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Assessment of Domestic Pollution Load from Urban Agglomeration in Ganga Basin: Gandak and Kosi Sub-Basin

GRBMP: Ganga River Basin Management Plan

by

Indian Institutes of Technology

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

Preface

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

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

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

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

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The Kosi basin is bounded on the north by the Himalayas, on the east by Mahananda basin, on the west by the Burhi Gandak basin and on the south by the river Ganga. The basin extends over areas of districts Saharsa, Purnea, Khagaria, Madhubani, Sitamarhi, Muzaffarpur and Darbhanga in Bihar state. Kosi (main stem), Kamla Balan Adhwara, Group of riversan Bagmati are the most important rivers in this basin

Class of Town	Name	Total Area (sq. km)	Population (as in 2011)
Class I	Muzzafarpur	26.43	330560
Class I	Dharbhanga	19.18	318144
Class I	Chhapra	16.96	201597
Class I	Siwan	15.68	134221
Class I	Bettiah	11.55	132928
Class II	Dumra	6	55215
Class II	Sitamarhi town	8	87279
Class II	Gopalganj	11.11	66624
Class III	Motipur	12.77	26852
Class III	kanti	6.6	25542
Class III	Birgania	5.5	42500
Class III	Belsand	4	20000
Class III	Jonakpur road (Purpi)	5	18000

Table1: Demographic details of Major urban centres in Gandak – Kosi sub basin

Pollution Load from the major urban centers

The details of the ground/surface water utilization were obtained from the various government bodies. The total domestic sewage is calculated on the basis of the field survey and actual flow measurements in all the major drains (as measured on the day of visit). The parameters BOD, COD and TKN are estimated based on per capita contribution.

As per the data available from Jal Nigam/Nagar Nigam none of the other major urban cities have an installed STP. All the sewage carried by the domestic drains are discharged into the river without any treatment.

The pollution load on the river in terms of BOD_5, COD and TKN is estimated based on the per capita contribution for all the major cities. *Figure 1a & 1b* shows the pollution load from major urban centers in Gandak – Kosi sub basin. *Table 2* gives the details of the pollution load from the major urban centers in Gandak – Kosi sub basin.

Class	BOD (kg/day)	COD (kg/day)	TKN (kg/day)
I	2418.4	2902.0	9599.9
II	14687.4	17624.8	1882.1
III	33223.5	39868.2	1196.0
Total	***50329.2***	***60395.1***	***12678.0***

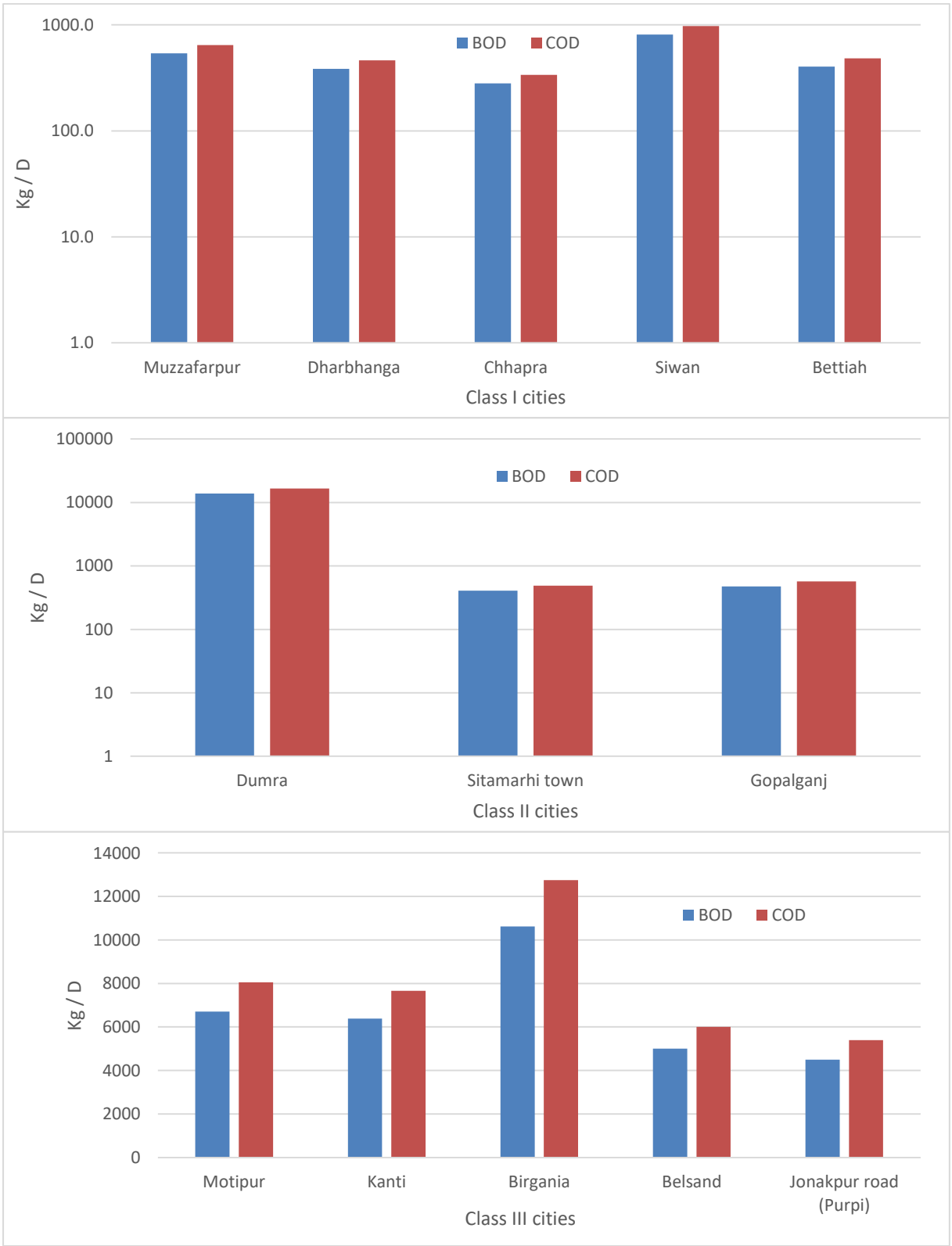

Fig 1a: Contribution of Pollution Load (BOD, COD from Class I, II, III Cities)

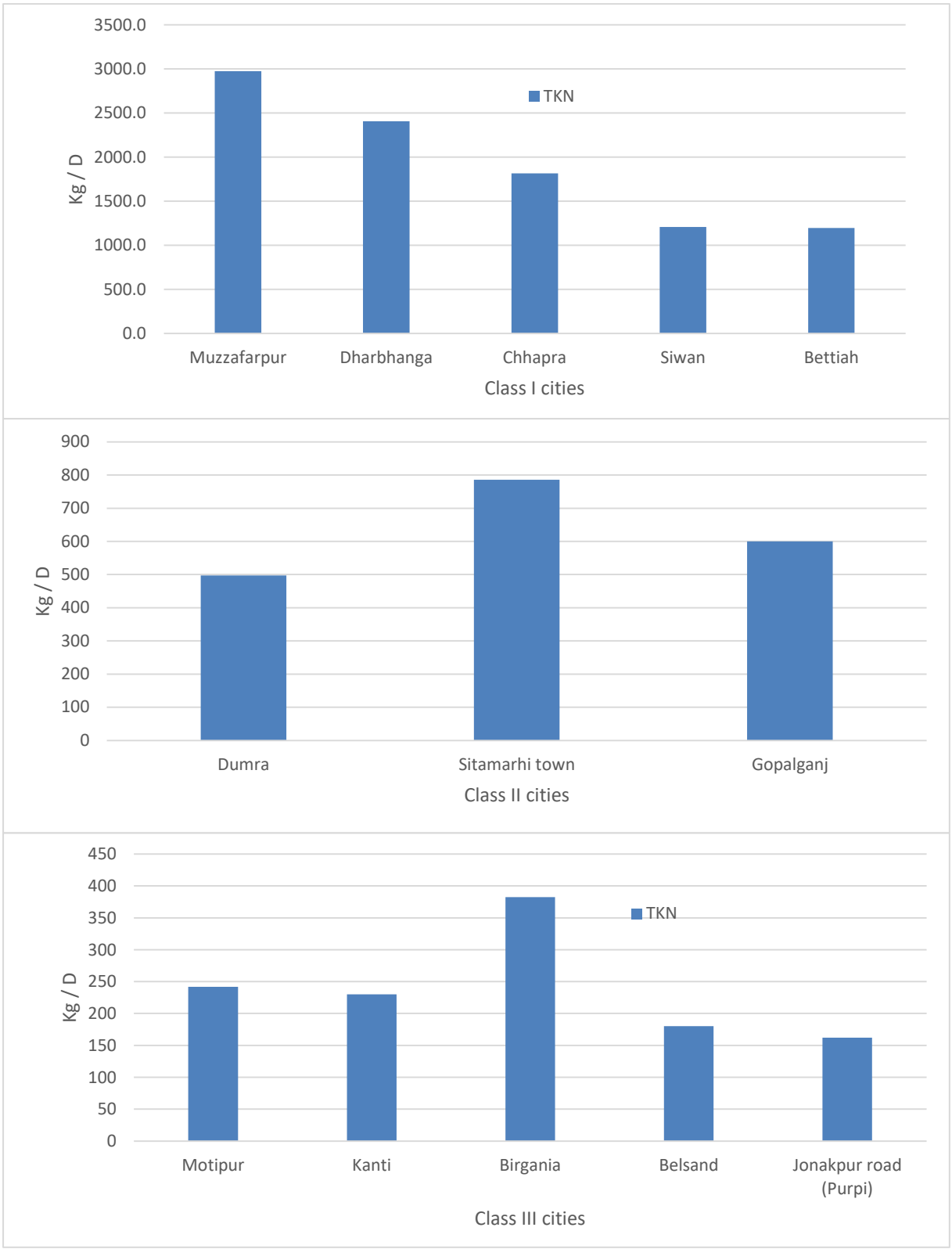

Fig 1b: Contribution of Pollution Load (TKN from Class I, II, III Cities)


District: Siwan, Bihar
Fig 1: Aggrawal Nala
26°47.411'N 84°21.280'E


District: Chapra, Bihar
Fig 6: Krishna Colony Nala
25°47.124'N 84°43662'E


District: Gopalganj, Bihar
Fig 4: Gandaki Nala (View 2)


District: Chapra, Bihar
Fig 9: Pit, near the railway tracks, filled with water. The Railway station Nala falls into the this pit.
25°47.300'N 84°43.591'E

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Muzaffarpur Town **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	26.43
2	Population as in 2011		:	330560
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	49
5	Population per Ward (Thousands)		:	6,746
6	Total Number of Household as in 2011		:	49922
7	Number of Household per Ward		:	1019
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	29.5
10	Number of Bore Wells		:	25
11	Ground Water Extraction per Bore Well (MLD)		:	5
12	Number of Hand Pumps		:	10000
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	80.20256877
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	34.5
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	104.4
19	Total Sewage Generation (MLD)		:	27.6
20	Per Capita Sewage Generation (lpcd)		:	83.5
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Gandak River
32	Number of Drains/Nallah for Wastewater Disposal		:	20
33	Number of Water Bodies		:	14
34	Gross Area of Water Bodies (sq km)		:	3.01635
35	Area of Water Bodies as % of Total Area		:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Darbanga **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	**19.18**
2	Population as in 2001		:	2,67,348
3	Population Growth Rate as in 2011 (%)		:	19.00
4	Total Number of Wards		:	48
5	Population per Ward (Thousands)		:	5,570
6	Total Number of Household as in 2001		:	41,578
7	Number of Household per Ward		:	866
8	Surface Water Supply (MLD)		:	0
9	Ground Water (GW) Supply (MLD)		:	13.37
10	Number of Tube Wells		:	8
11	Ground Water Extraction per Tube Well (MLD)		:	4.5
12	Number of Hand Pumps		:	3000
13	Ground Water Extraction per Hand Pump (lpd)		:	10000
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	1.7
16	Average Water Supply Rate from ULB Sources (lpcd)		:	50
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	43.4
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	162.2
19	Total Sewage Generation (MLD)		:	34.7
20	Per Capita Sewage Generation (lpcd)		:	129.8
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	385.0
		COD	:	462.0
		TKN	:	2406.1
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	-
32	Number of Drains/Nallah for Wastewater Disposal		:	19
33	Number of Water Bodies		:	206
34	Gross Area of Water Bodies (sq km)		:	4.16
35	Area of Water Bodies as % of Total Area		:	21.69

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Chhapra **State: Bihar**

S.	Items			Value
1	Total Area (sq km)		:	16.96
2	Population as in 2011/2001		:	201597/
3	Population Growth Rate as in 2011 (%)		:	12.73
4	Total Number of Wards		:	44
5	Population per Ward (Thousands)		:	4,582
6	Total Number of Household as in 2011		:	35000
7	Number of Household per Ward		:	795
8	Surface Water Supply (MLD)		:	0
9	Ground Water (GW) Supply (MLD)		:	4.35
10	Number of Bore Wells		:	13
11	Ground Water Extraction per Bore Well (MLD)		:	0.33
12	Number of Hand Pumps/ Tubewells		:	515
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NIL
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	*
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	4.6
18	Average Water Supply Rate from ULB & Non-ULB Sources		:	*
19	Total Sewage Generation (MLD)**		:	1.1
20	Per Capita Sewage Generation (lpcd)		:	*
21	Sewage Collection (MLD)		:	NIL
22	Percentage of Sewage Collection (%)		:	NIL
23	Number of STPs		:	NIL
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NIL
25	Current Utilized Capacity of STPs (MLD)		:	NIL
26	Percentage Utilization of Installed Capacity (%)		:	NIL
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NIL
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	
		COD	:	
		TKN	:	
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	280.8
		COD	:	337.0
		TKN	:	1814.4
30	Wastewater Disposal Means		:	River Disposal
31	Name of River/Streams for Wastewater Disposal		:	Ghagra
32	Number of Drains/Nallah for Wastewater Disposal		:	1 (major drain)*
33	Number of Water Bodies		:	7
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	NA

**Estimation based on one time survey by IT,BHU team on 17 Feb, 2012 from 2:00 - 5:00 PM.*

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Siwan **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	15.68
2	Population as in 2011/2001		:	134221/ 109919
3	Population Growth Rate as in 2011 (%)		:	22.11
4	Total Number of Wards		:	38
5	Population per Ward (Thousands)		:	3,532
6	Total Number of Household as in 2011		:	19062
7	Number of Household per Ward		:	502
8	Surface Water Supply (MLD)		:	0
9	Ground Water (GW) Supply (MLD)		:	2.84
10	Number of Bore Wells		:	8
11	Ground Water Extraction per Bore Well (MLD)		:	0.38
12	Number of Hand Pumps/ Tubewells		:	550
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NIL
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	*
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	3.1
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	*
19	Total Sewage Generation (MLD)		:	3.2
20	Per Capita Sewage Generation (lpcd)		:	*
21	Sewage Collection (MLD)		:	3.2
22	Percentage of Sewage Collection (%)		:	100
23	Number of STPs		:	NIL
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NIL
25	Current Utilized Capacity of STPs (MLD)		:	NIL
26	Percentage Utilization of Installed Capacity (%)		:	NIL
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NIL
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	
		COD	:	
		TKN	:	
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	811.9
		COD	:	974.2
		TKN	:	1208.0
30	Wastewater Disposal Means		:	River Disposal
31	Name of River/Streams for Wastewater Disposal		:	River Daha
32	Number of Drains/Nallah for Wastewater Disposal		:	2**
33	Number of Water Bodies		:	2
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	NA

**Estimation based on one time survey by IT,BHU team on 27 Feb, 2012 at 2:00 PM.*

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Betia **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	11.55
2	Population as in 2011/2001		:	132928/ 116692
3	Population Growth Rate as in 2011 (%)		:	13.91
4	Total Number of Wards		:	39
5	Population per Ward (Thousands)		:	3,408
6	Total Number of Household as in 2011		:	16900
7	Number of Household per Ward		:	433
8	Surface Water Supply (MLD)		:	0
9	Ground Water (GW) Supply (MLD)		:	0.76
10	Number of Bore Wells		:	3
11	Ground Water Extraction per Bore Well (MLD)		:	0.38
12	Number of Hand Pumps/ Tubewells		:	80
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NIL
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	*
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	0.8
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	*
19	Total Sewage Generation (MLD)		:	1.6
20	Per Capita Sewage Generation (lpcd)		:	*
21	Sewage Collection (MLD)		:	
22	Percentage of Sewage Collection (%)		:	200
23	Number of STPs		:	NIL
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NIL
25	Current Utilized Capacity of STPs (MLD)		:	NIL
26	Percentage Utilization of Installed Capacity (%)		:	NIL
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NIL
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	
		COD	:	
		TKN	:	
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	403.2
		COD	:	483.8
		TKN	:	1196.4
30	Wastewater Disposal Means		:	River Disposal
31	Name of River/Streams for Wastewater Disposal		:	River Anri-chunri
32	Number of Drains/Nallah for Wastewater Disposal		:	1**
33	Number of Water Bodies		:	9
34	Gross Area of Water Bodies (Hectare)		:	NA
35	Area of Water Bodies as % of Total Area		:	NA

**Estimation based on one time survey by IT,BHU team on 29 Feb, 2012 at 2:00 - 5:00 PM.*

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Dumra **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	6
2	Population as in 2011		:	55215
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	12
5	Population per Ward (Thousands)		:	4,601
6	Total Number of Household as in 2011		:	5200
7	Number of Household per Ward		:	433
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	4
10	Number of Bore Wells		:	2
11	Ground Water Extraction per Bore Well (MLD)		:	2
12	Number of Hand Pumps		:	4000
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	72.44
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	6.0
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	108.7
19	Total Sewage Generation (MLD)		:	4.8
20	Per Capita Sewage Generation (lpcd)		:	86.9
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	13803.8
		COD	:	16564.5
		TKN	:	496.9
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Gandak River
32	Number of Drains/Nallah for Wastewater Disposal		:	13
33	Number of Water Bodies		:	nil
34	Gross Area of Water Bodies (sq km)		:	0

35	Area of Water Bodies as % of Total Area	:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Sitamarhi Town **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	8
2	Population as in 2011		:	87279
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	28
5	Population per Ward (Thousands)		:	3,117
6	Total Number of Household as in 2011		:	13720
7	Number of Household per Ward		:	490
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	5
10	Number of Bore Wells		:	2
11	Ground Water Extraction per Bore Well (MLD)		:	3.5
12	Number of Hand Pumps		:	7000
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	80.20256877
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	8.5
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	97.4
19	Total Sewage Generation (MLD)		:	6.8
20	Per Capita Sewage Generation (lpcd)		:	77.9
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Lalakande & Baghmati River

32	Number of Drains/Nallah for Wastewater Disposal	:	20
33	Number of Water Bodies	:	7
34	Gross Area of Water Bodies (sq km)	:	0.167
35	Area of Water Bodies as % of Total Area	:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Gopalganj **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	11.11
2	Population as in 2011/2001		:	66624/ 54418
3	Population Growth Rate as in 2011 (%)		:	22.43
4	Total Number of Wards		:	28
5	Population per Ward (Thousands)		:	2,379
6	Total Number of Household as in 2011		:	10125
7	Number of Household per Ward		:	362
8	Surface Water Supply (MLD)		:	0
9	Ground Water (GW) Supply (MLD)		:	1.25
10	Number of Bore Wells		:	2
11	Ground Water Extraction per Bore Well (MLD)		:	0.63
12	Number of Hand Pumps/ Tubewells		:	135
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	NIL
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	*
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	1.3
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	*
19	Total Sewage Generation (MLD)		:	1.9
20	Per Capita Sewage Generation (lpcd)		:	*
21	Sewage Collection (MLD)		:	1.9
22	Percentage of Sewage Collection (%)		:	100
23	Number of STPs		:	NIL
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NIL
25	Current Utilized Capacity of STPs (MLD)		:	NIL
26	Percentage Utilization of Installed Capacity (%)		:	NIL
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NIL
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	
		COD	:	
		TKN	:	
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	476.1
		COD	:	571.3
		TKN	:	599.6
30	Wastewater Disposal Means		:	River Disposal
31	Name of River/Streams for Wastewater Disposal		:	R. Gandaki
32	Number of Drains/Nallah for Wastewater Disposal		:	12**
33	Number of Water Bodies		:	5
34	Gross Area of Water Bodies (Hectare)		:	NA

35	Area of Water Bodies as % of Total Area	:	NA

**Estimation based on one time survey by IT,BHU team on 28 Feb, 2012 from 9:00 am to 12:00 pm*

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Motipur **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	12.77
2	Population as in 2011		:	26852
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	15
5	Population per Ward (Thousands)		:	1,790
6	Total Number of Household as in 2011		:	3657
7	Number of Household per Ward		:	244
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	2.47
10	Number of Bore Wells		:	2
11	Ground Water Extraction per Bore Well (MLD)		:	1.325
12	Number of Hand Pumps		:	2650
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	91.98569939
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	3.8
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	141.3
19	Total Sewage Generation (MLD)		:	3.0
20	Per Capita Sewage Generation (lpcd)		:	113.1
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	6713.0
		COD	:	8055.6
		TKN	:	241.7
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	river

32	Number of Drains/Nallah for Wastewater Disposal	:	nil
33	Number of Water Bodies	:	NIL
34	Gross Area of Water Bodies (sq km)	:	0
35	Area of Water Bodies as % of Total Area	:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Kanti **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	6.6
2	Population as in 2011		:	25542
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	14
5	Population per Ward (Thousands)		:	1,824
6	Total Number of Household as in 2011		:	4257
7	Number of Household per Ward		:	304
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	1.58
10	Number of Bore Wells		:	2
11	Ground Water Extraction per Bore Well (MLD)		:	1.25
12	Number of Hand Pumps		:	2500
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	61.85889907
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	2.8
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	110.8
19	Total Sewage Generation (MLD)		:	2.3
20	Per Capita Sewage Generation (lpcd)		:	88.6
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	6385.5
		COD	:	7662.6
		TKN	:	229.9

30	Wastewater Disposal Means	:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal	:	Gandak River
32	Number of Drains/Nallah for Wastewater Disposal	:	20
33	Number of Water Bodies	:	5
34	Gross Area of Water Bodies (sq km)	:	0.4391
35	Area of Water Bodies as % of Total Area	:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Bairgania **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	5.5
2	Population as in 2011		:	42500
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	12
5	Population per Ward (Thousands)		:	3,542
6	Total Number of Household as in 2011		:	3952
7	Number of Household per Ward		:	329
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	3
10	Number of Bore Wells		:	1
11	Ground Water Extraction per Bore Well (MLD)		:	1.5
12	Number of Hand Pumps		:	3000
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	86.11780916
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	4.5
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	129.2
19	Total Sewage Generation (MLD)		:	3.6
20	Per Capita Sewage Generation (lpcd)		:	84.7
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	10625.0
		COD	:	12750.0

		TKN	:	382.5
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Gandak River
32	Number of Drains/Nallah for Wastewater Disposal		:	7
33	Number of Water Bodies		:	5
34	Gross Area of Water Bodies (sq km)		:	0.0808
35	Area of Water Bodies as % of Total Area		:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Belsand **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	4
2	Population as in 2011		:	20000
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	Nil
5	Population per Ward (Thousands)		:	Nil
6	Total Number of Household as in 2011		:	2500
7	Number of Household per Ward		:	Nil
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	3
10	Number of Bore Wells		:	nil
11	Ground Water Extraction per Bore Well (MLD)		:	0.85
12	Number of Hand Pumps		:	1700
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	50
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	1.9
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	92.5
19	Total Sewage Generation (MLD)		:	1.5
20	Per Capita Sewage Generation (lpcd)		:	74.0
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA
29	Pollution Load (Domestic) (Method 2: Per	BOD_5	:	5000.0

	Capita Contribution) (kg/d)	COD	:	6000.0
		TKN	:	180.0
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Gandak River
32	Number of Drains/Nallah for Wastewater Disposal		:	NIL
33	Number of Water Bodies		:	Nil
34	Gross Area of Water Bodies (sq km)		:	0
35	Area of Water Bodies as % of Total Area		:	<<1.0

Water Balance & Pollution Load (Domestic) Fact Sheet

City: Jonakpur Road (Pupri) **State: Bihar**

S. No.	Items			Value
1	Total Area (sq km)		:	5
2	Population as in 2011		:	18000
3	Population Growth Rate as in 2011 (%)		:	..
4	Total Number of Wards		:	10
5	Population per Ward (Thousands)		:	1,800
6	Total Number of Household as in 2011		:	4000
7	Number of Household per Ward		:	400
8	Surface Water Supply (MLD)		:	NIL
9	Ground Water (GW) Supply (MLD)		:	1
10	Number of Bore Wells		:	1
11	Ground Water Extraction per Bore Well (MLD)		:	1.5
12	Number of Hand Pumps		:	3000
13	Ground Water Extraction per Hand Pump (lpd)		:	500
14	Number of Pumping Stations for Water Supply		:	4
15	Total Pumping Capacity (MLD)		:	NIL
16	Average Water Supply Rate from ULB Sources (lpcd)		:	86.11780916
17	Total Water Supply from ULB and Non-ULB Sources (MLD)		:	2.5
18	Average Water Supply Rate from ULB & Non-ULB Sources (lpcd)		:	71.8
19	Total Sewage Generation (MLD)		:	2.0
20	Per Capita Sewage Generation (lpcd)		:	111.1
21	Sewage Collection (MLD)		:	NA
22	Percentage of Sewage Collection (%)		:	NA
23	Number of STPs		:	NA
24	Total Installed Capacity of STPs under GAP I & II (MLD)		:	NA
25	Current Utilized Capacity of STPs (MLD)		:	NA
26	Percentage Utilization of Installed Capacity (%)		:	NA
27	Capacity of STPs Sanctioned under JNNURM & Others (MLD)		:	NA
28	Pollution Load (Domestic) (Method 1: Actual Flow) (kg/d)	BOD_5	:	NA
		COD	:	NA
		TKN	:	NA

29	Pollution Load (Domestic) (Method 2: Per Capita Contribution) (kg/d)	BOD_5	:	4500.0
		COD	:	5400.0
		TKN	:	162.0
30	Wastewater Disposal Means		:	River & Land Disposal
31	Name of River/Streams for Wastewater Disposal		:	Buri Gandak River
32	Number of Drains/Nallah for Wastewater Disposal		:	8
33	Number of Water Bodies		:	9
34	Gross Area of Water Bodies (sq km)		:	1.1816
35	Area of Water Bodies as % of Total Area		:	<<1.0