

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

GRBMP: Ganga River Basin Management Plan

by

Consortium of 7 “Indian Institute of Technology”s



**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 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 (GRBMP). 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 GRBMP. 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. A list of persons who have contributed directly and names of those who have taken lead in preparing this report is given on the reverse side.

Dr Vinod Tare
Professor and Coordinator
Development of GRBMP
IIT Kanpur

The Team

1. A AKazmi, IIT Roorkee	<i>kazmifce@iitr.ernet.in</i>
2. A K Gupta, IIT Kharagpur	<i>akgupta18@rediffmail.com,akgupta@iitkgp.ac.in</i>
3. A K Mittal, IIT Delhi	<i>akmittal@civil.iitd.ernet.in</i>
4. A K Nema, IIT Delhi	<i>aknema@gmail.com</i>
5. Ajay Kalmhad, IIT Guwahati	<i>kajay@iitg.ernet.in</i>
6. Anirban Gupta, BESU Shibpur	<i>guptaanirban@hotmail.com</i>
7. Arun Kumar, IIT Delhi	<i>arunku@civil.iitd.ac.in</i>
8. G J Chakrapani, IIT Roorkee	<i>gjcufes@iitr.ernet.in</i>
9. GazalaHabib, IIT Delhi	<i>gazalahabib@gmail.com</i>
10. Himanshu Joshi, IIT Roorkee	<i>himanshujoshi58@gmail.com</i>
11. Indu Mehrotra, IIT Roorkee	<i>indumfce@iitr.ernet.in</i>
12. I M Mishra, IIT Roorkee	<i>imishfch@iitr.ernet.in</i>
13. Ligy Philip, IIT Madras	<i>ligy@iitm.ac.in</i>
14. M MGhangrekar, IIT Kharagpur	<i>ghangrekar@civil.iitkgp.ernet.in</i>
15. MukeshDoble, IIT Bombay	<i>mukeshd@iitm.ac.in</i>
16. P K Singh, IIT BHU	<i>dr_pksingh1@rediffmail.com</i>
17. Purnendu Bose, IIT Kanpur	<i>pbose@iitk.ac.in</i>
18. R Ravi Krishna, IIT Madras	<i>rrk@iitm.ac.in</i>
19. Rakesh Kumar, NEERI Nagpur	<i>r_kumar@neeri.res.in</i>
20. S M Shrivnagendra, IIT Madras	<i>snagendra@iitm.ac.in</i>
21. SaumyenGuha, IIT Kanpur	<i>sguha@iitk.ac.in</i>
22. Shyam R Asolekar, IIT Bombay	<i>asolekar@iitb.ac.in</i>
23. SudhaGoel, IIT Kharagpur	<i>sudhagoel@civil.iitkgp.ernet.in</i>
24. Suparna Mukherjee, IIT Bombay	<i>mitras@iitb.ac.in</i>
25. T R Sreekrishnan, IIT Delhi	<i>sree@dbec.iitd.ac.in</i>
26. Vinod Tare, IIT Kanpur	<i>vinod@iitk.ac.in</i>
27. Vivek Kumar, IIT Roorkee	<i>vivekfpt@iitr.ernet.in</i>

Lead Authors

1. Vinod Tare, IIT Kanpur
2. Purnendu Bose, IIT Kanpur
3. Vishal Kapoor, IIT Kanpur
4. Suresh Kr Gurjar, IIT Kanpur
5. Abhishek Gaur, IIT Kanpur

Contents

	<i>Page</i>
1 Introduction	7
2 Major Obstruction and Abstraction Projects on the Tributaries of the River Ganga Executed in the State	11
3 Demographic Profile of Ganga Basin in the State	13
4 Religious Places and their Importance	21
5 Pollution Load	22
6 Conclusions	33
References	35
Appendix 1: Compilation of Data Sheets of Water Balance & Pollution Load (Domestic) of Class I Cities/Towns in Madhya Pradesh	36
Appendix 2: Compilation of Data Sheets of Water Balance & Pollution Load (Domestic) of Class II Cities/Towns in Madhya Pradesh	61

1.0 Introduction

Madhya Pradesh is located in the geographic heart of India and covers an area of 308, 252 sq. km (9.38% of the land area of the country) (NIDM, 2000). It is the second largest state by area and sixth largest state by population. Madhya Pradesh shares its boundary with seven other states. The state comprises six percent of the total population of the country. The state is bordered on the west by Gujarat, Rajasthan and Maharashtra, northern border of the state has the state of Rajasthan and Uttar Pradesh, and the southern states are Maharashtra and Andhra Pradesh. The entire eastern border of the state is bounded by the states of Chattisgarh and Jharkhand.

It is a part of peninsular plateau of India lying in north central part, whose boundary can be classified in the north by the plains of Ganga-Yamuna, in the west by the Aravali, east by the Chhattisgarh plain and in the south by the Tapti valley and the plateau of Maharashtra.

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. Madhya Pradesh 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. In the state of Madhya Pradesh, ten major rivers are originated. As Madhya Pradesh is located in the center of India, most of the rivers are interstate rivers. The rivers contributing in Ganga River Basin are Chambal, Sindh, Betwa, Ken and Son, the first four rivers flow northward and meet with Yamuna whereas the fifth river falls directly into Ganga (Figure 1). Narmada, Tapti and Mahi rivers flow westward and meet Arabian Sea whereas Wainganga and Pench rivers meet Godavari in the south. A comparison of state wise distribution of GRB area with the geographical area of different states is presented in Table 1.

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

State/ Union Territory	*Total Geographical Area (sq km)	#Area contributing to Ganga Basin (sq km)	Percentage of the Basin Area (%)
Uttarakhand	53,483	53,436	6.2
Uttar Pradesh	240,928	240,928	28
Bihar	94,163	94,163	10.9
Jharkhand	79,716	49,798	5.8
Madhya Pradesh	308,252	198,962	23.1
Chhattisgarh	135,192		
Delhi	1,484	1,484	0.17
Haryana	44,212	34,341	4.0
Himachal Pradesh	55,673	4,317	0.5
Rajasthan	342,239	112,490	13.1
West Bengal	88,752	71,485	8.3

Source: *Census 2011

#<https://nmcg.nic.in/location.aspx>

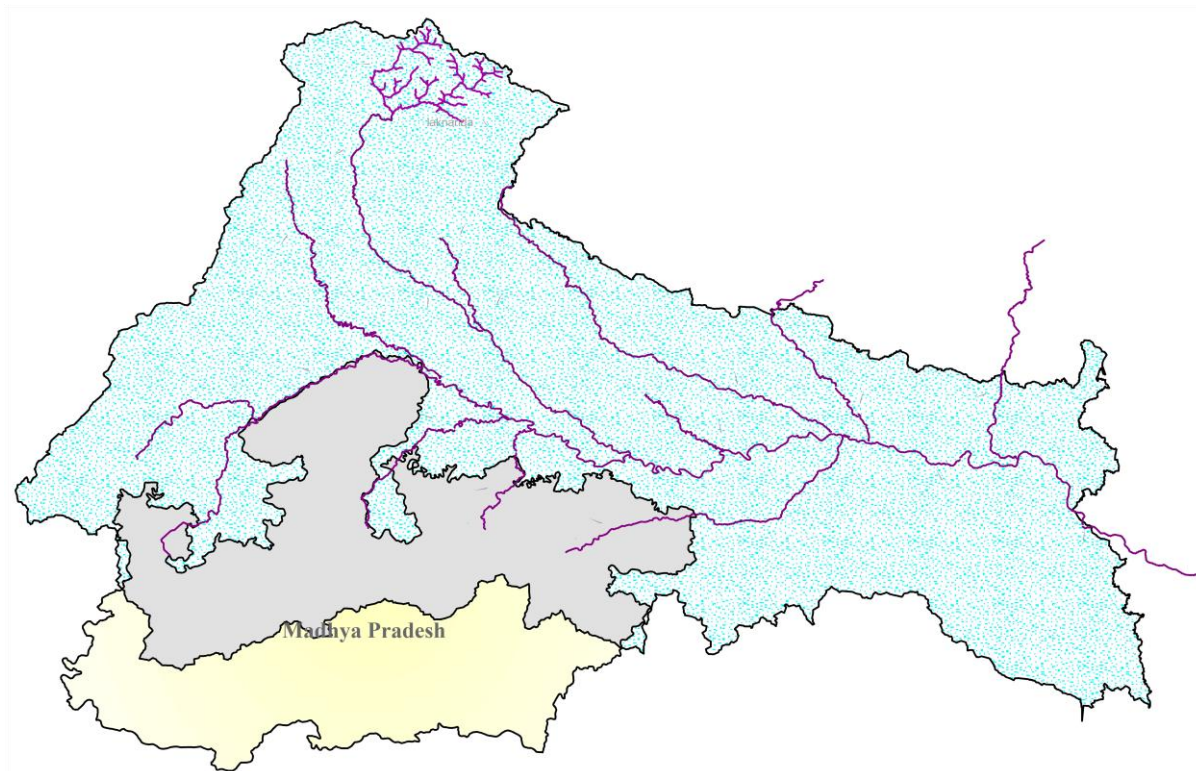


Figure 1: Ganga River Basin with the major tributaries in the state of Madhya Pradesh

Catchments of many rivers of India lie in Madhya Pradesh. The Ganga River Basin which is roughly rectangular in shape and the river flows approximately in the direction of North West to South East has also lie in the state. Most of the rivers which drain into the Ganga flow through the state are Chambal, Shipra, Kali Sindh, Parbati, Sind, Betwa, Dhasan and Ken rivers being the main tributaries of the Yamuna. The Eastern parts of the Ganga basin includes the river Son basin, which directly merge into the Ganga at Dinapur in the Patna district of Bihar. Ganga River Basin (contribution through Chambal, Ken, Sindh, Betwa and Son) covers 53.89% of the total geographic area (308,245 sq km) of the state. These sub-basins are formed by the merging of a number of tributaries and sub-tributaries. The sub basin wise percent area coverage in the state is mentioned in Table 2.

The major portion of the Sindh (94.12%) and Ken basins (86.41%) lie in the state while 68.12% of the Betwa basin and 43.23 and 40.18% of the Son and Chambal basins, respectively, also occupy the geographical area of the state. All of these are inter-state rivers (Chambal between Madhya Pradesh (346 km), Uttar Pradesh (32 km), Rajasthan (225 km), common boundary between Madhya Pradesh and Rajasthan (217 km) and common boundary between Madhya Pradesh and Uttar Pradesh (145 km); Son between Madhya Pradesh (500 km), Uttar Pradesh (82 km) and Bihar (202 km); Ken between Madhya Pradesh (292 km) and Uttar Pradesh (84 km) and common boundary (51 km) between Madhya Pradesh and Uttar Pradesh; Betwa between Madhya Pradesh (232 km) and Uttar Pradesh (358 km); Sindh between Madhya Pradesh (461 km) and Uttar Pradesh (9 km)). The salient features of the tributaries in the state are represented in Table 3. The pictorial presentation of the subbasins distribution and its percentage coverage in the state is presented in Figure 2 and 3.

Table 2: GRB Sub-basin Areas Lying in the State

Basin / Subbasin	Percentage of the Basin Area (%) in the State
Betwa Basin	68.12
Ken Basin	86.41
Sindh Basin	94.12
Chambal Basin	40.18
Son Basin	43.23

Table 3: The Salient Features of Tributaries of the Ganga River Basin Contributing to the River Ganga in the State of Madhya Pradesh

	Major Tributaries/ Sub-tributaries of the state contributing to GRB				
Characteristics	Son	Chambal	Sindh	Betwa	Ken
Position	Right bank	Right bank	Right bank	Right bank	Right bank
Region of origin	Sonbhadra in the Maikala range of hills (M.P.)	North wards slope of the Vindhyan mountains in native state of Indore (M.P.)	North wards slope of the Vindhyan mountains originates at Hatoli (District Vidisha)	North wards slope of the Vindhyan mountains	North Western slope of the Vindhyan mountains in native state of Bhopal
Mouth	Ganga	Yamuna	Yamuna	Yamuna	Yamuna
Total length (km)	784	960	415	590	427
Total catchment area (sq km)	71,259	143,219	25,879	47,940	28,058
Percent catchment area in MP	43	40	94	68	86
River bed/ Soil texture	Alluvial sediments consist of clay, fine to coarse-grained sand, kankar and gravel	Stony rapid, sand banks and gravel bars	-	Stones, Sand, Riffle and Pools; Pebbles and Cobble	Rocks, Stones, Sand

Gopal and Sah (1993); Dwivedi (2006)

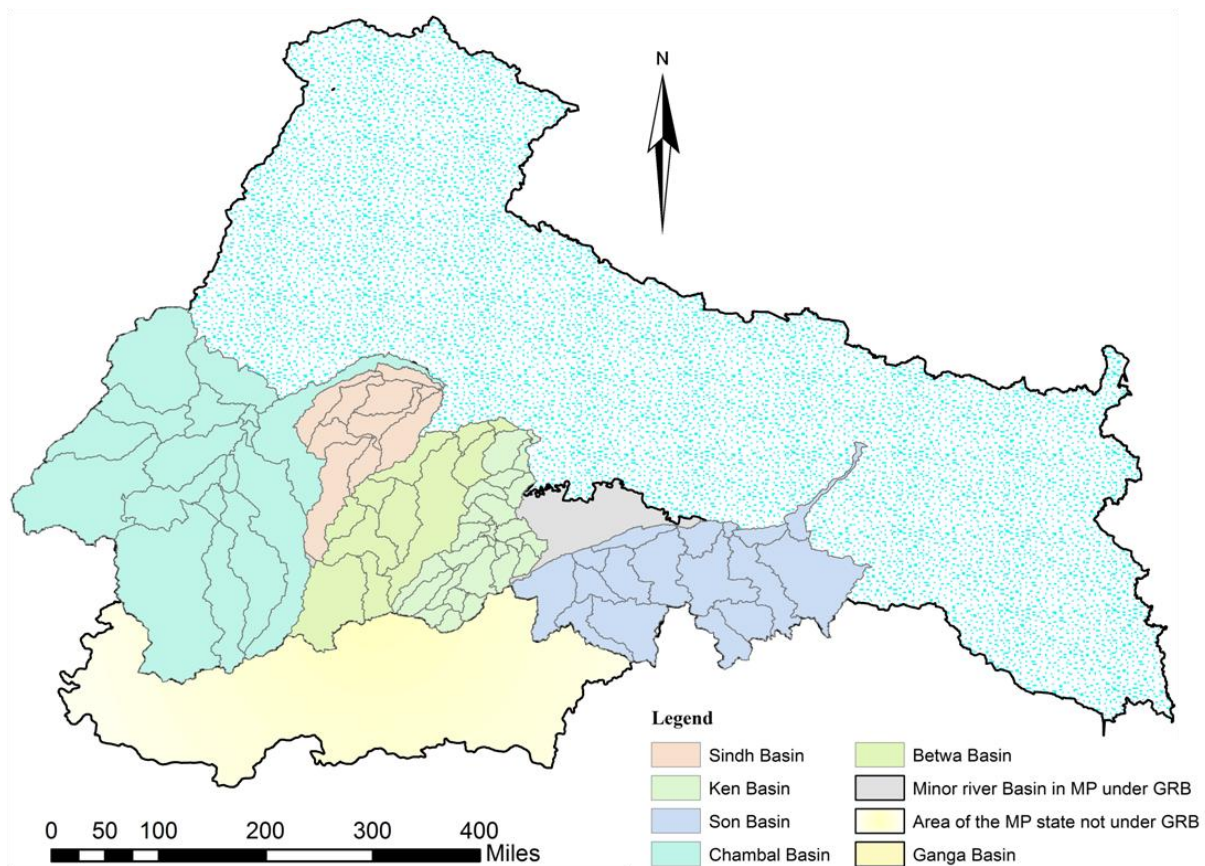


Figure 2: Major Sub-Basins of the State under Ganga River Basin



Figure 3: Basin Wise Percent Contribution of the major Basins in the State

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 state also has strong rural base with more than 55,000 villages which primarily dependent on the natural water resources for their livelihood. In totality nearly 75% of the total population is engaged directly in agriculture. To nourish the agricultural fields the state has more than 750 dams out of which 364 are under GRB. These dams are not only for irrigation but also for flood control, recharging the water table, water supply and hydroelectric power generation. The details of the major projects on the rivers in the state are depicted in Table 4.

Table 4: Details of the Major Dams on the Rivers in the State of Madhya Pradesh

Projects	River	Year of Completion	Purpose
Aoda Dam	Seep	1934	Irrigation
Arnia Bahadarpur Dam	Gandhi	1980	Irrigation
Bagharu Dam	Bagharu	-	Irrigation
Bah Dam	Bah	-	Irrigation
Ban Sagar Dam	Son	2006	Hydroelectric, Irrigation, Water Storage
Bandia Dam	Nagri	1994	Irrigation
Barchar Dam	Barchar	1986	Irrigation
Beniganj Dam	Beni	1974	Irrigation, Water Storage
Bhainsakhedi Dam	Chhotikali	1979	Irrigation
Bhaisawar Dam	Khatiar	1978	Irrigation
Bhitrigarh Dam	Niwar	1965	Irrigation
Bila Dam	Bilasi	1973	Irrigation
Birsinghpur Dam	Johilla	1988	Hydroelectric, Water Storage
Bisanda Dam	Bisandha	1992	Irrigation
Bohita Dam	Kantoor	1987	Irrigation
Budhna Dam	Budhna	1995	Irrigation, Water Storage
Chhapi Dam	Chhapi	1972	Irrigation
Chhoti Deori Dam	Bearma	1919	Irrigation
Chillar Dam	Chillar	1972	Irrigation
Dhamdhusar Dam	Charua	1958	Irrigation
Doraha Dam	Utawali	1983	Irrigation
Dudhi Dam	Dudhi	-	Irrigation
Gambhir Dam	Gambhir	1991	Water Storage
Gandhi Sagar Dam	Chambal	1960	Hydroelectric, Irrigation
Govindgarh Dam	Bihar Nadi	1970	Irrigation
Guradia Surdas Dam	Kali Sindh	1997	Irrigation

Projects	River	Year of Completion	Purpose
Harratola Dam	Butti/Shadol	1984	Irrigation
Harsi Dam	Parwati	1917	Irrigation
Hathaikheda Dam	Ajnar	1960	Irrigation, Water Storage
Hirapur Dam	Dehar Nadi	1984	Irrigation
Ichhawar Dam	Ajnal	1981	Irrigation
Jaguwa Dam	Bhadar	1921	Irrigation
Kacchal Dam	Kacchal	-	Irrigation
Kaketo Dam	Parwati	1934	Irrigation
Kaliasote Dam	Kaliasote	1988	Irrigation
Kanchan Dam	Kanchan	1979	Irrigation
Kankerkheda Dam	Utawali	1988	Irrigation
Karmodia Dam	Barna	1975	Irrigation, Pisciculture
Kazikhedi Dam	Kharkhara	1978	Irrigation
Kerwan Dam	Kerwan	1976	Irrigation
Kethan Dam	Kethan	1975	Irrigation
Koncha Dam	Koncha	1973	Irrigation
Kotwal Dam	Asan	1914	Irrigation
Kulgarhi Dam	Durha	1972	Irrigation
Kushalpur Dam	Dudhi	-	Irrigation
Kutni Feeder Dam	Kutni	-	Irrigation
Lakhunder Dam	Lakhunder	2000	Irrigation
Madikheda (Mohini Sagar) Dam	Sindh	2008	Hydroelectric, Irrigation
Mahan Dam	Mahan	2009	Irrigation
Mahuar Dam	Mahuar	-	Irrigation
Makroda Dam	Nagri	1980	Irrigation
Mala Dam	Sun Nadi	1929	Irrigation
Marhi Dam	Semra Nadi	1981	Irrigation
Mehroi Dam	Son	1990	Irrigation
Morwan Dam	Gameri	1959	Irrigation
Nagda Dam	Shipra	1977	Irrigation
Naktara Dam	Amra	1980	Irrigation
Nandanwara Dam	Bargi Nadi	1964	Irrigation
Naren Dam	Naren	1981	Irrigation
Pagara Dam	Asan	1927	Irrigation
Paronch Dam	Paronch	1980	Irrigation
Pehsari Dam	Mowar	1984	Irrigation, Water Storage
Pillowa Dam	Sankh	1914	Irrigation
Pipliyakumar Dam	Banganga	1978	Irrigation
Rajiv Sagar (Maksudangarh) Dam	Bhader	2002	Irrigation
Rampur Dam	Negi	1917	Irrigation
Rampurakhurd Dam	Parwati	1992	Irrigation

Projects	River	Year of Completion	Purpose
Rangwan Dam		1957	Irrigation
Ratapani Dam	Godmedi	1965	Irrigation
Rehti Dam	Rehti	-	Irrigation
Sagad Dam	Sagar	-	Irrigation
Sahibkhedi Dam	Surasa	1981	Irrigation
Samrat Ashok Sagar (Halali) Dam	Halali	1997	Irrigation, Water Storage
Sanjay Sagar (Gomukh) Dam	Gomukh	1985	Irrigation
Sarro Dam	Dhonnai	1973	Irrigation
Shamsherpura Dam	Puchi	1992	Hydroelectric, Irrigation
Sirsa Dam	Koil	1953	Irrigation
Tigra Dam	Sankh	1917	Irrigation, Water Storage
Tillar Dam	Tillar	1987	Irrigation
Umrar Dam	Umrar	1978	Irrigation
Upper Kaketo Dam	Parwati	-	Irrigation
Yashvant Sagar Dam	Gambhir	1939	Water Storage

Adopted from India-wris (2015)

3. Demographic Profile of Ganga Basin in the State

Madhya Pradesh in total has 24 Class I cities, 21 Class II towns and 72 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 72 million out of which 27.6% belong to the urban area. The population density in the state is about 236 people per square kilometer. Some of the Class I cities of M.P. in GRB are Bhind, Bhopal, Chhatarpur, Damoh, Datia, Dewas, Guna, Gwalior, Indore, Mandsaur, Morena, Murwara (Katni), Nagda, Neemach, Pithampur, Ratlam, Rewa, Sagar, Satna, Sehore, Shivpuri, Singrauli, Ujjain and Vidisha. Among all the cities Gwalior, Indore and Bhopal are the most populated cities having more than 1 million resident people according to the Population Census 2011.

The population resident under major basins lying in the state has also been estimated for both Class I and Class II cities/ towns. The largest population reside in Chambal Basin (Class I: 30.61%) and least (1.75%) in Son Basin where a single Class I town of the state comes under GRB. The second least populated basin is Ken (Class I: 2.24%). The least population of Class II town also belongs to Ken basin (0.47%) while maximum to Chambal basin (4.30%). The total population resident outside the selected basins for Class I cities in the state is 5.89%. The overall share of Class III population in the state is 16.76%. Figure 4 shows the population distribution of Class I cities, Class II and III towns in the major sub-basins of GRB in the state. Figures 5, 6 and 7 show the distribution of Class I cities and Class II and Class III towns in the state under Ganga River Basin.

The details of the area, population and the major river systems of all the Class I, II and III cities are presented in Tables 5-7, respectively. The average population of class I town in the state is 0.4 million, which is approximately six times and thirteen times higher than the population of class II and class III towns, respectively. Indore is the most populated class I city having the population of the order of 1.9 million while Nagda is the least populated (0.1 million) class I city. Dhar and Khurai are the cities having maximum and minimum population under class II towns of 0.09 and 0.05 million, respectively. In class III towns where the population is less than 0.05 million, the maximum population is in the Biaora town (0.049 million) while minimum is in Maksi (0.02 million).

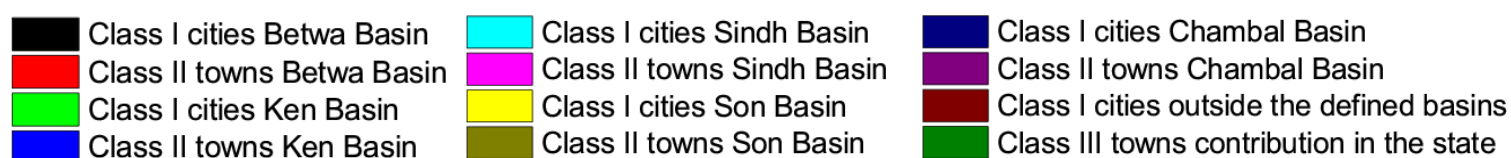
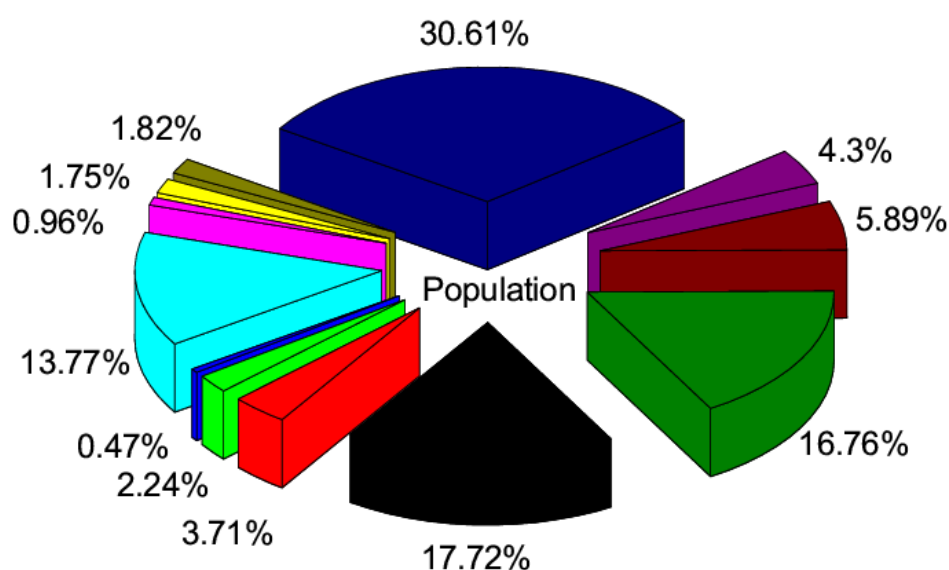


Figure 4: Population Distribution of Class I Cities and Class II, Class III Towns in the Major Sub-basins of GRB in the State

Table 5: Demography of Class I Cities in Portion of the Ganga Basin Lying in the State of Madhya Pradesh

S No.	Town Name	River System	Area (sq km)	Town Population (Census 2011)
1	Bhind	Kunwari River	17.18	197,585
2	Bhopal	Betwa River	285.88	1,798,218
3	Chhatarpur	Dhasan River	15.56	142,128
4	Damoh	Ken River	33.23	139,561
5	Datia	Sindh River	6.64	100,284
6	Dewas	Shipra River	100.22	289,550
7	Guna	Sindh River	45.75	180,935
8	Gwalior	SonRekha River	173.68	1,054,420
9	Indore	Saraswati River	172.39	1,994,397
10	Mandsaur	Shivna River	36.36	141,667
11	Morena	Asan River	12.00	200,482
12	Murwara (Katni)	Katni River	68.57	221,883
13	Nagda	Chambal River	23.83	100,039
14	Neemuch	Ratem River	22.04	128,561
15	Pithampur	Mahi River	75.51	126,200
16	Ratlam	-	39.19	264,914
17	Rewa	Beehar River	102.00	235,654
18	Sagar	Dhasan River	34.26	274,556
19	Satna	Satna River	79.01	282,977
20	Sehore	Parbati River	15.11	109,118
21	Shivpuri	Sindh River	81.11	179,977
22	Singrauli	-	284.46	220,257
23	Ujjain	Kshipra River	92.68	515,215
24	Vidisha	Betwa River	5.83	155,951

Table 6: Demography of Class II towns in Portion of the Ganga Basin Lying in the State of Madhya Pradesh

S No.	Town Name	River System	Area (sq km)	Town Population (Census 2011)
1	Ashoknagar	Aur River	4.43	81,828
2	Ashta	Prabati river	15.78	53,184
3	Bangarda Chhota	Saraswati River	11.19	64,213
4	Basoda	Betwa River	16.55	78,289
5	Bina	Bina River	12.00	64,529
6	Dabra	Sindh River	3.79	61,277
7	Dhar	-	36.00	93,917
8	Gohad	Chambal River	14.91	58,939
9	Jaora	Maleni River	14.54	74,907
10	Khurai	Bina River	11.03	51,108
11	Kolar	Palar River	50.18	87,882
12	Mandideep	Kaliasot River	12.78	59,654
13	Panna	Kilkila River	10.00	59,091
14	Raghogarh -Vijaypur	Chopan & Parbati River	73.79	62,163
15	Shahdol	Son River	24.28	86,681
16	Shajapur	Chiler River	17.19	69,263
17	Sheopur	Parbati River	6.29	71,951
18	Shujalpur	Newaj River	7.74	51,225
19	Sidhi	Son River	12.31	54,331
20	Sironj	Betwa River 36 km	9.99	52,460
21	Tikamgarh	Jamani River	6.22	79,106

Table 7: Demography of Class III towns in Portion of the Ganga Basin Lying in the State of Madhya Pradesh

S No.	Town Name	River System	Area (sq km)	Town Population (Census 2011)
1	Agar	Kali Sindh River	3.52	37,917
2	Alot	Kshipra River	2.78	24,115
3	Ambah	Chambal River	3.85	47,177
4	Amlai	Son River	19.90	30,336
5	Aron	Sindh River	20.01	28,010
6	Badnagar	Chamla River	7.02	36,438
7	Badnawar	Mahi River	3.01	20,917
8	Bamor Kalan	Betwa River	3.43	32,838
9	Banda	Dhasan River	10.02	30,923
10	Bangawan	-	7.14	20,873
11	Begamganj	Bina River	18.46	34,031
12	Beohari	Banas River	35.14	24,545
13	Berasia	Baanh River	13.99	30,951
14	Bhander	Pahuj River	1.68	25,204
15	Bhanpura	Ahu River	8.00	21,013
16	Biaora	Parbati River	6.96	49,093
17	Bijawar	Dhasan River	25.72	20,513
18	Bijuri	Kewai River	36.65	32,682
19	Binaganj	Parbati River	11.65	21,860
20	Chanderi	Betwa River	14.87	33,081
21	Chitrakoot	Ken & Yamuna River	83.00	23,316
22	Deori	-	5.00	25,632
23	Dhanpuri	Son River	24.86	45,156
24	Garhakota	Sunar River	2.98	32,726
25	Gormi	-	17.00	20,841
26	Hatta	Ken River	6.29	32,465
27	Indergarh	Sindh River	18.05	23,045
28	Jaura Khurd	Asan River	10.42	32,087
29	Jirapur	Kali Sindh River	9.25	21,724
30	Joura	Asan River	4.00	42,153
31	Kailaras	Chambal River	1.72	25,920

S No.	Town Name	River System	Area (sq km)	Town Population (Census 2011)
32	Karera	Mahuar River	12.00	28,705
33	Khachrod	Chambal River	10.40	34,191
34	Khajuraho	Khudar River	59.80	24,481
35	Kotma	Kewai River	12.09	29,704
36	Lahar	Kwari River	19.04	35,674
37	Laundi	Umil River	25.04	22,002
38	Maharajpur	Narmada River	14.50	23,328
39	Maihar	Mahanadi River	10.36	40,192
40	Makronia Buzurg	-	4.32	23,861
41	Maksi	Choti Kali Sindh River	19.19	20,088
42	Manasa	Ratem River	3.61	26,551
43	Mau	Parbati River	58.69	20,147
44	Mauganj	Son River	36.91	26,420
45	Mehidpur	Kshipra River	15.15	34,362
46	Mehgaon	Sindh River	4.00	21,335
47	Mhowgaon	-	13.00	30,012
48	Mungaoli	Betwa River	17.98	26,192
49	Nagod	Satna River	4.40	22,568
50	Narsinghgarh	Parbati River	12.95	32,329
51	Niwari	Betwa River	14.91	23,724
52	Nowgong	Dhasan River	20.86	40,580
53	Nowrozabad	Johilla River	15.96	21,883
54	Obedullaganj	-	29.86	22,845
55	Pachor	Lakhundar River	25.79	27,396
56	Pali	Chambal River	20.42	22,324
57	Pasan	Kewai River	15.06	28,447
58	Patharia	Sunar River	19.24	21,026
59	Porsa	Chambal River	12.17	39,669
60	Prithvipur	Betwa River	0.55	26,883
61	Rahatgarh	Bina River	6.54	31,537
62	Raisen	Bari & Tendoni River	19.08	44,162
63	Rajakhedi	Dhasan River	3.54	20,668
64	Rajgarh	Parbati River 45km	7.77	29,726
65	Rau	Saraswati River	14.74	36,055

S No.	Town Name	River System	Area (sq km)	Town Population (Census 2011)
66	Rehli	Sunar River	27.86	30,329
67	Sabalgarh	Chambal River	8.57	40,333
68	Sarangpur	Kali Sindh River	5.68	37,435
69	Seondha	Sindh River	2.93	23,140
70	Shamgarh	Chambal River	3.02	24,637
71	Tarana	Choti Kali Sindh River	1.45	24,908
72	Umaria	Son River	12.68	33,114

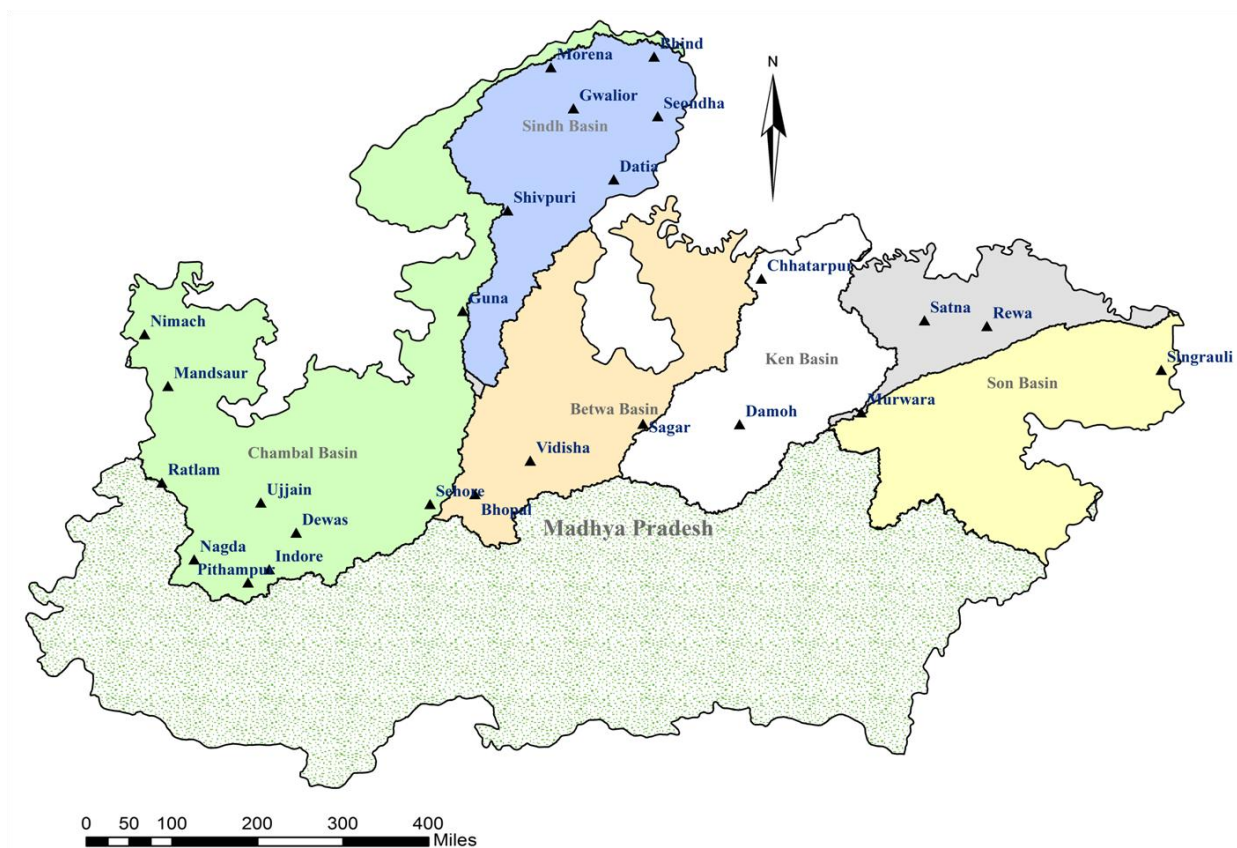


Figure 5: Class I Cities in the State of Madhya Pradesh under Ganga River Basin

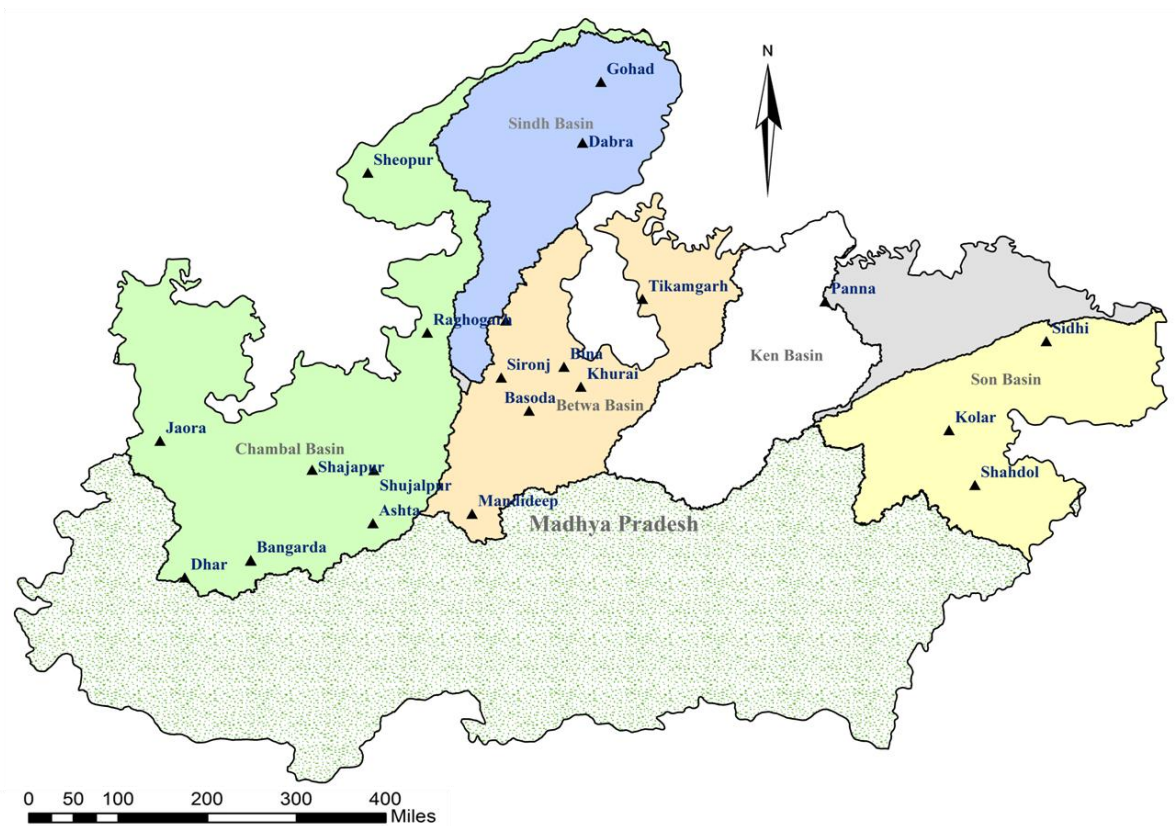


Figure 6: Class II towns in the State of Madhya Pradesh under Ganga River Basin

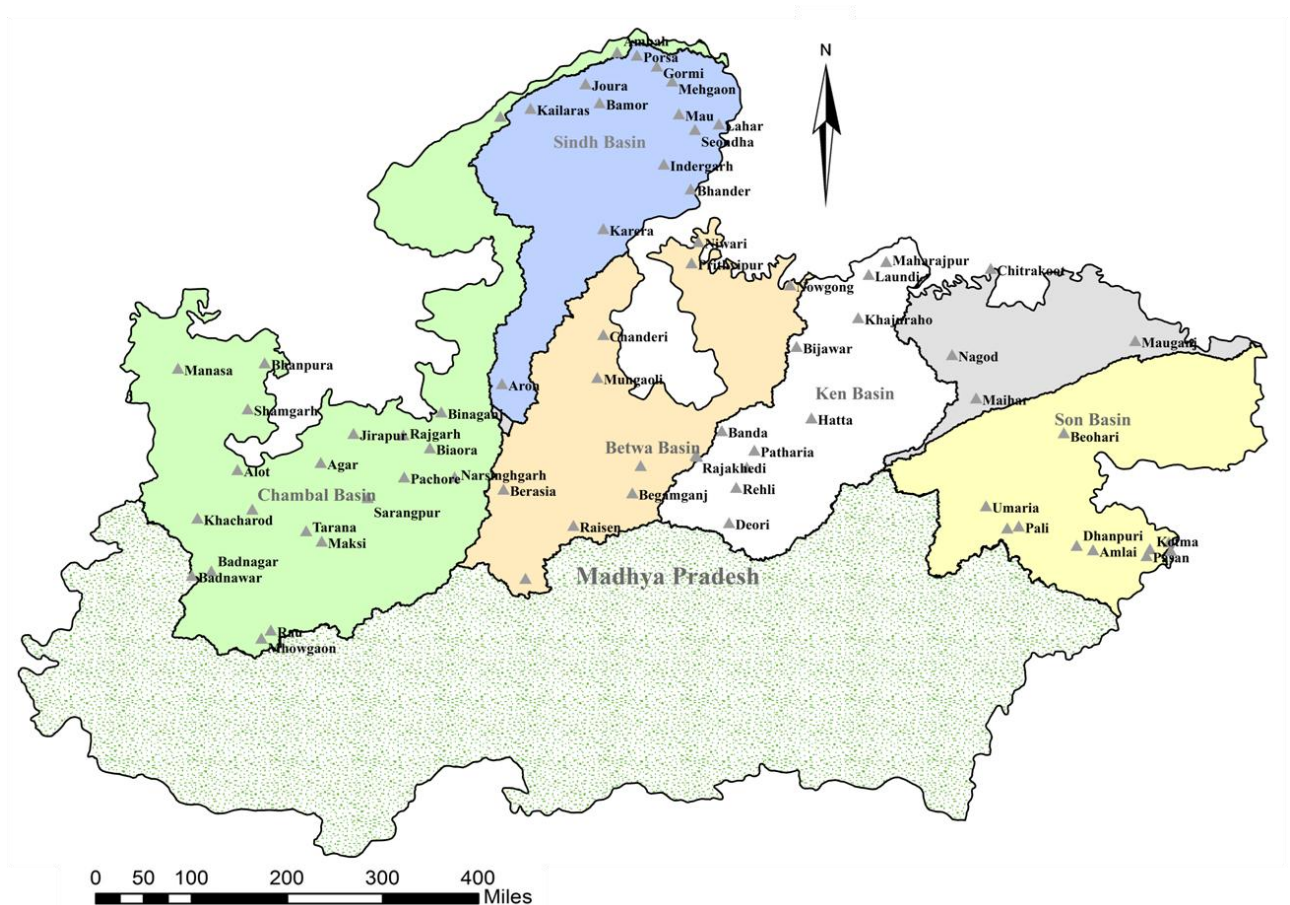


Figure 7: Class III towns in the State of Madhya Pradesh under Ganga River Basin

4. Religious Places and Their Importance

Madhya Pradesh, located at the center of India, is a beautiful and regal state. The state has richness in history, culture, religion and traditions. In every nook and corner of the state one can find religious shades, yet there are several pilgrimage sites. Ujjain, Amarkantak, Orchha, Omkareshwar and Chitrakoot are the most important pilgrimage centers among others. The hordes of pilgrims and devotees visit these places of pilgrimage every year. Hindu temples dominate the pilgrimage as the highest population here is of the Hindus. However, some Buddhist and Jain pilgrimages places are present in state.

Ujjain is an ideal destination for the spiritual souls, dedicated mostly to the Shaivite, Vaishnavite and followers of Shakta. It is one of the seven sacred cities (Sapta Puri) of the Hindus located on the eastern bank of the Kshipra River. The place has several old age temples of 10th and 11th century and ancient caves which are believed to be in existence since Mahabharata era. Ujjain is one out of four pilgrimage sites in India where the largest Hindu fair (Kumbh Mela) celebrated in every 12 years. There are about 15 Ghats along river Kshipra.

Orchha is one of the ancient towns situated on the bank of river Betwa and famous for its architectural heritage and its pilgrimage stature. It has many temples but most famous for the Ram Raja mandir where devotees visit regularly. Orchha receives huge number of devotees on certain important Hindu festivals like the Ram navami, Makar Sankranti, Vivaha Panchami, Basant Panchami, Shivratri and Kartik Purnima.

Bhojpur is a small town near to Bhopal having historical and religious importance. The place is located on river Betwa, famous for an ancient incomplete Bhojeshwar Temple dedicated to Lord Shiva and an unfinished Jain temple. Bhojeshwar Temple is also known as Somnath of the east. During Maha Shivratri, a big fair is organized every year.

Maihar is one of the 52 Shakti Peethas (shrines) located in the district of Satna and associated with the Goddess Shakti, also known as Sharda Devi. Millions of pilgrims throng the temple all round the year.

Chitrakoot, 'the hill of many wonders', lies on the borders of Madhya Pradesh–Uttar Pradesh. The town has spiritual, cultural and historical significance, known for a number of ancient temples as well as bathing ghats along the Mandakini River. The place is a renowned Lord Rama Pilgrimage and devotees believed that Lord Rama along with his brother Lakshman and goddess Sita spent 11 and half years of their 14 years exile in forests around Chitrakoot. This holy town is mostly crowded with pilgrims visiting throughout the year.

Amarkantak was initially called Riksh Parvat, now known as Tirthraj or "king of pilgrimages", an ancient pilgrim center for the Hindus and the source of the rivers Narmada and Son. The

place is surrounded by Vindhya, Satpuras and Maikal mountain ranges. The sanctity of Amarkantak is significantly linked with the sacred river Narmada.

Some major religious events and their features have been illustrated in Table 8.

Table 8: Major Religious Events on River Banks in Madhya Pradesh

S No	Religious Events	Place	River Bank	Duration	Period
1	Kumbha Mela (Simhastha)	Ujjain	Kshipra River	When Jupiter ascends into sun sign Leo's quarter or the Simha constellation of zodiac	Every twelfth year
2	Kartik Poornima	Orchha	Betwa River	October–November	Annual
3	Ram Navmi	Orchha	Betwa River	April	Annual
4	Makar Sankranti	Orchha	Betwa River	14 th January	Annual
5	Vivaha panchami	Orchha	Betwa River	November–December	Annual
6	Basant Panchami	Orchha	Betwa River	February	Annual
7	Shivratri	Orchha	Betwa River	March	Annual

5. 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, Betwa, Ken, Sindh and Son 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 1248.72 and 130.9 MLD, respectively while the treatment capacity of the respective cities/towns is 14.9% and 6.87% of the total sewage generated (CPCB, 2009) (Figure 8). According to the same report, the total sewage generation of the Class I cities under GRB (Morena, Indore, Sagar, Bhind, Neemuch, Mandsaur, Dewas, Vidisha, Bhopal, Rewa, Guna, Damoh, Satna, Shivpuri, Singrauli, Gwalior and Ujjain) in the state is 877.4 MLD while the treatment capacity of the cities in the state under GRB is only 13.27% of the total sewage generated. The complete discharge of sewage generated through Class I cities is in the tributaries and sub-tributaries of river Ganga *i.e.*, Kunwari, Khan, Shipra, Dhasan, Chambal, Chhoti Kali Sindh, Betwa, Baichaiya, Sindh, Sonar, Bearma, Tons, Gopad, Son and Vaishali river, as no town comes in direct contact with the river Ganga. Murwara is the only Class I town where the disposal is on land (21.5 MLD). The sewage generated by Class II towns (Dhar, Nagda,

Sehore, Chhatarpur and Mhow Cantt.) in the state under GRB is 40.4 MLD, out of which only 9.0 MLD is treated and remaining discharged directly into the tributaries/ subtributaries (Chambal, Kali Sindh, Ken and Khan river). Other Class II towns (Bina Etawa, Datia, Shahdol, Tikamgarh, Murwara, Pithampur, Ashok Nagar, Dabra, Joara, Seoni, Shajapur, Sheopur and Basoda) under GRB disposed their sewage generated (83.7 MLD) on the land. According to the other report published by CPCB (2009), the total waste water, 626.5 MLD is generated in the state which either disposes directly into the tributaries or subtributaries (503 MLD) of the Ganga or in the land/low lying areas (123.5 MLD).

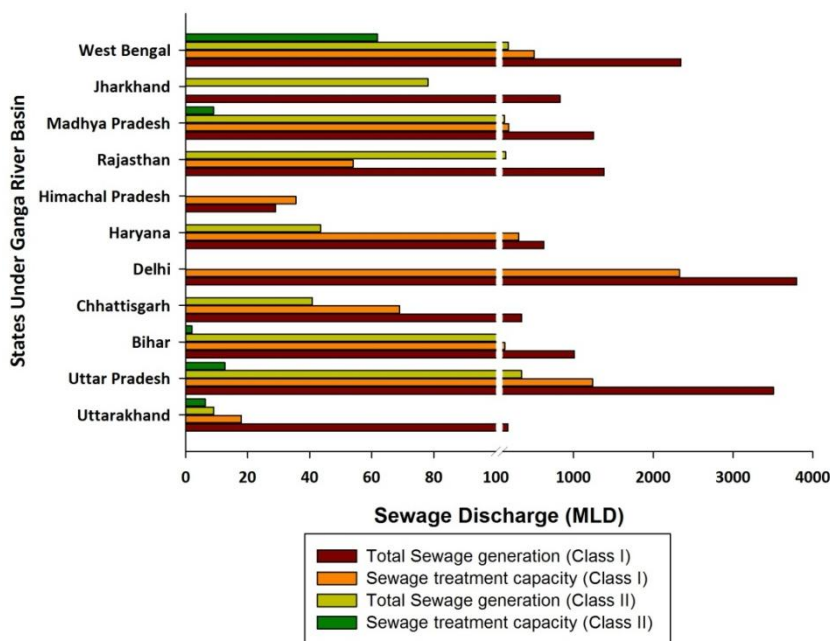


Figure 8: Assessment of Total Sewage Generation (MLD) and Sewage Treatment Capacity of Class I and II Cities in the States under Ganga River Basin

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 9).

The maximum sewage generation is in the Class I cities (72.77%) followed by Class III (16.35%) and Class II towns (10.87%). The BOD and COD load for Class I cities, Class II and Class III towns are in the range of 72, 11 and 17%, 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 Indore 278.8 MLD, approximately 80% of the water supply. In case of the class II towns the sewage generation in Dhar is maximum 10.1 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 is approximately 10.2 and 17.3 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 1.34 tons/day of BOD and COD, respectively. The maximum and minimum BOD, COD and TKN contributing cities in Class I towns are Indore and Nagda, respectively. In Class II towns, maximum BOD, COD and TKN load is from Dhar, whereas minimum is from Khurai. In class III towns, maximum and minimum BOD, COD and TKN load is from Biaora and Maksi. The estimates of total water supply, total sewage generated, BOD, COD and TKN loads are summarized and illustrated in Figures (10a-12b) 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 13.

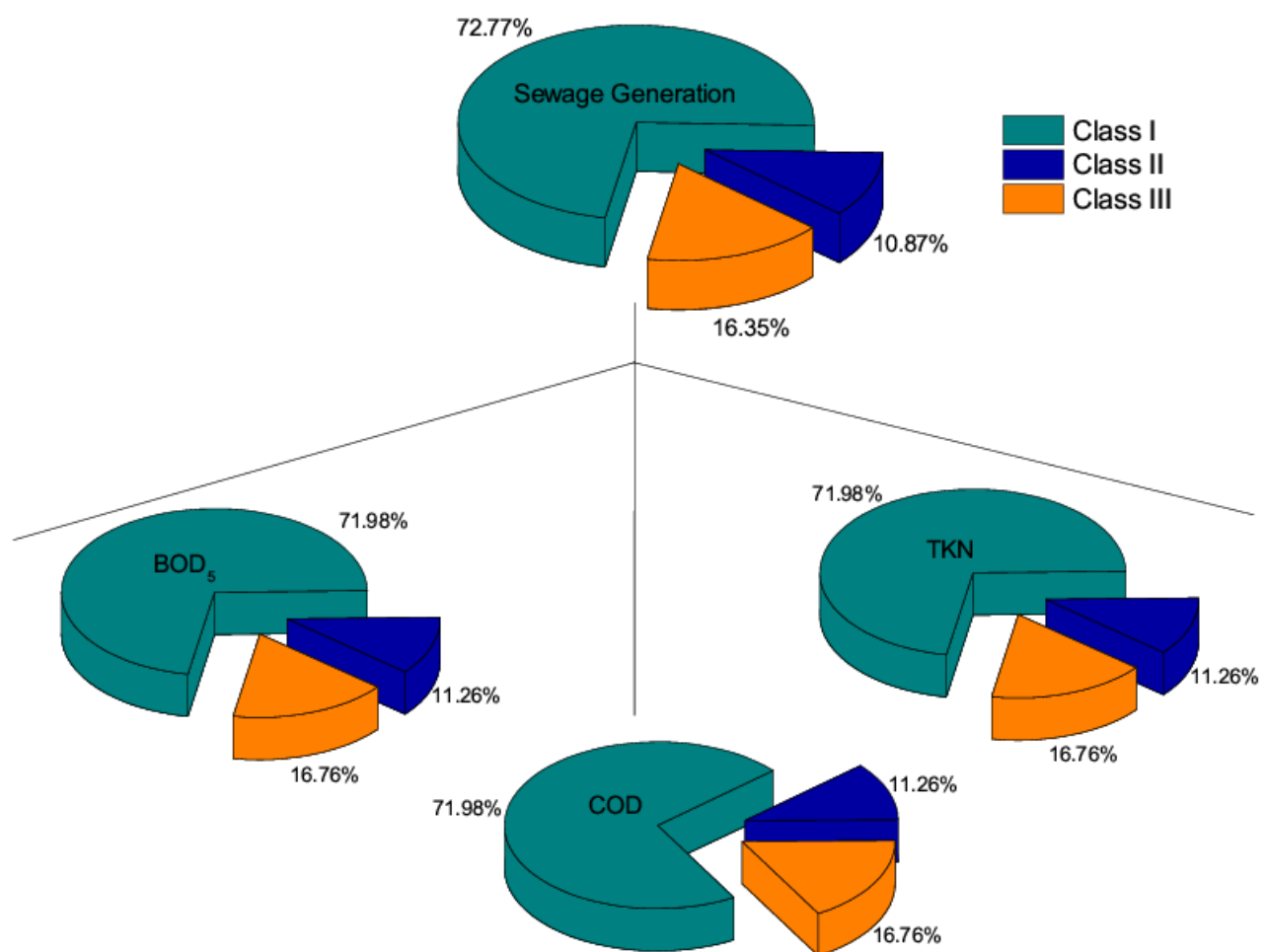


Figure 9: Distribution of Pollution Load of Class I Cities and Class II, Class III Towns in Madhya Pradesh

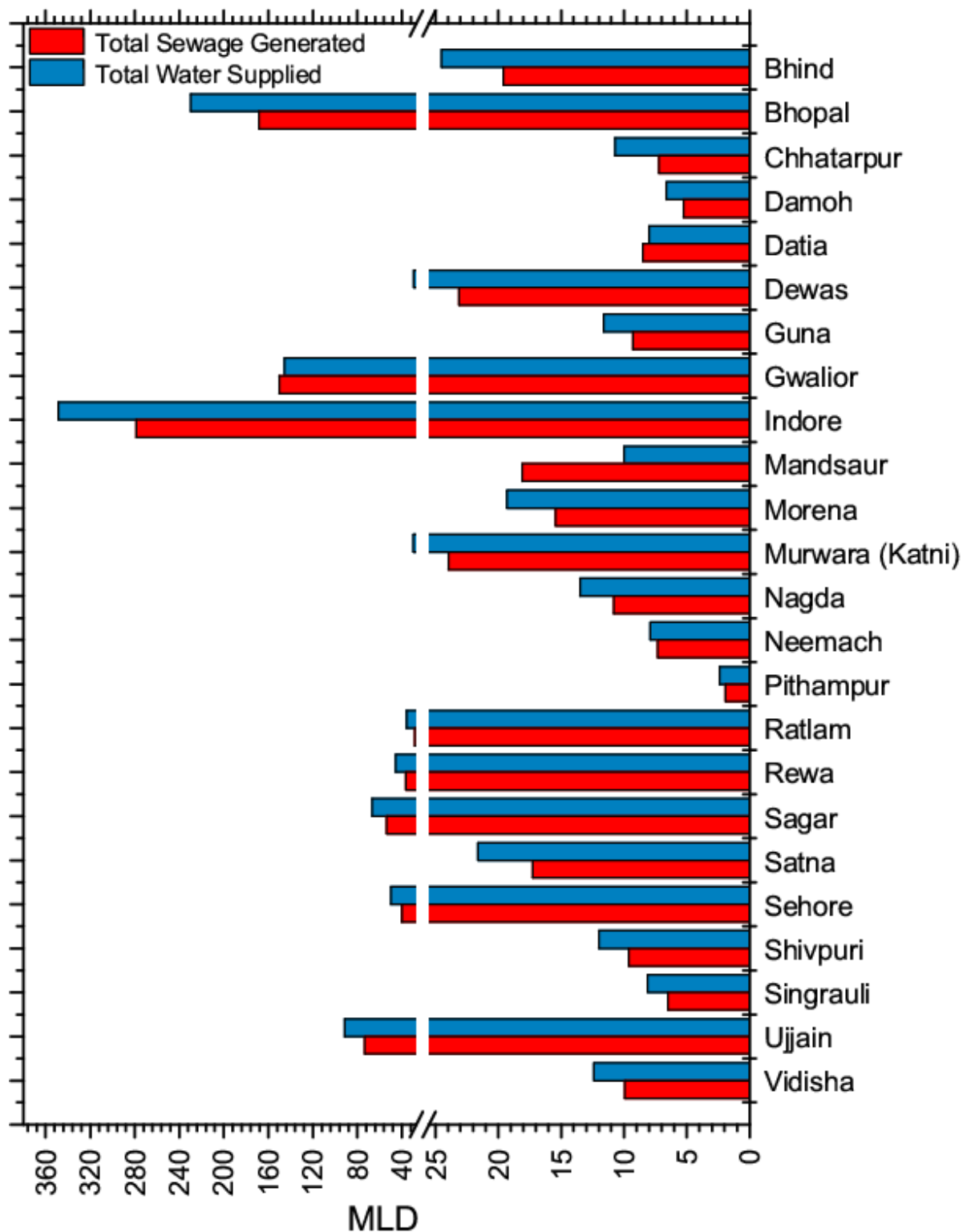


Figure 10a: Assessment of Water Supply and Sewage Generation (MLD) in Class I Towns in the Ganga River Basin Lying in the State of Madhya Pradesh

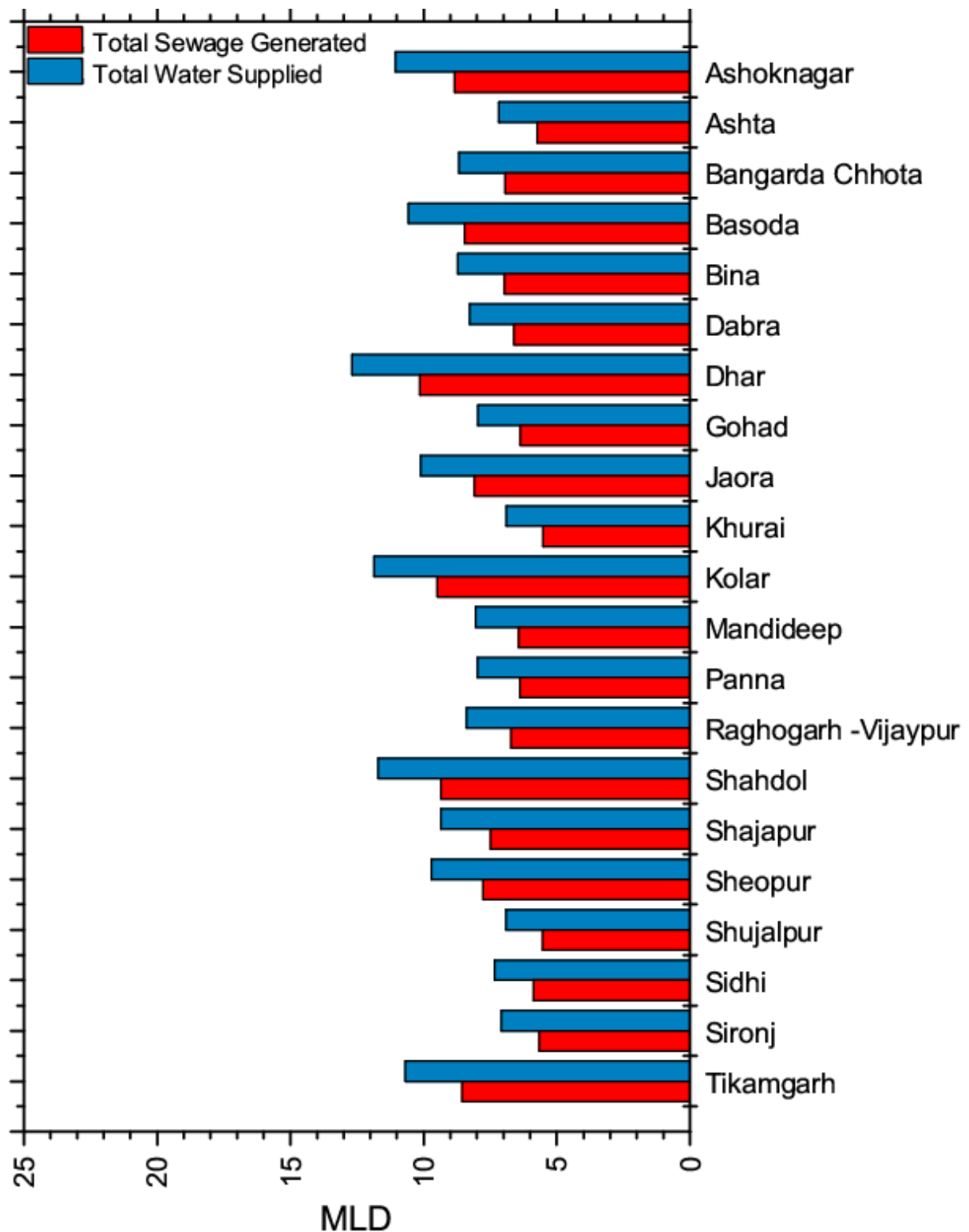


Figure 10b: Assessment of Water Supply and Sewage Generation (MLD) in Class II Towns in the Ganga River Basin Lying in the State of Madhya Pradesh

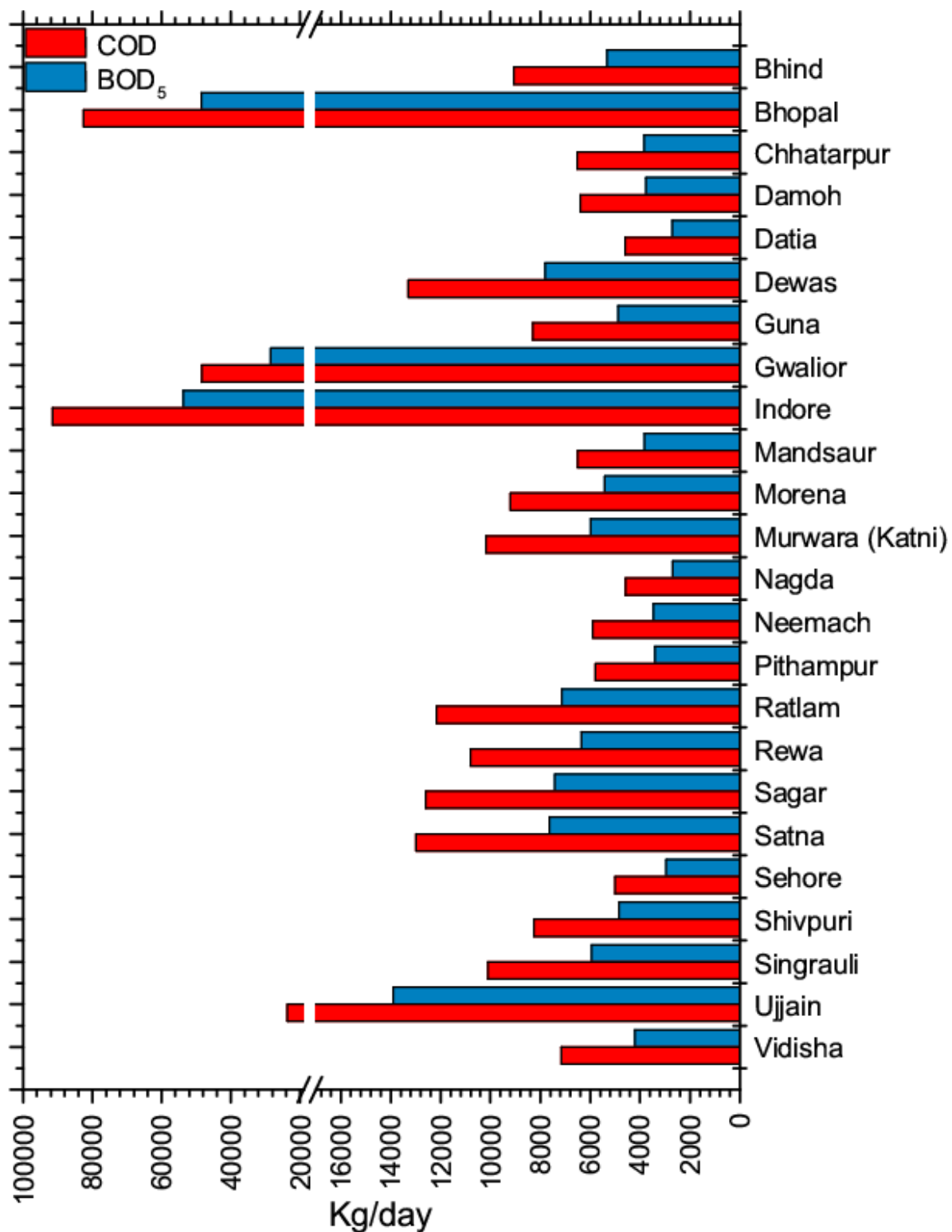


Figure 11a: Assessment of Organic Pollution Load (kg/day) from Class I Towns in the Ganga River Basin lying in Madhya Pradesh

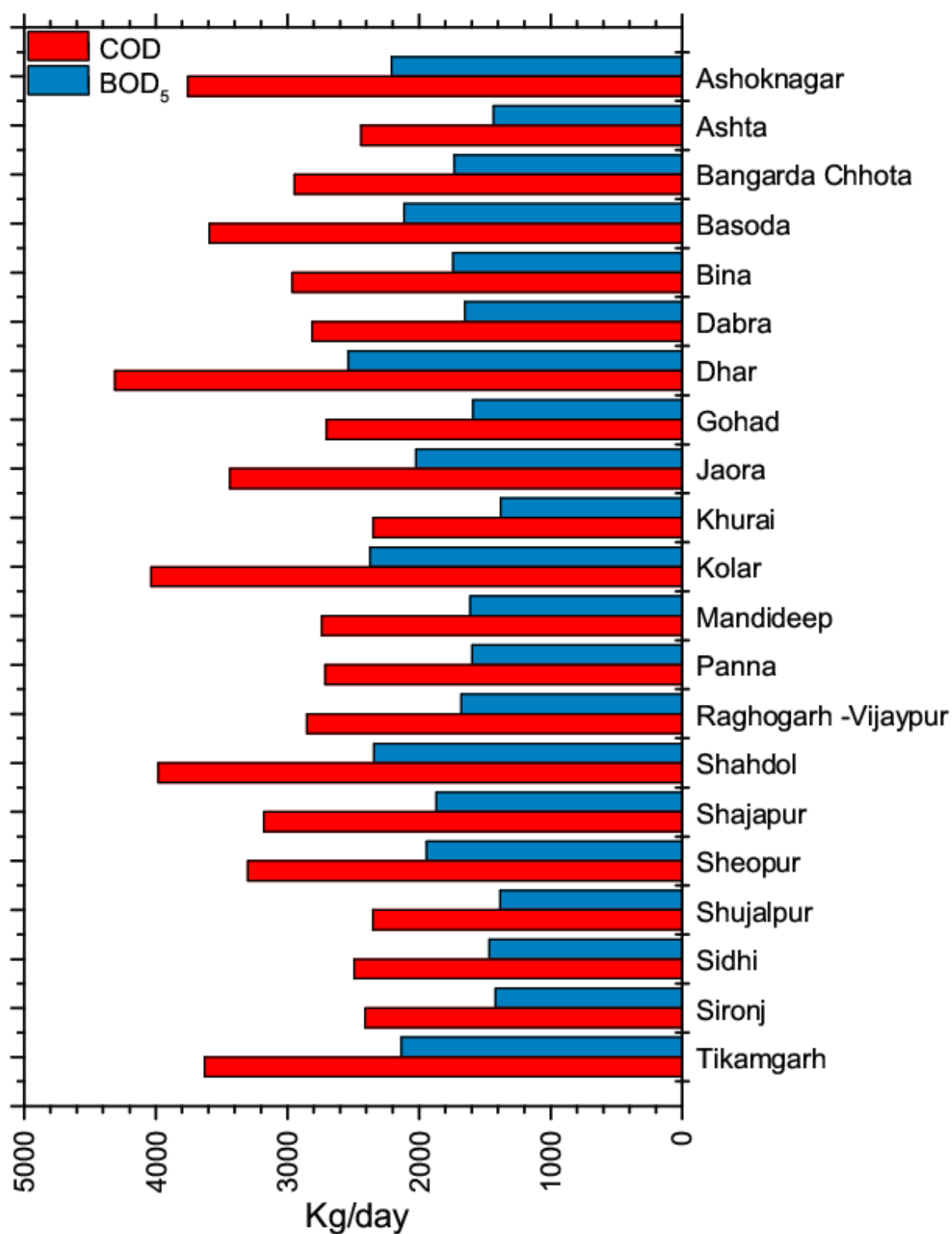


Figure 11b: Assessment of Organic Pollution Load (kg/day) from Class II Towns in the Ganga River Basin Lying in Madhya Pradesh

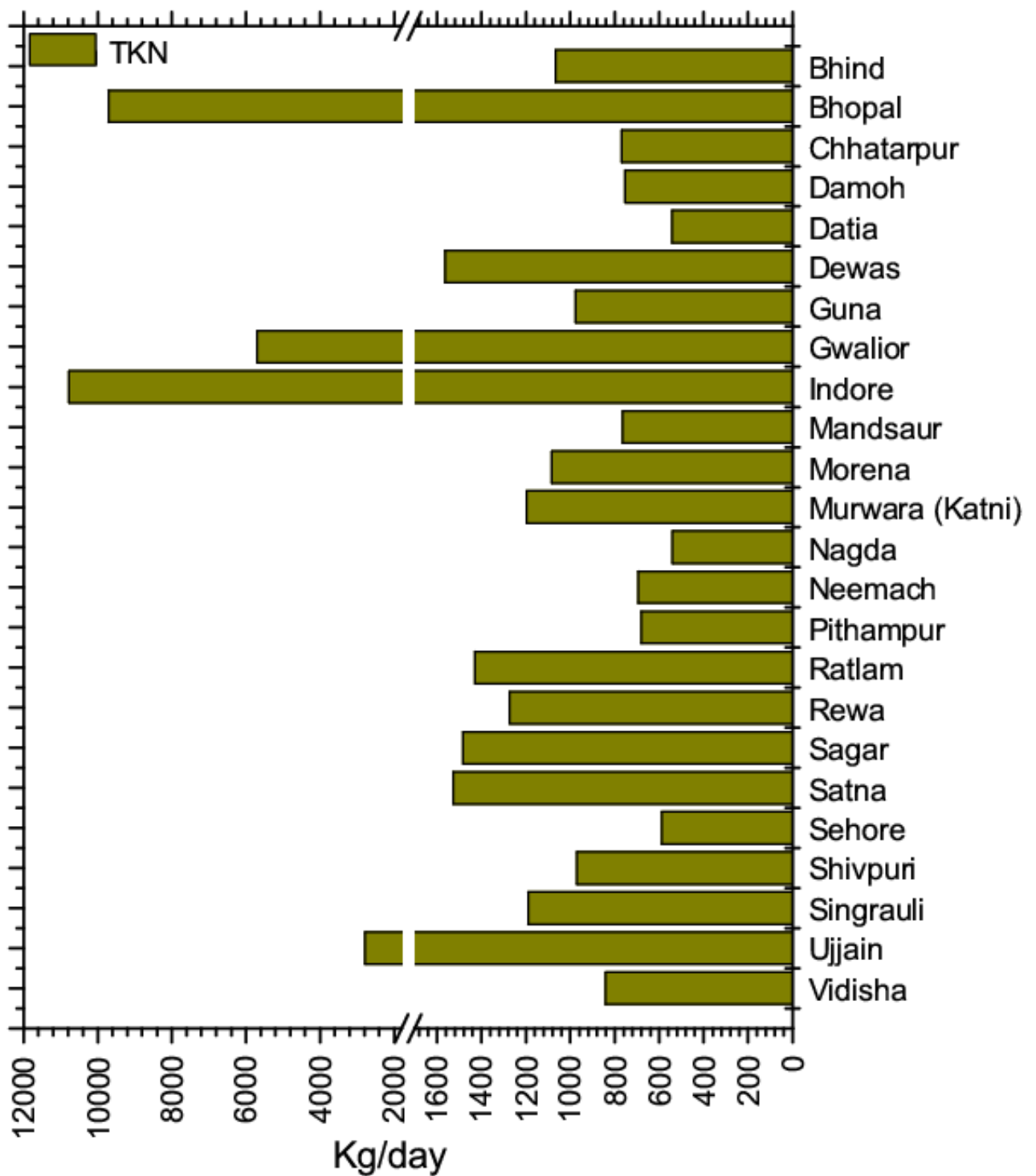


Figure 12a: Assessment of TKN Load (kg/day) from Class I Towns in the Ganga River Basin Lying in the State of Madhya Pradesh

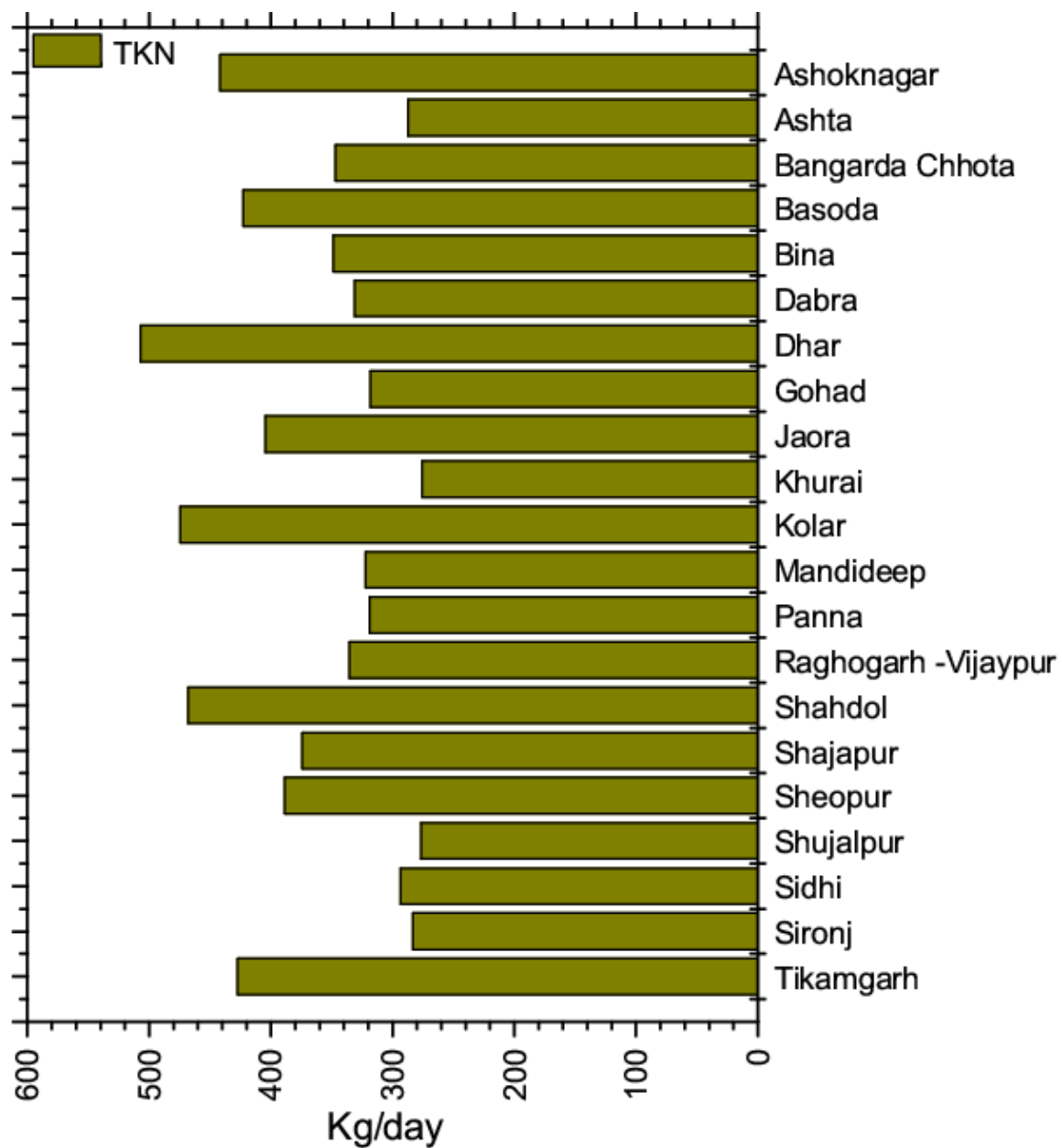


Figure 12b: Assessment of TKN Load (kg/day) from Class II Towns in the Ganga River Basin Lying in the State of Madhya Pradesh

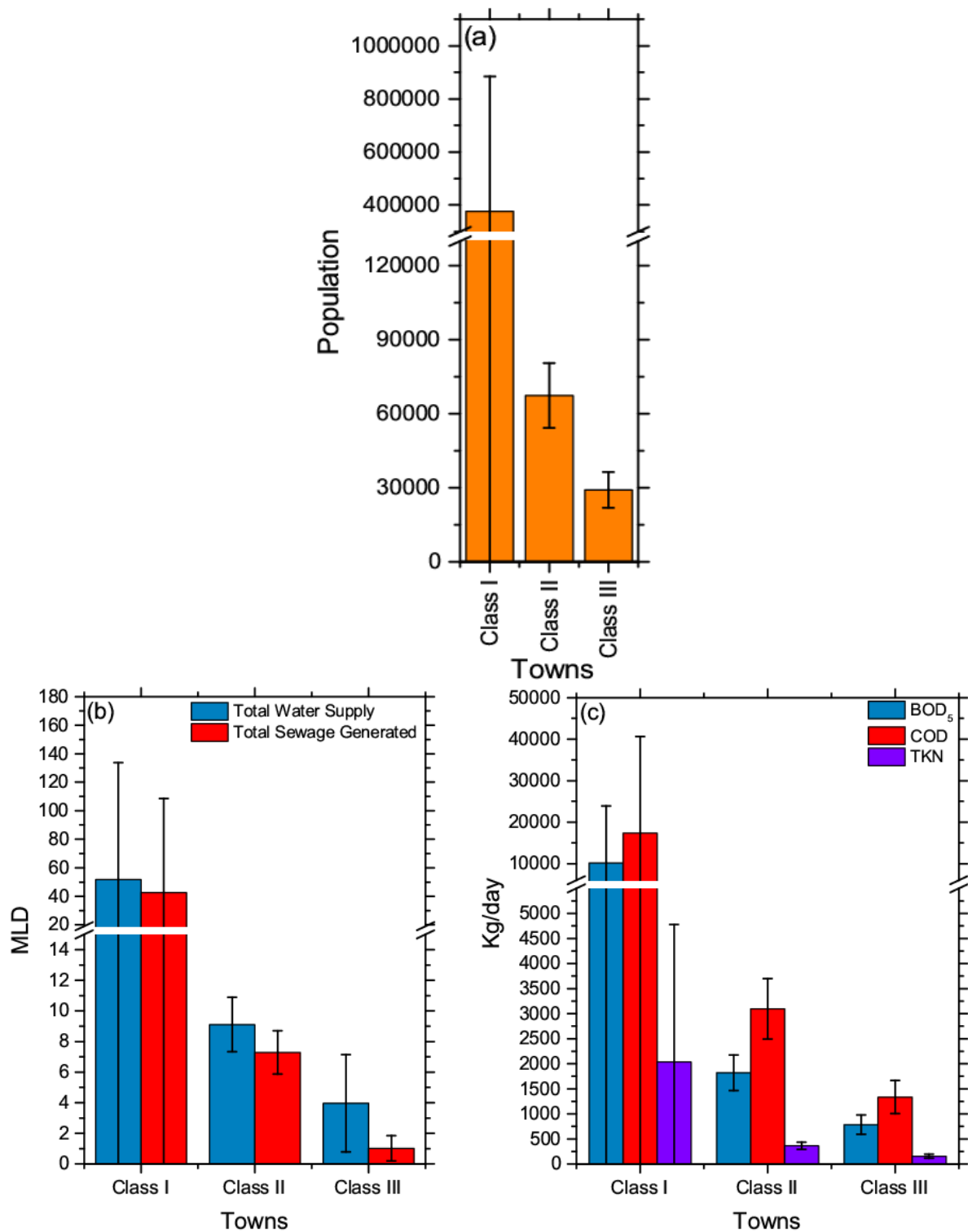


Figure 13: Comparative Analysis of Class I, Class II and Class III Cities/Towns Lying Under the State: (a) Population (b) Total Water Supply and Sewage Generation (c) Pollution Load

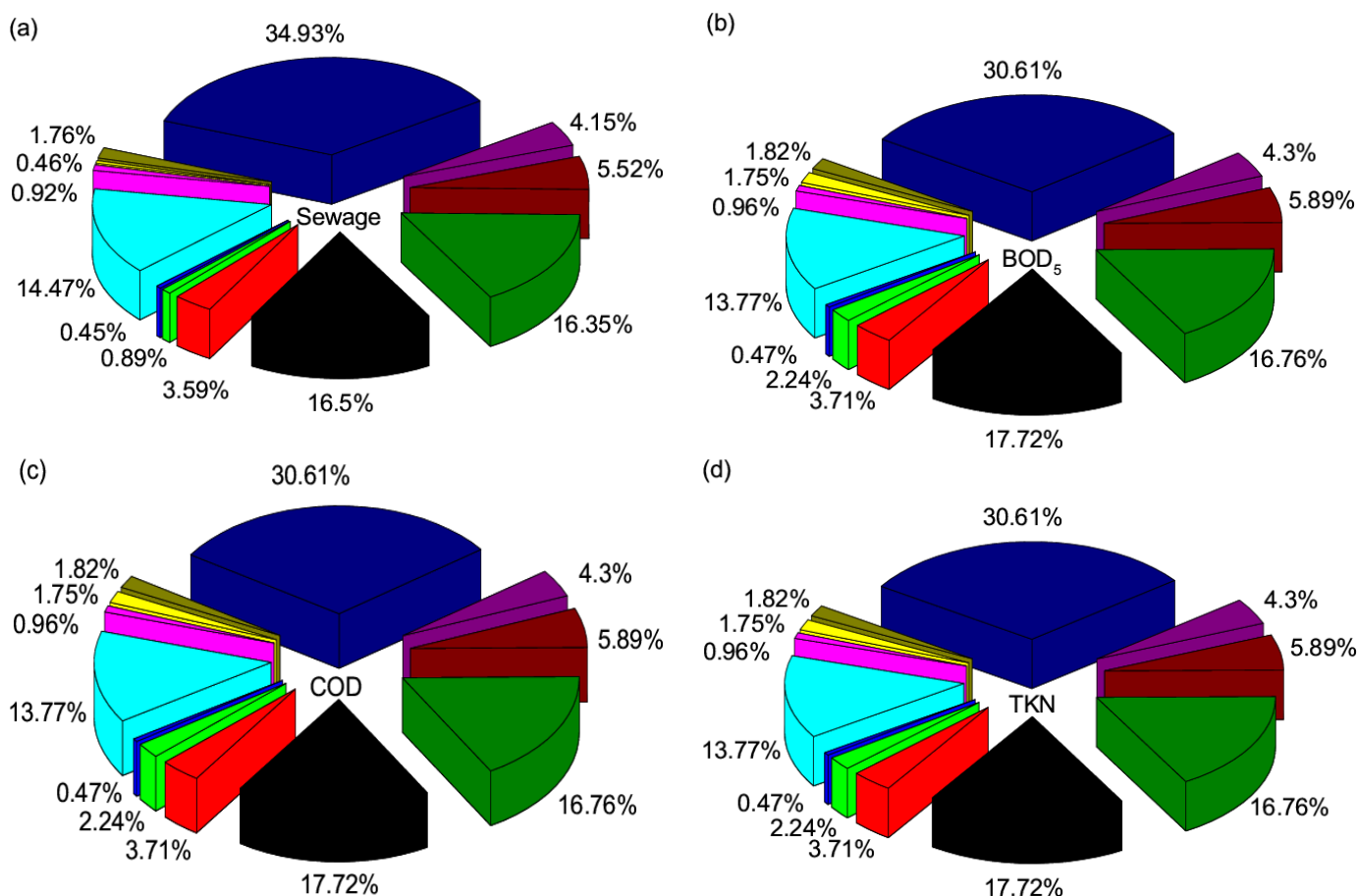


Figure 14 (a-d): Pollution load of Class I Cities and Class II, Class III Towns in the Major Basins in the State: (a) Sewage Generation; (b) BOD₅ ; (c) COD; (d) TKN

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 14a) and the results revealed that the percentage of the total sewage generation is maximum in Class I cities situated in the Chambal basin (34.93%) which is more than two times higher than the total percent contribution of Class I cities placed in the Betwa basin (16.50%). The percent sewage generation in Class I cities of the other major basins in the state *i.e.*, Sindh, Ken and Son are 14.47, 0.89 and 0.46%, respectively. The Class I cities outside the major defined basins combindly contributed 5.52% of waste water. The percentage sewage generation by Class III towns of the entire state is 16.35% of the total sewage generated by the state. The Class II towns of each basin separately contributing less than 4.5% of the total sewage generation with the maximum contribution by Chambal (4.15%) and the minimum by towns under Ken basin (0.45%).

The Class III towns of the state impart around 16.0-18.0% of the total BOD, COD and TKN load. The basin wise major contributors of Class I cities for BOD, COD and TKN load are Chambal (31.0%), Betwa (18.0%) and Sindh (14.0%). The other basins like Ken and Son contributed relatively lesser BOD, COD and TKN load and are in the range of 1.8-2.2%. But significant BOD, COD and TKN loads are also contributed by the Class I cities lying outside the selected basins (17.0%). The details of the BOD and COD load in the state are presented in Figure 14b and c while the TKN load is presented in Figure 14 d.

2.0 Conclusions

River Ganga flowing in the Indo-Gangetic plains having a broad basin covers more than 50% geographical area of the state. The major portion of the Sindh (94.12%) and Ken basin (86.41%) lie in the state while 68.12% of the Betwa basin and 43.23% and 40.18% of the Son and Chambal basin, respectively, also lie in the state. The catchment of the river bears the load of 24 Class I Cities, 21 Class II and 72 Class III Towns indirectly as all the cities/ towns are not directly in contact with the main stem of river Ganga. The maximum number of Class I cities lies in the Chambal basin of the state; these are Nimach, Mandsaur, Ratlam, Ujjain, Dewas, Indore, Pithampur, Nagda, Sehore and Guna.

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 Chambal and Son tributaries discharge their partially treated and untreated effluent into river Ganga.

The maximum sewage generation is in the Class I cities (72.77%) followed by Class III (16.35%) and Class II towns (10.87%). The BOD and COD load for Class I cities, Class II and Class III towns are in the range of 72, 11 and 17%, respectively. Indore and Dhar 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 Indore, Dhar and Biaora while the minimum load is from Nagda (Class I), Khurai (Class II) and Maksi (Class III).



Plate 1: Major Drains Disposing Sewage into Tributaries of River Ganga

References

Arceiwala, S.J. (1998). Waste water treatment for pollution control, Tata McGraw, Hill Publishers, New Delhi.

CPCB (2009). Status of Water Supply, Wastewater Generation and Treatment In Class-I Cities & Class-II Towns of India. [Accessed April 26, 2014 from: http://cpcb.nic.in/upload/NewItems/NewItem_153_Foreword.pdf].

CPCB (2013). Pollution Assessment: River Ganga. [Accessed April 26, 2014 from: http://cpcb.nic.in/upload/NewItems/NewItem_203_Ganga_report.pdf].

Dwivedi, A.C. (2006). Age structure of some commercially exploited fish stocks of the Ganga river system (Banda-Mirzapur section). D.Phil Thesis, Allahabad University, Allahabad, India.

Gopal, B. and Sah, M. (1993). Conservation and management of rivers in India: Case study of the river Yamuna. Environmental Conservation, 20:243-254.

India-wris (2015). Dams in Madhya Pradesh. [Accessed January 21, 2015 from: http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Dams_in_Madhya_Pradesh].

NIDM (2000). NIDM Madhya Pradesh. [Accessed 15 Oct, 2015 from: <http://nidm.gov.in/pdf/dp/Madhya.pdf>].

NIH (1999). Hydrological Inventory of River Basin in Eastern Uttar Pradesh. Agriculture Factsheet SAG-11-09, Ohio State University. [Accessed April 03, 2012 from: http://www.nih.ernet.in/TechnicalPapers/Hydrological_Inventory_of_River_Basins_in_Eastern_Uttar_Pradesh.pdf].

Appendix-1

Compilation of Data Sheets of Water Balance & Pollution Load (Domestic) of Major Class II Cities/Towns in Madhya Pradesh

Water Balance & Pollution Load (Domestic) Data Sheet

City: Bhind		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	17.18
2	Population as in 2011	:	197585
3	Population Growth Rate as in 2011 (%)	:	28.51
4	Total Number of Wards	:	39
5	Population per Ward (Thousands)	:	5,066
6	Total Number of Household as in 2011	:	33592
7	Number of Household per Ward	:	861
8	Surface Water Supply (MLD)	:	NA
9	Ground Water (GW) Supply (MLD)	:	19.08
10	Number of Bore Wells	:	42
11	Ground Water Extraction per Bore Well (MLD)	:	0.45
12	Number of Hand Pumps/ Tubewells	:	5400
13	Ground Water Extraction per Hand Pump (lpd)	:	1000
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	24.50
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	124.00
18	Total Sewage Generation (MLD)*	:	19.60
19	Per Capita Sewage Generation (lpcd)	:	99.20
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 5334.80
		COD	: 9069.20
		TKN	: 1067.00
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Kunwari River
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	2
33	Gross Area of Water Bodies (Hectare)	:	27.00
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Bhopal		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	285.88
2	Population as in 2011	:	1798218
3	Population Growth Rate as in 2011 (%)	:	23.30
4	Total Number of Wards	:	70
5	Population per Ward (Thousands)	:	25,689
6	Total Number of Household as in 2011	:	382690
7	Number of Household per Ward	:	5467
8	Surface Water Supply (MLD)	:	211.96
9	Ground Water (GW) Supply (MLD)	:	15.14
10	Number of Bore Wells	:	1675
11	Ground Water Extraction per Bore Well (MLD)	:	0.01
12	Number of Hand Pumps/ Tubewells	:	5275
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	211.96
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	229.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	127.70
18	Total Sewage Generation (MLD)*	:	168.50
19	Per Capita Sewage Generation (lpcd)	:	93.70
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 48551.90
		COD	: 82538.20
		TKN	: 9710.40
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Betwa River
31	Number of Drains/Nallah for Wastewater Disposal	:	5
32	Number of Water Bodies	:	29
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Chhatarpur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	15.56
2	Population as in 2011	:	142128
3	Population Growth Rate as in 2011 (%)	:	30.30
4	Total Number of Wards	:	40
5	Population per Ward (Thousands)	:	3,553
6	Total Number of Household as in 2011	:	26793
7	Number of Household per Ward	:	670
8	Surface Water Supply (MLD)	:	0.75
9	Ground Water (GW) Supply (MLD)	:	1.67
10	Number of Bore Wells	:	10
11	Ground Water Extraction per Bore Well (MLD)	:	0.17
12	Number of Hand Pumps/ Tubewells	:	16480
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	0.75
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	10.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	75.30
18	Total Sewage Generation (MLD)*	:	7.20
19	Per Capita Sewage Generation (lpcd)	:	50.70
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 3837.50
		COD	: 6523.70
		TKN	: 767.50
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	7
33	Gross Area of Water Bodies (Hectare)	:	10.00
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Damoh		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	33.23
2	Population as in 2011	:	139561
3	Population Growth Rate as in 2011 (%)	:	9.06
4	Total Number of Wards	:	39
5	Population per Ward (Thousands)	:	3,578
6	Total Number of Household as in 2011	:	28274
7	Number of Household per Ward	:	725
8	Surface Water Supply (MLD)	:	6.30
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	:	550
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	6.30
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	6.60
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	47.30
18	Total Sewage Generation (MLD)*	:	5.30
19	Per Capita Sewage Generation (lpcd)	:	37.80
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 3768.10
		COD	: 6405.80
		TKN	: 753.60
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Sunar River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	9
33	Gross Area of Water Bodies (Hectare)	:	119.44
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Datia		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	6.64
2	Population as in 2011	:	100284
3	Population Growth Rate as in 2011 (%)	:	21.18
4	Total Number of Wards	:	36
5	Population per Ward (Thousands)	:	2,786
6	Total Number of Household as in 2011	:	19254
7	Number of Household per Ward	:	535
8	Surface Water Supply (MLD)	:	4
9	Ground Water (GW) Supply (MLD)	:	1
10	Number of Bore Wells	:	26
11	Ground Water Extraction per Bore Well (MLD)	:	0.04
12	Number of Hand Pumps/ Tubewells	:	3000
13	Ground Water Extraction per Hand Pump (lpd)	:	1000
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	4
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	79.80
18	Total Sewage Generation (MLD)*	:	8.50
19	Per Capita Sewage Generation (lpcd)	:	84.80
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2707.70
		COD	: 4603.00
		TKN	: 541.50
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Sindh River
31	Number of Drains/Nallah for Wastewater Disposal	:	4
32	Number of Water Bodies	:	10
33	Gross Area of Water Bodies (Hectare)	:	60.80
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Dewas		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	100.22
2	Population as in 2011	:	289550
3	Population Growth Rate as in 2011 (%)	:	24.98
4	Total Number of Wards	:	45
5	Population per Ward (Thousands)	:	6,434
6	Total Number of Household as in 2011	:	57397
7	Number of Household per Ward	:	1275
8	Surface Water Supply (MLD)	:	6.35
9	Ground Water (GW) Supply (MLD)	:	4
10	Number of Bore Wells	:	507
11	Ground Water Extraction per Bore Well (MLD)	:	0.01
12	Number of Hand Pumps/ Tubewells	:	236
13	Ground Water Extraction per Hand Pump (lpd)	:	4238
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	6.35
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	29.40
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	101.50
18	Total Sewage Generation (MLD)*	:	23.10
19	Per Capita Sewage Generation (lpcd)	:	79.80
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 7817.90
		COD	: 13290.30
		TKN	: 1563.60
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Kshipra River
31	Number of Drains/Nallah for Wastewater Disposal	:	3
32	Number of Water Bodies	:	2
33	Gross Area of Water Bodies (Hectare)	:	3.06
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Guna		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	45.75
2	Population as in 2011	:	180935
3	Population Growth Rate as in 2011 (%)	:	31.90
4	Total Number of Wards	:	37
5	Population per Ward (Thousands)	:	4,890
6	Total Number of Household as in 2011	:	34383
7	Number of Household per Ward	:	929
8	Surface Water Supply (MLD)	:	5
9	Ground Water (GW) Supply (MLD)	:	5.50
10	Number of Bore Wells	:	254
11	Ground Water Extraction per Bore Well (MLD)	:	0.02
12	Number of Hand Pumps/ Tubewells	:	284
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	5
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	11.60
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	64.10
18	Total Sewage Generation (MLD)*	:	9.30
19	Per Capita Sewage Generation (lpcd)	:	51.30
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 4885.20
		COD	: 8304.90
		TKN	: 977.00
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	3
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Gwalior		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	173.68
2	Population as in 2011	:	1054420
3	Population Growth Rate as in 2011 (%)	:	27.50
4	Total Number of Wards	:	60
5	Population per Ward (Thousands)	:	17,574
6	Total Number of Household as in 2011	:	199466
7	Number of Household per Ward	:	3324
8	Surface Water Supply (MLD)	:	135
9	Ground Water (GW) Supply (MLD)	:	10
10	Number of Bore Wells	:	1485
11	Ground Water Extraction per Bore Well (MLD)	:	0.01
12	Number of Hand Pumps/ Tubewells	:	1270
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	135
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	145.60
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	138.10
18	Total Sewage Generation (MLD)*	:	150.30
19	Per Capita Sewage Generation (lpcd)	:	142.50
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 28469.30
		COD	: 48397.90
		TKN	: 5693.90
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	14
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Indore		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	172.39
2	Population as in 2011	:	1994397
3	Population Growth Rate as in 2011 (%)	:	32.42
4	Total Number of Wards	:	96
5	Population per Ward (Thousands)	:	20,775
6	Total Number of Household as in 2011	:	405090
7	Number of Household per Ward	:	4220
8	Surface Water Supply (MLD)	:	221.50
9	Ground Water (GW) Supply (MLD)	:	27
10	Number of Bore Wells	:	4000
11	Ground Water Extraction per Bore Well (MLD)	:	0.01
12	Number of Hand Pumps/ Tubewells	:	50000
13	Ground Water Extraction per Hand Pump (lpd)	:	2000
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	221.50
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	348.50
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	174.70
18	Total Sewage Generation (MLD)*	:	278.80
19	Per Capita Sewage Generation (lpcd)	:	139.80
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 53848.70
		COD	: 91542.80
		TKN	: 10769.70
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Saraswati River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	25
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Mandsaur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	36.36
2	Population as in 2011	:	141667
3	Population Growth Rate as in 2011 (%)	:	20.51
4	Total Number of Wards	:	40
5	Population per Ward (Thousands)	:	3,542
6	Total Number of Household as in 2011	:	28916
7	Number of Household per Ward	:	723
8	Surface Water Supply (MLD)	:	0.75
9	Ground Water (GW) Supply (MLD)	:	9.09
10	Number of Bore Wells	:	42
11	Ground Water Extraction per Bore Well (MLD)	:	0.22
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)	:	0.75
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	10.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	70.60
18	Total Sewage Generation (MLD)*	:	18.10
19	Per Capita Sewage Generation (lpcd)	:	127.80
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 3825.00
		COD	: 6502.50
		TKN	: 765.00
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Shivna River
31	Number of Drains/Nallah for Wastewater Disposal	:	5
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Morena		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	12.00
2	Population as in 2011	:	200482
3	Population Growth Rate as in 2011 (%)	:	32.81
4	Total Number of Wards	:	39
5	Population per Ward (Thousands)	:	5,141
6	Total Number of Household as in 2011	:	33104
7	Number of Household per Ward	:	849
8	Surface Water Supply (MLD)	:	NA
9	Ground Water (GW) Supply (MLD)	:	18
10	Number of Bore Wells	:	85
11	Ground Water Extraction per Bore Well (MLD)	:	0.21
12	Number of Hand Pumps/ Tubewells	:	2600
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	19.30
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	96.30
18	Total Sewage Generation (MLD)*	:	15.40
19	Per Capita Sewage Generation (lpcd)	:	77.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 5413.00
		COD	: 9202.10
		TKN	: 1082.60
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Asan, Chambal River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Pithampur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	75.51
2	Population as in 2011	:	126200
3	Population Growth Rate as in 2011 (%)	:	85.37
4	Total Number of Wards	:	31
5	Population per Ward (Thousands)	:	4,071
6	Total Number of Household as in 2011	:	31136
7	Number of Household per Ward	:	1004
8	Surface Water Supply (MLD)	:	1
9	Ground Water (GW) Supply (MLD)	:	1.2
10	Number of Bore Wells	:	30
11	Ground Water Extraction per Bore Well (MLD)	:	0.04
12	Number of Hand Pumps/ Tubewells	:	225
13	Ground Water Extraction per Hand Pump (lpd)	:	900
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	1
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	2.4
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	19.0
18	Total Sewage Generation (MLD)*	:	1.9
19	Per Capita Sewage Generation (lpcd)	:	15.2
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 3407.4
		COD	: 5792.6
		TKN	: 681.5
29	Wastewater Disposal Means	:	Land Disposal
31	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	1
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Ratlam		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	39.19
2	Population as in 2011	:	264914
3	Population Growth Rate as in 2011 (%)	:	19.22
4	Total Number of Wards	:	49
5	Population per Ward (Thousands)	:	5,406
6	Total Number of Household as in 2011	:	53133
7	Number of Household per Ward	:	1084
8	Surface Water Supply (MLD)	:	NA
9	Ground Water (GW) Supply (MLD)	:	NA
10	Number of Bore Wells	:	96
11	Ground Water Extraction per Bore Well (MLD)	:	NA
12	Number of Hand Pumps/ Tubewells	:	961
13	Ground Water Extraction per Hand Pump (lpcd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	35.80
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	133.6
18	Total Sewage Generation (MLD)*	:	28.60
19	Per Capita Sewage Generation (lpcd)	:	108.0
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 7152.7
		COD	: 12159.6
		TKN	: 1430.5
29	Wastewater Disposal Means	:	Land Disposal
31	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	5
32	Number of Water Bodies	:	2
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Singrauli		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	284.46
2	Population as in 2011	:	220257
3	Population Growth Rate as in 2011 (%)	:	18.94
4	Total Number of Wards	:	45
5	Population per Ward (Thousands)	:	4,895
6	Total Number of Household as in 2011	:	44682
7	Number of Household per Ward	:	993
8	Surface Water Supply (MLD)	:	NA
9	Ground Water (GW) Supply (MLD)	:	NA
10	Number of Bore Wells	:	45
11	Ground Water Extraction per Bore Well (MLD)	:	NA
12	Number of Hand Pumps/ Tubewells	:	2219
13	Ground Water Extraction per Hand Pump (lpcd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.1
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	36.8
18	Total Sewage Generation (MLD)*	:	6.5
19	Per Capita Sewage Generation (lpcd)	:	29.4
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 5946.9
		COD	: 10109.8
		TKN	: 1189.4
29	Wastewater Disposal Means	:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal	:	Mahan River
31	Number of Drains/Nallah for Wastewater Disposal	:	4
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Sehore		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	15.11
2	Population as in 2011	:	109118
3	Population Growth Rate as in 2011 (%)	:	17.94
4	Total Number of Wards	:	35
5	Population per Ward (Thousands)	:	3,118
6	Total Number of Household as in 2011	:	20314
7	Number of Household per Ward	:	580
8	Surface Water Supply (MLD)	:	40
9	Ground Water (GW) Supply (MLD)	:	10
10	Number of Bore Wells	:	55
11	Ground Water Extraction per Bore Well (MLD)	:	0.18
12	Number of Hand Pumps/ Tubewells	:	440
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	40
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	50.20
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	460.10
18	Total Sewage Generation (MLD)*	:	40.20
19	Per Capita Sewage Generation (lpcd)	:	368.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2946.20
		COD	: 5008.50
		TKN	: 589.20
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Karbala River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Shivpuri		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	81.11
2	Population as in 2011	:	179977
3	Population Growth Rate as in 2011 (%)	:	22.52
4	Total Number of Wards	:	39
5	Population per Ward (Thousands)	:	4,615
6	Total Number of Household as in 2011	:	33803
7	Number of Household per Ward	:	867
8	Surface Water Supply (MLD)	:	5
9	Ground Water (GW) Supply (MLD)	:	7
10	Number of Bore Wells	:	430
11	Ground Water Extraction per Bore Well (MLD)	:	0.02
12	Number of Hand Pumps/ Tubewells	:	80
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	5
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	12.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	66.70
18	Total Sewage Generation (MLD)*	:	9.60
19	Per Capita Sewage Generation (lpcd)	:	53.30
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 4859.40
		COD	: 8260.90
		TKN	: 971.90
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	7
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Ujjain		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	92.68
2	Population as in 2011	:	515215
3	Population Growth Rate as in 2011 (%)	:	19.49
4	Total Number of Wards	:	54
5	Population per Ward (Thousands)	:	9,541
6	Total Number of Household as in 2011	:	102401
7	Number of Household per Ward	:	1896
8	Surface Water Supply (MLD)	:	87.06
9	Ground Water (GW) Supply (MLD)	:	3.79
10	Number of Bore Wells	:	85
11	Ground Water Extraction per Bore Well (MLD)	:	0.04
12	Number of Hand Pumps/ Tubewells	:	1282
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	87.06
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	91.50
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	177.60
18	Total Sewage Generation (MLD)*	:	73.20
19	Per Capita Sewage Generation (lpcd)	:	142.10
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 13910.80
		COD	: 23648.40
		TKN	: 2782.20
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Kshipra River
31	Number of Drains/Nallah for Wastewater Disposal	:	9
32	Number of Water Bodies	:	23
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Vidisha		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	5.83
2	Population as in 2011	:	155951
3	Population Growth Rate as in 2011 (%)	:	24.31
4	Total Number of Wards	:	36
5	Population per Ward (Thousands)	:	4,332
6	Total Number of Household as in 2011	:	31627
7	Number of Household per Ward	:	879
8	Surface Water Supply (MLD)	:	9
9	Ground Water (GW) Supply (MLD)	:	1
10	Number of Bore Wells	:	12
11	Ground Water Extraction per Bore Well (MLD)	:	0.08
12	Number of Hand Pumps/ Tubewells	:	4830
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	9
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	12.40
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	79.50
18	Total Sewage Generation (MLD)*	:	9.92
19	Per Capita Sewage Generation (lpcd)	:	63.60
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 4210.70
		COD	: 7158.20
		TKN	: 842.10
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Betwa River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	1
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Murwara (Katni)			State: Madhya Pradesh	
S. No.	Items			Value
1	Total Area (sq km)		:	68.57
2	Population as in 2011		:	221883
3	Population Growth Rate as in 2011 (%)		:	18.64
4	Total Number of Wards		:	45
5	Population per Ward (Thousands)		:	4,931
6	Total Number of Household as in 2011		:	46261
7	Number of Household per Ward		:	1028
8	Surface Water Supply (MLD)		:	7.50
9	Ground Water (GW) Supply (MLD)		:	8
10	Number of Bore Wells		:	133
11	Ground Water Extraction per Bore Well (MLD)		:	0.06
12	Number of Hand Pumps/ Tubewells		:	565
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	7.50
16	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	30.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	135.00
18	Total Sewage Generation (MLD)*		:	24.00
19	Per Capita Sewage Generation (lpcd)		:	108.00
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	5990.80
		COD	:	10184.40
		TKN	:	1198.20
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Katni River
31	Number of Drains/Nallah for Wastewater Disposal		:	1
32	Number of Water Bodies		:	59
33	Gross Area of Water Bodies (Hectare)		:	NA
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Neemach		State: Madhya Pradesh		
S. No.	Items			Value
1	Total Area (sq km)		:	22.04
2	Population as in 2011		:	128561
3	Population Growth Rate as in 2011 (%)		:	13.92
4	Total Number of Wards		:	40
5	Population per Ward (Thousands)		:	3,214
6	Total Number of Household as in 2011		:	25549
7	Number of Household per Ward		:	639
8	Surface Water Supply (MLD)		:	6.82
9	Ground Water (GW) Supply (MLD)		:	1
10	Number of Bore Wells		:	40
11	Ground Water Extraction per Bore Well (MLD)		:	0.03
12	Number of Hand Pumps/ Tubewells		:	193
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	6.82
16	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	7.90
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	96.50
18	Total Sewage Generation (MLD)*		:	7.30
19	Per Capita Sewage Generation (lpcd)		:	45.90
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	3471.10
		COD	:	5900.90
		TKN	:	694.20
29	Wastewater Disposal Means		:	Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal		:	5
32	Number of Water Bodies		:	3
33	Gross Area of Water Bodies (Hectare)		:	NA
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Rewa		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	102.00
2	Population as in 2011	:	235654
3	Population Growth Rate as in 2011 (%)	:	28.58
4	Total Number of Wards	:	45
5	Population per Ward (Thousands)	:	5,237
6	Total Number of Household as in 2011	:	45275
7	Number of Household per Ward	:	1006
8	Surface Water Supply (MLD)	:	44
9	Ground Water (GW) Supply (MLD)	:	1
10	Number of Bore Wells	:	66
11	Ground Water Extraction per Bore Well (MLD)	:	0.02
12	Number of Hand Pumps/ Tubewells	:	910
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	44
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	45.50
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	193.10
18	Total Sewage Generation (MLD)*	:	36.40
19	Per Capita Sewage Generation (lpcd)	:	154.50
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 6362.70
		COD	: 10816.50
		TKN	: 1272.50
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Beehar River
31	Number of Drains/Nallah for Wastewater Disposal	:	23
32	Number of Water Bodies	:	2
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Sagar		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	34.26
2	Population as in 2011	:	274556
3	Population Growth Rate as in 2011 (%)	:	12.19
4	Total Number of Wards	:	48
5	Population per Ward (Thousands)	:	5,720
6	Total Number of Household as in 2011	:	52573
7	Number of Household per Ward	:	1095
8	Surface Water Supply (MLD)	:	65
9	Ground Water (GW) Supply (MLD)	:	2
10	Number of Bore Wells	:	28
11	Ground Water Extraction per Bore Well (MLD)	:	0.07
12	Number of Hand Pumps/ Tubewells	:	225
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	65
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	67.10
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	244.40
18	Total Sewage Generation (MLD)*	:	53.70
19	Per Capita Sewage Generation (lpcd)	:	195.50
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 7413.00
		COD	: 12602.10
		TKN	: 1482.60
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Choti River
31	Number of Drains/Nallah for Wastewater Disposal	:	5
32	Number of Water Bodies	:	3
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Satna		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	79.01
2	Population as in 2011	:	282977
3	Population Growth Rate as in 2011 (%)	:	23.41
4	Total Number of Wards	:	45
5	Population per Ward (Thousands)	:	6,288
6	Total Number of Household as in 2011	:	54699
7	Number of Household per Ward	:	1216
8	Surface Water Supply (MLD)	:	18
9	Ground Water (GW) Supply (MLD)	:	3
10	Number of Bore Wells	:	308
11	Ground Water Extraction per Bore Well (MLD)	:	0.01
12	Number of Hand Pumps/ Tubewells	:	1198
13	Ground Water Extraction per Hand Pump (lpcd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	18
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	21.60
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	76.30
18	Total Sewage Generation (MLD)*	:	17.30
19	Per Capita Sewage Generation (lpcd)	:	61.10
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 7640.40
		COD	: 12988.60
		TKN	: 1528.10
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Satna River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	7
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Nagda		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	3.58
2	Population as in 2011	:	100039
3	Population Growth Rate as in 2011 (%)	:	23.83
4	Total Number of Wards	:	36
5	Population per Ward (Thousands)	:	2779
6	Total Number of Household as in 2011	:	20177
7	Number of Household per Ward	:	560
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 (lpcd)	:	NA
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	13.50
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	134.90
18	Total Sewage Generation (MLD)*	:	10.80
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD5	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD5	: 2701.10
		COD	: 4591.80
		TKN	: 540.20
29	Wastewater Disposal Means	:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal	:	Chambal, Kshipra River
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	1
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Appendix-2

Compilation of Data Sheets of Water Balance & Pollution Load (Domestic) of Major Class II Cities/Towns in Madhya Pradesh

Water Balance & Pollution Load (Domestic) Data Sheet

City: Askok Nagar			State: Madhya Pradesh	
S. No.	Items			Value
1	Total Area (sq km)		:	4.43
2	Population as in 2011		:	81828
3	Population Growth Rate as in 2011 (%)		:	41.80
4	Total Number of Wards		:	22
5	Population per Ward (Thousands)		:	3,719
6	Total Number of Household as in 2011		:	15806
7	Number of Household per Ward		:	718
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 (lpcd)		:	NA
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	11.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	134.40
18	Total Sewage Generation (MLD)*		:	8.80
19	Per Capita Sewage Generation (lpcd)		:	107.50
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	2209.40
		COD	:	3755.90
		TKN	:	441.90
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Aur River
31	Number of Drains/Nallah for Wastewater Disposal		:	NA
32	Number of Water Bodies		:	NA
33	Gross Area of Water Bodies (Hectare)		:	NA
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Ashta			State: Madhya Pradesh	
S. No.	Items			Value
1	Total Area (sq km)		:	15.78
2	Population as in 2011		:	53184
3	Population Growth Rate as in 2011 (%)		:	30.90
4	Total Number of Wards		:	19
5	Population per Ward (Thousands)		:	2,799
6	Total Number of Household as in 2011		:	10006
7	Number of Household per Ward		:	527
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	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	7.20
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	135.40
18	Total Sewage Generation (MLD)*		:	5.70
19	Per Capita Sewage Generation (lpcd)		:	107.20
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	1436.00
		COD	:	2441.10
		TKN	:	287.20
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Parbati River
31	Number of Drains/Nallah for Wastewater Disposal		:	NA
32	Number of Water Bodies		:	NA
33	Gross Area of Water Bodies (Hectare)		:	NA
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Basoda		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	16.55
2	Population as in 2011	:	78289
3	Population Growth Rate as in 2011 (%)	:	20.56
4	Total Number of Wards	:	24
5	Population per Ward (Thousands)	:	3,262
6	Total Number of Household as in 2011	:	14219
7	Number of Household per Ward	:	592
8	Surface Water Supply (MLD)	:	2.27
9	Ground Water (GW) Supply (MLD)	:	2.33
10	Number of Bore Wells	:	29
11	Ground Water Extraction per Bore Well (MLD)	:	0.08
12	Number of Hand Pumps/ Tubewells	:	3520
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	2.27
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	10.60
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	158.40
18	Total Sewage Generation (MLD)*	:	8.50
19	Per Capita Sewage Generation (lpcd)	:	75.40
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2113.80
		COD	: 3593.50
		TKN	: 422.80
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Betwa River
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Bangarda Chhota		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	11.19
2	Population as in 2011	:	64213
3	Population Growth Rate as in 2011 (%)	:	18.94
4	Total Number of Wards	:	1
5	Population per Ward (Thousands)	:	64,213
6	Total Number of Household as in 2011	:	13345
7	Number of Household per Ward	:	13345
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.50
18	Total Sewage Generation (MLD)*	:	6.90
19	Per Capita Sewage Generation (lpcd)	:	107.50
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1733.80
		COD	: 2947.40
		TKN	: 346.80
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Kherkhali River
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Bina		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	12.00
2	Population as in 2011	:	64529
3	Population Growth Rate as in 2011 (%)	:	26.08
4	Total Number of Wards	:	25
5	Population per Ward (Thousands)	:	2,581
6	Total Number of Household as in 2011	:	12356
7	Number of Household per Ward	:	494
8	Surface Water Supply (MLD)	:	4
9	Ground Water (GW) Supply (MLD)	:	2
10	Number of Bore Wells	:	32
11	Ground Water Extraction per Bore Well (MLD)	:	0.06
12	Number of Hand Pumps/ Tubewells	:	1520
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	4
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	7.00
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1742.30
		COD	: 2961.90
		TKN	: 348.50
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Motichur, Bina, Betwa River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Dabra		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	3.79
2	Population as in 2011	:	61277
3	Population Growth Rate as in 2011 (%)	:	8.13
4	Total Number of Wards	:	24
5	Population per Ward (Thousands)	:	2,553
6	Total Number of Household as in 2011	:	11085
7	Number of Household per Ward	:	462
8	Surface Water Supply (MLD)	:	1.50
9	Ground Water (GW) Supply (MLD)	:	4
10	Number of Bore Wells	:	107
11	Ground Water Extraction per Bore Well (MLD)	:	0.04
12	Number of Hand Pumps/ Tubewells	:	130
13	Ground Water Extraction per Hand Pump (lpd)	:	3000
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	1.50
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.30
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	6.60
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1654.50
		COD	: 2812.60
		TKN	: 330.90
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Sindh River
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Dhar		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	36.00
2	Population as in 2011	:	93917
3	Population Growth Rate as in 2011 (%)	:	24.60
4	Total Number of Wards	:	30
5	Population per Ward (Thousands)	:	3,131
6	Total Number of Household as in 2011	:	18531
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	:	263
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	12.7
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.2
18	Total Sewage Generation (MLD)*	:	10.1
19	Per Capita Sewage Generation (lpcd)	:	107.5
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2535.8
		COD	: 4310.8
		TKN	: 507.2
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	1
32	Number of Water Bodies	:	4
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Gohad			State: Madhya Pradesh	
S. No.	Items		Value	
1	Total Area (sq km)	:	14.91	
2	Population as in 2011	:	58939	
3	Population Growth Rate as in 2011 (%)	:	30.30	
4	Total Number of Wards	:	18	
5	Population per Ward (Thousands)	:	3,274	
6	Total Number of Household as in 2011	:	10161	
7	Number of Household per Ward	:	565	
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.00	
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.70	
18	Total Sewage Generation (MLD)*	:	6.40	
19	Per Capita Sewage Generation (lpcd)	:	108.60	
20	Sewage Collection (MLD)	:	NA	
21	Percentage of Sewage Collection (%)	:	NA	
22	Number of STPs	:	NA	
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA	
24	Current Utilized Capacity of STPs (MLD)	:	NA	
25	Percentage Utilization of Installed Capacity (%)	:	NA	
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA	
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	1591.40
		COD	:	2705.30
		TKN	:	318.30
29	Wastewater Disposal Means	:	Land Disposal	
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal	
31	Number of Drains/Nallah for Wastewater Disposal	:	NA	
32	Number of Water Bodies	:	NA	
33	Gross Area of Water Bodies (Hectare)	:	NA	
34	Area of Water Bodies as % of Total Area	:	<<< 1	

Water Balance & Pollution Load (Domestic) Data Sheet

City: Jaora		State: Madhya Pradesh		
S. No.	Items			Value
1	Total Area (sq km)	:		14.54
2	Population as in 2011	:		74907
3	Population Growth Rate as in 2011 (%)	:		15.05
4	Total Number of Wards	:		30
5	Population per Ward (Thousands)	:		2,497
6	Total Number of Household as in 2011	:		13102
7	Number of Household per Ward	:		437
8	Surface Water Supply (MLD)	:		3.25
9	Ground Water (GW) Supply (MLD)	:		0.15
10	Number of Bore Wells	:		61
11	Ground Water Extraction per Bore Well (MLD)	:		0.00
12	Number of Hand Pumps/ Tubewells	:		159
13	Ground Water Extraction per Hand Pump (lpd)	:		500
14	Number of Pumping Stations for Water Supply	:		NA
15	Total Pumping Capacity (MLD)	:		3.25
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:		10.10
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:		135.00
18	Total Sewage Generation (MLD)*	:		8.10
19	Per Capita Sewage Generation (lpcd)	:		108.00
20	Sewage Collection (MLD)	:		NA
21	Percentage of Sewage Collection (%)	:		NA
22	Number of STPs	:		NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:		NA
24	Current Utilized Capacity of STPs (MLD)	:		NA
25	Percentage Utilization of Installed Capacity (%)	:		NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:		NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	2022.50
		COD	:	3438.20
		TKN	:	404.50
29	Wastewater Disposal Means	:		River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:		Maleni River
31	Number of Drains/Nallah for Wastewater Disposal	:		2
32	Number of Water Bodies	:		2
33	Gross Area of Water Bodies (Hectare)	:		NA
34	Area of Water Bodies as % of Total Area	:		<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Khurai			State: Madhya Pradesh	
S. No.	Items			Value
1	Total Area (sq km)		:	11.03
2	Population as in 2011		:	51108
3	Population Growth Rate as in 2011 (%)		:	23.12
4	Total Number of Wards		:	27
5	Population per Ward (Thousands)		:	1,893
6	Total Number of Household as in 2011		:	9798
7	Number of Household per Ward		:	363
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	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	6.90
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	135.00
18	Total Sewage Generation (MLD)*		:	5.50
19	Per Capita Sewage Generation (lpcd)		:	107.60
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	1379.90
		COD	:	2345.90
		TKN	:	276.00
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Bina River
31	Number of Drains/Nallah for Wastewater Disposal		:	1
32	Number of Water Bodies		:	2
33	Gross Area of Water Bodies (Hectare)		:	NA
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Kolar		State: Madhya Pradesh		
S. No.	Items			Value
1	Total Area (sq km)	:		50.18
2	Population as in 2011	:		87882
3	Population Growth Rate as in 2011 (%)	:		NA
4	Total Number of Wards	:		21
5	Population per Ward (Thousands)	:		4,182
6	Total Number of Household as in 2011	:		19800
7	Number of Household per Ward	:		943
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 (lpcd)	:		NA
14	Number of Pumping Stations for Water Supply	:		NA
15	Total Pumping Capacity (MLD)	:		NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:		11.9
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:		135.5
18	Total Sewage Generation (MLD)*	:		9.5
19	Per Capita Sewage Generation (lpcd)	:		108.2
20	Sewage Collection (MLD)	:		NA
21	Percentage of Sewage Collection (%)	:		NA
22	Number of STPs	:		NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:		NA
24	Current Utilized Capacity of STPs (MLD)	:		NA
25	Percentage Utilization of Installed Capacity (%)	:		NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:		NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	2371.2
		COD	:	4031.0
		TKN	:	474.2
29	Wastewater Disposal Means	:		River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:		Son River
31	Number of Drains/Nallah for Wastewater Disposal	:		NA
32	Number of Water Bodies	:		NA
33	Gross Area of Water Bodies (Hectare)	:		NA
34	Area of Water Bodies as % of Total Area	:		<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Mandideep		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	12.78
2	Population as in 2011	:	59654
3	Population Growth Rate as in 2011 (%)	:	49.66
4	Total Number of Wards	:	18
5	Population per Ward (Thousands)	:	3,314
6	Total Number of Household as in 2011	:	14330
7	Number of Household per Ward	:	796
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	:	NIL
15	Total Pumping Capacity (MLD)	:	NA
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.1
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.8
18	Total Sewage Generation (MLD)*	:	6.4
19	Per Capita Sewage Generation (lpcd)	:	107.3
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1610.7
		COD	: 2738.1
		TKN	: 322.1
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Kaliasot River
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	1
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Panna		State: Madhya Pradesh		
S. No.	Items			Value
1	Total Area (sq km)		:	10.00
2	Population as in 2011		:	59091
3	Population Growth Rate as in 2011 (%)		:	13.51
4	Total Number of Wards		:	22
5	Population per Ward (Thousands)		:	2,686
6	Total Number of Household as in 2011		:	10019
7	Number of Household per Ward		:	455
8	Surface Water Supply (MLD)		:	2.34
9	Ground Water (GW) Supply (MLD)		:	1.06
10	Number of Bore Wells		:	65
11	Ground Water Extraction per Bore Well (MLD)		:	0.02
12	Number of Hand Pumps/ Tubewells		:	NA
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	2.34
16	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.00
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	135.00
18	Total Sewage Generation (MLD)*		:	6.40
19	Per Capita Sewage Generation (lpcd)		:	108.00
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	1595.50
		COD	:	2712.30
		TKN	:	319.10
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Kilkila, Ken River
31	Number of Drains/Nallah for Wastewater Disposal		:	1
32	Number of Water Bodies		:	12
33	Gross Area of Water Bodies (Hectare)		:	54.47
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Raghogarh-Vijaypur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	73.79
2	Population as in 2011	:	62163
3	Population Growth Rate as in 2011 (%)	:	26.42
4	Total Number of Wards	:	24
5	Population per Ward (Thousands)	:	2,590
6	Total Number of Household as in 2011	:	12409
7	Number of Household per Ward	:	517
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	8.4
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.1
18	Total Sewage Generation (MLD)*	:	6.7
19	Per Capita Sewage Generation (lpcd)	:	107.8
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1678.4
		COD	: 2853.3
		TKN	: 335.7
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Parbati, Chopan River
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	7
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Shahdol		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	10.25
2	Population as in 2011	:	86681
3	Population Growth Rate as in 2011 (%)	:	24.28
4	Total Number of Wards	:	34
5	Population per Ward (Thousands)	:	2,549
6	Total Number of Household as in 2011	:	17833
7	Number of Household per Ward	:	525
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	11.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	9.40
19	Per Capita Sewage Generation (lpcd)	:	108.40
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2340.40
		COD	: 3978.70
		TKN	: 468.10
29	Wastewater Disposal Means	:	River Disposal
30	Name of River/Streams for Wastewater Disposal	:	Son River
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	51
33	Gross Area of Water Bodies (Hectare)	:	81.30
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Shajapur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	17.19
2	Population as in 2011	:	69263
3	Population Growth Rate as in 2011 (%)	:	19.79
4	Total Number of Wards	:	29
5	Population per Ward (Thousands)	:	2,388
6	Total Number of Household as in 2011	:	13066
7	Number of Household per Ward	:	451
8	Surface Water Supply (MLD)	:	4
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	:	60
13	Ground Water Extraction per Hand Pump (lpd)	:	500
14	Number of Pumping Stations for Water Supply	:	NA
15	Total Pumping Capacity (MLD)	:	4
16	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	9.40
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	7.50
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NIL
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1870.10
		COD	: 3179.20
		TKN	: 374.00
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Chiler, Lakhunder River
31	Number of Drains/Nallah for Wastewater Disposal	:	9
32	Number of Water Bodies	:	2
33	Gross Area of Water Bodies (Hectare)	:	3.04
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Sheopur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	6.29
2	Population as in 2011	:	71951
3	Population Growth Rate as in 2011 (%)	:	23.33
4	Total Number of Wards	:	23
5	Population per Ward (Thousands)	:	3,128
6	Total Number of Household as in 2011	:	13724
7	Number of Household per Ward	:	597
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	9.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	7.80
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1942.70
		COD	: 3302.60
		TKN	: 388.50
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Parbati River
31	Number of Drains/Nallah for Wastewater Disposal	:	5
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Shujalpur		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	7.74
2	Population as in 2011	:	51225
3	Population Growth Rate as in 2011 (%)	:	20.63
4	Total Number of Wards	:	21
5	Population per Ward (Thousands)	:	2,439
6	Total Number of Household as in 2011	:	9833
7	Number of Household per Ward	:	468
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	6.90
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	5.50
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1383.10
		COD	: 2351.20
		TKN	: 276.60
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Newaj River
31	Number of Drains/Nallah for Wastewater Disposal	:	NA
32	Number of Water Bodies	:	NA
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Sidhi		State: Madhya Pradesh		
S.No.	Items			Value
1	Total Area (sq km)		:	12.31
2	Population as in 2011		:	54331
3	Population Growth Rate as in 2011 (%)		:	18.89
4	Total Number of Wards		:	24
5	Population per Ward (Thousands)		:	2,264
6	Total Number of Household as in 2011		:	10599
7	Number of Household per Ward		:	442
8	Surface Water Supply (MLD)		:	4
9	Ground Water (GW) Supply (MLD)		:	0.40
10	Number of Bore Wells		:	21
11	Ground Water Extraction per Bore Well (MLD)		:	0.02
12	Number of Hand Pumps/ Tubewells		:	2410
13	Ground Water Extraction per Hand Pump (lpd)		:	900
14	Number of Pumping Stations for Water Supply		:	NA
15	Total Pumping Capacity (MLD)		:	4
16	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	7.30
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	135.00
18	Total Sewage Generation (MLD)*		:	5.90
19	Per Capita Sewage Generation (lpcd)		:	108.00
20	Sewage Collection (MLD)		:	NA
21	Percentage of Sewage Collection (%)		:	NA
22	Number of STPs		:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
24	Current Utilized Capacity of STPs (MLD)		:	NA
25	Percentage Utilization of Installed Capacity (%)		:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	:	NA
		COD	:	NA
		TKN	:	NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	:	1466.90
		COD	:	2493.80
		TKN	:	293.40
29	Wastewater Disposal Means		:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal		:	Son River
31	Number of Drains/Nallah for Wastewater Disposal		:	2
32	Number of Water Bodies		:	4
33	Gross Area of Water Bodies (Hectare)		:	15.00
34	Area of Water Bodies as % of Total Area		:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Sironj		State: Madhya Pradesh	
S.No.	Items		Value
1	Total Area (sq km)	:	9.99
2	Population as in 2011	:	52460
3	Population Growth Rate as in 2011 (%)	:	24.37
4	Total Number of Wards	:	21
5	Population per Ward (Thousands)	:	2,498
6	Total Number of Household as in 2011	:	9928
7	Number of Household per Ward	:	473
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	7.10
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	5.70
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 1416.40
		COD	: 2407.90
		TKN	: 283.30
29	Wastewater Disposal Means	:	Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Land Disposal
31	Number of Drains/Nallah for Wastewater Disposal	:	2
32	Number of Water Bodies	:	1
33	Gross Area of Water Bodies (Hectare)	:	NA
34	Area of Water Bodies as % of Total Area	:	<<< 1

Water Balance & Pollution Load (Domestic) Data Sheet

City: Tikamgarh		State: Madhya Pradesh	
S. No.	Items		Value
1	Total Area (sq km)	:	6.22
2	Population as in 2011	:	79106
3	Population Growth Rate as in 2011 (%)	:	15.61
4	Total Number of Wards	:	27
5	Population per Ward (Thousands)	:	2,930
6	Total Number of Household as in 2011	:	14587
7	Number of Household per Ward	:	540
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	Total Water Supply from ULB and Non-ULB Sources (MLD)	:	10.70
17	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)	:	135.00
18	Total Sewage Generation (MLD)*	:	8.50
19	Per Capita Sewage Generation (lpcd)	:	108.00
20	Sewage Collection (MLD)	:	NA
21	Percentage of Sewage Collection (%)	:	NA
22	Number of STPs	:	NA
23	Total Installed Capacity of STPs under GAP I & II (MLD)	:	NA
24	Current Utilized Capacity of STPs (MLD)	:	NA
25	Percentage Utilization of Installed Capacity (%)	:	NA
26	Capacity of STPs Sanctioned under JNNURM & Others (MLD)	:	NA
27	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD ₅	: NA
		COD	: NA
		TKN	: NA
28	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD ₅	: 2135.90
		COD	: 3631.00
		TKN	: 427.20
29	Wastewater Disposal Means	:	River & Land Disposal
30	Name of River/Streams for Wastewater Disposal	:	Jamani River
31	Number of Drains/Nallah for Wastewater Disposal	:	7
32	Number of Water Bodies	:	6
33	Gross Area of Water Bodies (Hectare)	:	125.28
34	Area of Water Bodies as % of Total Area	:	<<< 1