		:	5.60
20	Per Capita Sewage Generation (lpcd)		:	47.00
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	3215.40
		COD	:	5466.20
		TKN	:	643.10
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Kothari, Banas River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	0
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Hindaun		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	48.00
2	Population as in 2011		:	105452
3	Population Growth Rate as in 2011 (%)		:	24.26
4	Total Number of Wards		:	40
5	Population per Ward (Thousands)		:	2,636
6	Total Number of Household as in 2011		:	18299
7	Number of Household per Ward		:	457
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	150
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	5.30
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	50.00
19	Total Sewage Generation (MLD)*		:	2.70
20	Per Capita Sewage Generation (lpcd)		:	25.60
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD5	:	2847.20
		COD	:	4840.20
		TKN	:	569.40
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Utangan River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	NA
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Jaipur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	484.64
2	Population as in 2011		:	3046163
3	Population Growth Rate as in 2011 (%)		:	31.15
4	Total Number of Wards		:	77
5	Population per Ward (Thousands)		:	39,561
6	Total Number of Household as in 2011		:	599507
7	Number of Household per Ward		:	7786
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	1983
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	403.00
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	132.30
19	Total Sewage Generation (MLD)*		:	321.60
20	Per Capita Sewage Generation (lpcd)		:	105.60
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	82246.40
		COD	:	139818.90
		TKN	:	16449.30
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	NA
33	Number of Water Bodies		:	14
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Kishangarh		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	45.49
2	Population as in 2011		:	154886
3	Population Growth Rate as in 2011 (%)		:	33.27
4	Total Number of Wards		:	45
5	Population per Ward (Thousands)		:	3,442
6	Total Number of Household as in 2011		:	28353
7	Number of Household per Ward		:	630
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	720
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	16.20
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	104.30
19	Total Sewage Generation (MLD)*		:	12.60
20	Per Capita Sewage Generation (lpcd)		:	81.60
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	4181.90
		COD	:	7109.30
		TKN	:	836.40
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	2
33	Number of Water Bodies		:	4
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Kota		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	527.03
2	Population as in 2011		:	1001694
3	Population Growth Rate as in 2011 (%)		:	44.27
4	Total Number of Wards		:	60
5	Population per Ward (Thousands)		:	16,695
6	Total Number of Household as in 2011		:	210135
7	Number of Household per Ward		:	3502
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	3115
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	271.80
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	271.30
19	Total Sewage Generation (MLD)*		:	216.20
20	Per Capita Sewage Generation (lpcd)		:	215.80
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	27045.70
		COD	:	45977.80
		TKN	:	5409.10
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Chambal, Kali Sindh River
32	Number of Drains/Nallah for Wastewater Disposal		:	5
33	Number of Water Bodies		:	9
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Tonk				State: Rajasthan
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	60.50
2	Population as in 2011		:	165294
3	Population Growth Rate as in 2011 (%)		:	21.82
4	Total Number of Wards		:	45
5	Population per Ward (Thousands)		:	3,673
6	Total Number of Household as in 2011		:	29098
7	Number of Household per Ward		:	647
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	546
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	12.90
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	77.90
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	10.10
19	Total Sewage Generation (MLD)*		:	61.00
20	Per Capita Sewage Generation (lpcd)		:	NA
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP & YAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	4462.90
		COD	:	7587.00
		TKN	:	892.60
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Banas River
32	Number of Drains/Nallah for Wastewater Disposal		:	1
33	Number of Water Bodies		:	14
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Udaipur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	56.92
2	Population as in 2011		:	451100
3	Population Growth Rate as in 2011 (%)		:	15.83
4	Total Number of Wards		:	55
5	Population per Ward (Thousands)		:	8,202
6	Total Number of Household as in 2011		:	94704
7	Number of Household per Ward		:	1722
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	2380
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	82.60
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	183.10
19	Total Sewage Generation (MLD)*		:	65.10
20	Per Capita Sewage Generation (lpcd)		:	144.40
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	12179.70
		COD	:	20705.50
		TKN	:	2435.90
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Ayad River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	3
34	Gross Area of Water Bodies (Hectare)		:	17254.00
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Sawai Madhopur		State: Rajasthan		
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	59.00
2	Population as in 2011		:	121106
3	Population Growth Rate as in 2011 (%)		:	18.73
4	Total Number of Wards		:	40
5	Population per Ward (Thousands)		:	3,028
6	Total Number of Household as in 2011		:	22841
7	Number of Household per Ward		:	571
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	469
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.00
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	66.30
19	Total Sewage Generation (MLD)*		:	11.80
20	Per Capita Sewage Generation (lpcd)		:	97.40
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	3269.90
		COD	:	5558.80
		TKN	:	654.00
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Banas River
32	Number of Drains/Nallah for Wastewater Disposal		:	1
33	Number of Water Bodies		:	15
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Appendix-2

Compilation of Fact Sheets of Water Balance & Pollution Load (Domestic) of Major Class II Towns in State Rajasthan

Water Balance & Pollution Load (Domestic) Fact Sheet

City:Bari				State: Rajasthan
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	22.27
2	Population as in 2011		:	62721
3	Population Growth Rate as in 2011 (%)		:	24.26
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2091
6	Total Number of Household as in 2011		:	10456
7	Number of Household per Ward		:	349
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	9.00
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	143.10
19	Total Sewage Generation (MLD)*		:	6.80
20	Per Capita Sewage Generation (lpcd)		:	108.40
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1693.50
		COD	:	2878.90
		TKN	:	338.70
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Ayad River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	0
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Chomu				State: Rajasthan
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	22.53
2	Population as in 2011		:	64417
3	Population Growth Rate as in 2011 (%)		:	27.04
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2147
6	Total Number of Household as in 2011		:	9921
7	Number of Household per Ward		:	331
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	9.20
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	142.40
19	Total Sewage Generation (MLD)*		:	7.00
20	Per Capita Sewage Generation (lpcd)		:	108.70
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1739.30
		COD	:	2956.70
		TKN	:	347.90
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	NA
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Dausa			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	16.00
2	Population as in 2011		:	85960
3	Population Growth Rate as in 2011 (%)		:	39.54
4	Total Number of Wards		:	35
5	Population per Ward (Thousands)		:	2456
6	Total Number of Household as in 2011		:	15465
7	Number of Household per Ward		:	442
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	12.10
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	140.50
19	Total Sewage Generation (MLD)*		:	9.30
20	Per Capita Sewage Generation (lpcd)		:	108.20
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	2320.90
		COD	:	3945.60
		TKN	:	464.20
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Banganga RIver
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	2
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Jhalawar			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	12.95
2	Population as in 2011		:	66919
3	Population Growth Rate as in 2011 (%)		:	39.26
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2231
6	Total Number of Household as in 2011		:	13595
7	Number of Household per Ward		:	453
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.60
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	128.10
19	Total Sewage Generation (MLD)*		:	9.30
20	Per Capita Sewage Generation (lpcd)		:	139.00
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1806.80
		COD	:	3071.60
		TKN	:	361.40
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Kali Sindh, Ahu River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	10
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Karauli				State: Rajasthan
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	35.00
2	Population as in 2011		:	82960
3	Population Growth Rate as in 2011 (%)		:	25.24
4	Total Number of Wards		:	35
5	Population per Ward (Thousands)		:	2370
6	Total Number of Household as in 2011		:	14578
7	Number of Household per Ward		:	417
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	11.70
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	140.70
19	Total Sewage Generation (MLD)*		:	9.00
20	Per Capita Sewage Generation (lpcd)		:	108.50
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	2239.90
		COD	:	3807.90
		TKN	:	448.00
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Utangan River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	0
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Kuchaman			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	12.50
2	Population as in 2011		:	61969
3	Population Growth Rate as in 2011 (%)		:	22.50
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2066
6	Total Number of Household as in 2011		:	9643
7	Number of Household per Ward		:	321
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.90
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	143.20
19	Total Sewage Generation (MLD)*		:	6.70
20	Per Capita Sewage Generation (lpcd)		:	108.10
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1673.20
		COD	:	2844.40
		TKN	:	334.60
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	NA
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Nasirabad			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	22.93
2	Population as in 2011		:	50804
3	Population Growth Rate as in 2011 (%)		:	3.41
4	Total Number of Wards		:	7
5	Population per Ward (Thousands)		:	7258
6	Total Number of Household as in 2011		:	9078
7	Number of Household per Ward		:	1297
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	7.40
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	145.20
19	Total Sewage Generation (MLD)*		:	5.50
20	Per Capita Sewage Generation (lpcd)		:	108.30
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1371.70
		COD	:	2331.90
		TKN	:	274.30
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	2
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Nimbahera			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	12.74
2	Population as in 2011		:	61949
3	Population Growth Rate as in 2011 (%)		:	16.17
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2065
6	Total Number of Household as in 2011		:	12776
7	Number of Household per Ward		:	426
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	4.50
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	72.20
19	Total Sewage Generation (MLD)*		:	10.40
20	Per Capita Sewage Generation (lpcd)		:	167.90
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1672.60
		COD	:	2843.50
		TKN	:	334.50
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Land Disposal
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	NA
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Rajsamand			State: Rajasthan	
S. No.	**Items**			**Value**
1	Total Area (sq km)		:	55.00
2	Population as in 2011		:	67798
3	Population Growth Rate as in 2011 (%)		:	21.75
4	Total Number of Wards		:	30
5	Population per Ward (Thousands)		:	2260
6	Total Number of Household as in 2011		:	13765
7	Number of Household per Ward		:	459
8	Surface Water Supply (MLD)		:	NA
9	Ground Water (GW) Supply (MLD)		:	NA
10	Number of Bore Wells		:	NA
11	Ground Water Extraction per Bore Well (MLD)		:	NA
12	Number of Hand Pumps/ Tubewells		:	950
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Average Water Supply Rate from ULB Sources (lpcd)		:	NA
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	9.70
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	142.70
19	Total Sewage Generation (MLD)*		:	7.30
20	Per Capita Sewage Generation (lpcd)		:	107.70
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	1830.50
		COD	:	3111.90
		TKN	:	366.10
30	Wastewater Disposal Means		:	Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Banas,Gomati River
32	Number of Drains/Nallah for Wastewater Disposal		:	3
33	Number of Water Bodies		:	1
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	<<< 1