ANNEXURE CSP JHANSI

Report 2014

MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA

NAGAR NIGAM JHANSI, INDIA

ADMINISTRATIVE STAFF COLLEGE OF INDIA
HYEDERABAD, INDIA

LIST OF ANNEXURES

ANNEXURE 1: POLICY FRAMEWORK- CITY SANITATION TASK FORCE

1.1. Background

The Ministry of Urban Development of India through its **National Urban Sanitation Policy (NUSP)** seeks to address the gap in sanitation infrastructure and move Indian cities towards **Total Sanitation** through a '**Systems**' driven approach. Therefore equal or greater importance has been awarded, in the City Sanitation Planning (CSP) process, to development of local institutions, a systematic process of community awareness generation as well as long term monitoring and evaluation of sanitation status in the urban area.

Therefore the following document describes in brief the National urban Sanitation Policy – its objectives, need for City Sanitation Task Force, its institutional structure, preparing a City Sanitation Plan, stages of involvement and the idea of working groups.

1.2. Legal Status of the City Sanitation Task Force - CSTF

The CSTF shall be a non-statutory body. However it is recommended that a council resolution be passed recognizing the CSTF as body that will be involved in achieving the goals of the National Urban Sanitation Policy.

1.3. Key Roles and Responsibilities

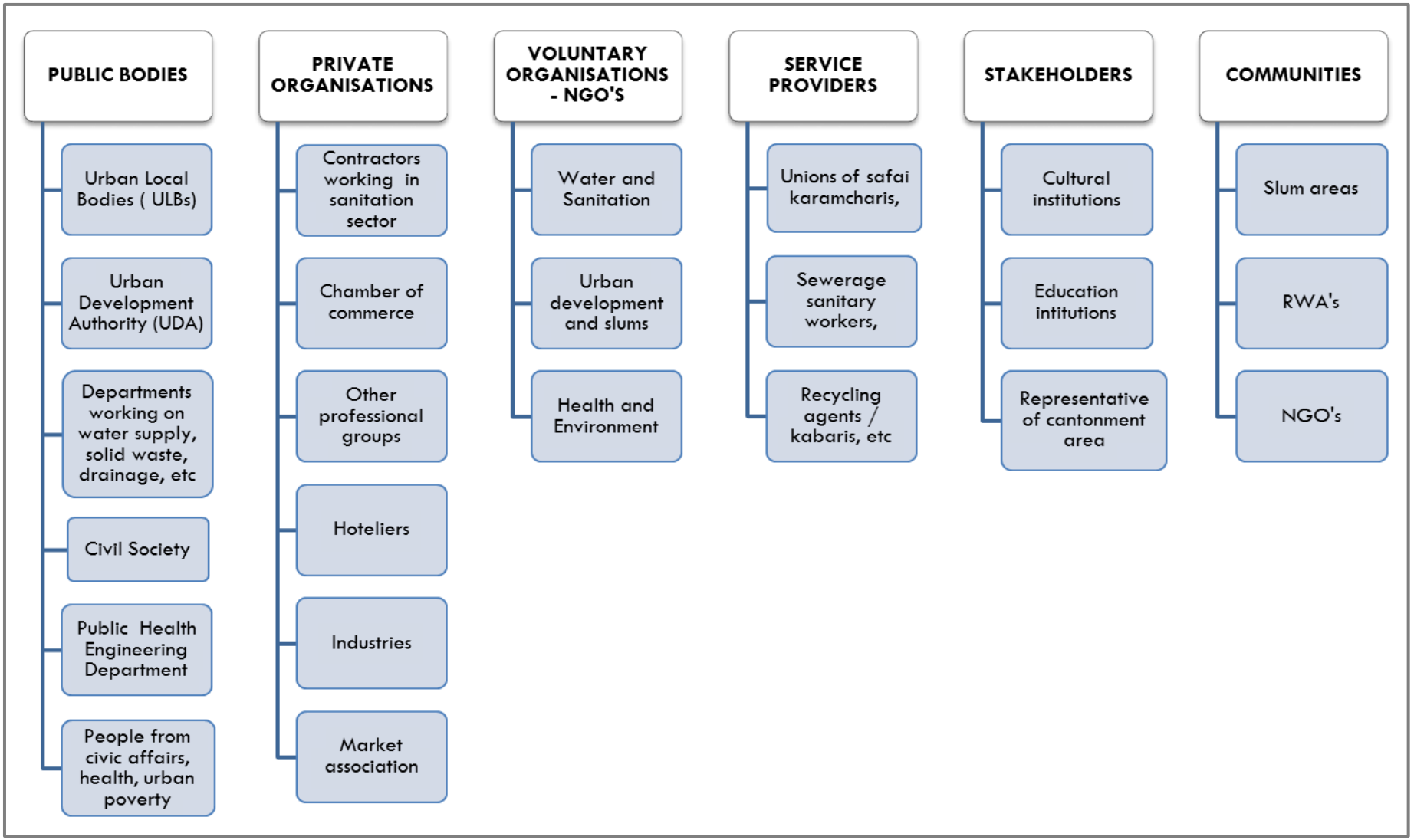
1. The CSTF must participate in a multi-stakeholder, multi-party meeting in the preparatory stage, and take a formal resolution to make the city 100% Sanitized, and publicize the same.
2. The CSTF will be responsible for:

- Launching the City wide 100% Sanitation Campaign
- Generating awareness amongst the city's citizens and stakeholders
- Approving materials and progress reports provided by the implementing agency, other public agencies, as well as NGOs and private parties contracted by the Implementing Agency, for different aspects of implementation
- Approving the City Sanitation Plan for the city prepared by the Sanitation Implementation Agency after consultations with citizens
- Undertaking field visits from time to time to supervise progress
- Issue briefings to the press/media and state government about progress
- Providing overall guidance to the Implementation Agency
- Recommend to the ULB about fixing of responsibilities for city-wide sanitation on a permanent basis

1.4. Institutional structure

The CSTF at local level shall constitute the different parts of the public, private, community and voluntary sectors; allowing different initiatives and services to support one another so that they can work together more effectively. The Urban Local Body shall be the nodal implementing agency for implementing the City Sanitation Plan

The following is an illustrative list of stakeholders who can become members of the CSTF.



1.5. Working Groups

It is proposed that different working groups be created in CSTF to ensure focused efforts to different aspects of the sanitation planning and implementation. Illustrative list of working groups and possible stakeholders who can participate are as follows:

1. *Technical core group (TCG)*
    - City engineers
    - Sanitation related service provider agencies
    - Para-statal agencies
    - Other private sector engineers
2. *Voices of the Economically Weaker Section*
    - NGOs working with the urban poor
3. *Sanitation Awareness Group*
    - Institutions, schools
    - NGOs
4. *The city residents' group*
    - RWAs'
    - Cantonment
    - Housing board colonies
5. *City growth and development group*
    - Chamber of commerce, hoteliers
    - Builders & developers

1.6. Meetings and Consultations

- The CSTF shall convene once in 2 months for undertaking progress review and discussion of key issues pertaining to the planning and implementation
- The CSTF working groups shall convene once a month of focused discussions at the planning stage. Thereafter it may convene once in 2 months
- The individual members of the CSTF shall participate in informal consultations with the planning agency to guide and inform the process

1.7. Draft Standard Operational Procedures

1.7.1. City Sanitation Task Force

Call for Meetings

The Municipal Corporation shall appoint one officer for organizing and coordinating the CSTF meetings. This officer shall send invitation letters to the members of the CSTF at least 1 week prior to the decided date of the CSTF meeting. This shall include the agenda for the meeting.

Conducting meetings

Each meeting shall discuss issues as per agenda laid out for the meeting first. In addition the head of each working group shall briefly outline the progress of work and key concerns pertaining to that working group's focus area.

Towards the end of the meeting the tentative agenda and date for the next meeting shall be decided.

Documentation of Proceedings

The municipal officer in-charge of the CSTF meetings shall organize for each meeting to be recorded in the form of minutes, clearly outlining the summary of discussions, decisions taken and action points recorded with responsibility allocation. Each 'Minutes of Meeting' shall be prepared and sent to the members of the CSTF within a week from the date of meeting

1.7.2. CSTF Working Groups

Call for meetings

The working groups shall appoint one person to head each group. The working group meetings can be held at a mutually convenient place and time once a month. The meetings can be called for through informal communication (phone, email, letters)

Conducting and documenting meetings

In addition the task of documenting proceedings may be taken up in rotation by the different members of the working group. The minutes of meeting shall be prepared and shared at the next CSTF meeting with the other members of the CSTF.

ANNEXURE 2: CITY SANITATION TASK FORCE MEMBERS

	NAME	DESIGNATION	CONTACT INFORMATION
1	Ms. Kiran Varma	Mayor Jhansi	
2	Mr J P Chaurasia	Nagar Ayukt, Nagar Nigam Jhansi	
3	Rakesh Shrivastav	Sahayak Nagar Ayukt, Nagar Nigam Jhansi	
4	Mahesh Chandra	Chief Health Officer	
5	R. K. Varma	Chief Engineer	
6	Hari Govind Prasad	Assistant Engineer	
7	M. P. Bajapai	Chief Accountant	
8	Manoj Shrivastav	Sanitary and Food Inspector	
9	Ravi Chandra Niranjan	Sanitary and Food Inspector	
10	Ms. Neeti Shastri	Social Worker (Principal, KV, Jhansi)	
11	Dr. Dhannulal Gautam	Ex. Chairman, Nagar Palika	
12	Keshav Balmiki	President, Sanitary Workers Organisation	
13	Ashok Payal	President Swachakar Association	
14	Mr. Pandey	Taragram, Non Government Organisation	
15	S. Choubey	SWM, APR Hyderabad	
16	Mr. P I Jacob	City Sanitation Ambassador, (earlier City Engineer)	

ANNEXURE 3: CSTF MEETING CUM SENSITIZATION & ORIENTATION WORKSHOP AT JHANSI 19 NOV 2010

City Sanitation Task Force Meeting cum Sensitization & Orientation Workshop for Jhansi City Sanitation Plan

Sabha Ghar Nagar Nigam Jhansi at 11am on 19 Nov 2010

Chairman: Dr B Lal, Mayor
Secretary: Mr CP Chaurasia, Nagar Ayukt
Presentation by: Col J Jamwal, Advisor, ASCI, Hyderabad

The list of the CSTF members and prominent citizen attended the meeting/workshop are:

S. No.	Name	Address	Mobile No.
1.	Anand Yadav	243/2c Nainagad Nagar	9415505489
2.	Rajendra Singh Yadav	202, Pratappura	9415030366
3.	Urmila Devi Jha	Narsingh Rao ki toriya	9296939529
4.	Kanchan Manager D.I.C	D.I.C Jhansi	2445256
5.	Sushila Dubey	Godu compound	2443254
6.	D.P. Singh	Jalkal Abhiyanta ,Jhansi	8808060032
7.	Sureshchandra	Jal Sansthan	9598822555
8.	Mukesh Agrawal	Councilor	9415503955
9.	Prakash Sahu	Neta Sadan	9451170469
10.	Markar	379/1, Sharda Hind Colony	9415055734
11.	Sunil K. Pankaj	Nagar Nigam, Dept. of Audit	9412155539
12.	Rayis Ahmed Siddhique	48, Topkhana	9792351894
13.	Dr. S.N. Pandey, Programme Manager	Development Alternatives, Taragram	9415055801
14.	P.I. Jacob	Ambassader, C.S.P.	9415055823
15.	Mukul Verma	101,Purani Naghai	9453901139
16.	Chenu Singh Yadav	Nagar Nigam Parisar	9415585620
17.	Mahesh Chandra Verma	CSFI NagarNigam	9473762365

18.	Rakesh Srivastava	Nagar Nigam	9450082044
19.	Mahesh Prasad Vajpayee		9336122478
20.	Sanjay Patwari	Chief, U.P. Business Mandal	9415030196
21.	Hemant Singh Rajput	R2 Nagar Nigam	9415588079
22.	Imran Hussain	Councillor	9415503430
23.	Manju Jain		9415194572
24.	Pramodpal Kheri	Dir. Ind. Area Bijali	9839594038
25.	Rakesh Birthare	Barabazar	9415505600,8853156109
26.	Mahendra Pratap Singh, Operation Incharge	U.P. Solid waste management Pvt. Ltd. Bijholi	7607777113
27.	Satish Chandra	Nagar Nigam	9411925430
28.	Dhannu Lal Gautam	Nagar Palika Parishad	9450289955
29.	Dinesh Chandra Sharma	Gautam Hospital Main Road,Hansari,Jhansi	9532822755
30.	Dr. Neeti Shastri	Samajsevika	9415112563
31.	Dr. D.B. Kaushal	CMO Jhansi	9695516512
32.	K. Santosh Kumar	J.E. U.P. Pollution Control Board	9415739080
33.	Ram Gopal	U.P. Pollution Control Board	9415030422
34.	Dr. P.K. Singh	Nagar Nigam	9415878056
35.	Sunil Sullere	Journalist	8954886384
36.	Purshottam Narayan Dongre	D/S Sainyar Gate	9506813439
37.	Ashok Payal	President, Akhil Bharti Nagar	9936331874
38.	R.B. Dohare S.R.E.	C & Ds U.P. Jal Nigam	9450433697
39.	Sumit Mishra	DLA Media	9415996901
40.	Vishnu Dubey	Journalist	9450071270
41.	Deep Chantan		9236840967
42.	Gupta	Chhoti mata mandir	0510-2361117
43.	Imran Khan,Director,Hindu muslim unity samiti	131,Talaiyya	7860648003 7398922099
44.	Dr. Jaheer Abbasi	03, Panchkuiyya	9889996892
45.	Ramcharan Kahirvaar	Taalpura	9794854795
46.	B.D. Singh	609,Ambedkar Nagar	9450078232
47.	Arvind Kumar Parshad, Nagar Nigam	Ward 2, Hansari	9889284424
48.	Hemant Rawat, Nagar Nigam	Ward No. 42, Civil Lines	9450081753
49.	Vikas Shastri	93/3, Civil Lines	9415588933
50.	Avsar Ali	H 306, Awas Vikas, Mahanagar	9415186634
51.	Rajaram, Jal Nigam	Jal Nigam Colony	9473972217
52.	M.K. Sharma, Sanitation Supdt.	Cantonment Board	9506020132
53.	P.N. Gupta	Cantonment Board	9506020131
54.	Manoj Kumar Srivastava	Nagar Nigam	9935888279
55.	Charan Singh Kushwaha, Councillor	289,Bahar Datiya Gate	9935106325
56.	Rajendra Singh	C.I.C. Jhansi	9889002606
57.	Kamlesh Devi	Councilor	
58.	Ahmed		9450082266
59.	Kumud Kant Parashar	Gyan Jyoti Shiksha Samiti	9457251988
60.	Dr. Pramod Srivastava S.D.O.(DUDA)	DUDA	9415768801
61.	Rami Niwas(L.D.S.) SUDA (PIO)	DUDA	9454927274
62.	Richaju	Bahar Aurha Gate	9453664485
63.	Devendra Kumar Shukla	7021/ Civil Lines	9452575200
64.	Santosh Kushwaha	Bahar Aurha Gate	941558747
65.	Chandramaan Agdim	258, Ambedkar Nagar, Taalpura	9415194203
66.	Dinesh Bhargava	447, Nai Basti	9415179385

67.	Mohammad Shadab	269, Mukaryana	7860604786
68.	Rafeek Makrani		9415505391
69.	Raghuraj Singh S.F.I.	Nagar Nigam Campus	9415923675
70.	Om Narayana Rathore	Nagar Nigam Campus	9415946021
71.	Kishore	Nagar Nigam	9415412626
72.	Abil Batta	Nagar Nigam	9415590190
73.	Makrani	Bahar Datiya Gate	9919028145
74.	Jitendra Swaroop Tiwari	Nagar Nigam	9506218446
75.	Ravi Nirangan	Nagar Nigam	

ANNEXURE 4: SANITATION ISSUES RAISED DURING CSTF MEETING ON 19 NOV 2010

City Sanitation Task Force (CSTF) meeting cum sensitization & orientation workshop was organized by ASCI, Hyderabad at Sabha Ghar of Nagar Nigam, Jhansi at 11am on 19/11/2010. The meeting was Chaired by Dr B Lal, Mayor and attended by seventy-five people including the members of CSTF and other prominent citizens. Col J Jamwal, Advisor Urban Governance, ASCI Hyderabad gave a detailed presentation on **City Sanitation Plan** being developed under the National Urban Sanitation Policy of Government of India.

During this workshop, Jhansi City Opinion Poll was conducted to seek the views of the various stakeholders and prominent citizen about the prevailing sanitation conditions in the city and need assessment for the improvement. The outcome of the opinion poll is as follows:

Issues related to Open Defecation & Sewerage:

- The waste water from toilets and kitchen is discharged in to drains, nallahs and talabs.
- In maximum households, the toilet flush are not connected to soakpits. The water from septic tanks goes directly into drains which is very unhygienic. **Sewer line is urgently needed in Jhansi city.**
- **People are ready to pay User Charges for the sanitation services in the city.**
- The **wastewater should be reused/recycled** after treatment for agricultural purposes, washing clothes/cars /vehicles etc.
- In ward number 58, the vegetable & flower markets are occupying space on the main road. These **markets may be relocated** so as to improve the congestion as well as the cleanliness & sanitation of this area.
- **Slum sanitation should be given high priority.**
- Most of the city drainage system is **clogged with polythenes bags** and it should be cleaned regularly.
- The condition of the **city drainage system is very poor and need immediate repairs** and regular upkeep/maintenance.
- The large drains are being encroached by dwelling units, milk diaries, shopkeepers etc and thus difficult to clean & maintain them. It should be checked so that sanitary conditions of the city are improved.
- **The use of Polythene Bags should be banned in the city**. In fact, polythene bags are worsening the sanitary conditions of the city.
- There is acute shortage of the community toilets in the city and thus compelling the people particularly in slum and LIG areas to defecate in the open. **More community toilets should be constructed in the city.**
- **Wastewater Treatment Project** should come up in the city like solid waste management project.
- **Sanitation Awareness Campaign** should be arranged twice a month particularly in slum and LIG areas. Media/posters/skits and other tools should be used for the sanitation awareness campaign in schools, markets awareness campaigns should be organized. A system should be introduced to seek people's feedback and opinion about the sanitation services in the city.

- Before passing the proposed house maps, it should be ensured that the house is having provision of waterborne toilets and facility of rain water harvesting.
- The large historic water reservoirs like **Laxmi Talaab**, **Hathia Talaabl and Pani ki Dharmshaala s**hould be properly maintained and nallas should not be discharged in to these water bodies.

Issues relating to Solid Waste Management:

- Most of the **people throw the household garbage in the open and drains**.
- Over the period of time, the solid waste and garbage is being dumped and accumulated at various places in the city.
- There is **no provision of door-to-door collection of garbage** in the city. As a pilot project, door to door collection of garbage has started at few places including Premnagar, Narsingh Rao Tauriya, Topekhana Bazar, Taraganj, Ambedkar Nagar, Taalpura, Civil Lines, Seepri Bazar, Nagar Nigam Campus-ward no. 52, Newraiganj, Cantonment area, Barabazar, Pratappura Nagar etc.
- Most of the street/road sweeping **waste and garbage are thrown in the drains and nallas** by the safaikaramcharis.
- The drains and nallas are not cleaned regularly.
- Street sweeping is not done regularly in many wards of the city. In some areas it is done once a day like Narsingh Rao Tauriya, ward no. 60, Topekhana Bazar, Cant, Taraganj, Ambedkar Nagar, Taalpura, Civil Lines, Seepri Bazar, Ward no. 1,, Barabazar.
- The areas like Kureshnagar, Madakkhana, Sagar Khidki, Darivaran, Rai ka tajiya and vegetable markets are the most dirty & polluted areas in the city because of mismanagement of solid waste management.
- All old garbage depots/locations should be relocated and at these places community halls, primary health centres, junior high schools, parks and playgrounds should be constructed.
- Dust bins and Garbage Containers should be permanently placed in the markets/identified places and some responsible agency should be designated to collect the garbage regularly.
- The safai karamcharies should be motivated to perform their duties honestly and meticulously to keep the city clean and green.

ANNEXURE 5: WARD WISE POPULATION OF JHANSI CITY

Colour Codes		Population less than 25 /Hec		In between 51 to 150/Hec		In between 151 to 300/Hec		Population more than 300 /Hec

Ward No.		Area (sq. km.)	Population(2001)	Population(2011) with factor of 7.89 %	Population / Hector
1	HASARIGRAD (FRIST)	0.45	6933	7480	166
2	HASARIGRAD (SECOND)	0.46	7142	7706	168
3	OUTSIDE OF SAYER GATE	1.00	8820	9516	95
4	BHATTAGAON	2.03	6710	7239	36
5	MASEEHAGANJ	1.00	7500	8092	81
6	NAINAGARH	1.05	8760	9451	90
7	SCHOOOL PURA	1.15	7664	8269	72
8	TALPURA (FIRST)	0.80	7548	8144	102
9	KHUSHIPURA (FIRST)	0.55	7365	7946	144
10	SIMRADHA	35.73	8993	9703	3
11	NAI BASTI (FIRST)	0.75	8050	8685	116
12	TALPURA (SECOND)	0.80	6690	7218	90
13	GANDHIAGAON	12.28	6722	7252	6
14	KHUSHIPURA (SECOND)	0.55	7039	7594	138
15	BIJOLI	12.06	7657	8261	7
16	ISAI TOLA (SECOND)	0.79	8975	9683	123
17	KACHHIYA PULIA NO. 9	1.15	6827	7366	64
18	GADRI	1.10	8435	9101	83
19	NAI BASTI (SECOND)	0.75	7782	8396	112
20	BANGALA GHAT	1.00	8993	9703	97
21	NAINAGARH (SOUTH) FIRST	0.55	7482	8072	147
22	ISAI TOLA (FIRST)	0.78	7856	8476	109
23	SIMRAHA	9.93	7867	8488	9
24	LAHERGIRD (FIRST)	4.92	8804	9499	19
25	HLLRAJRA	1.00	8489	9159	92
26	KOCHHA BHAVAR	10.20	6869	7411	7
27	BAGICHA PULIA NO 9	1.20	6901	7445	62
28	NAINAGARH (SOUTH)	0.55	8101	8740	159
29	PICHHORE	7.29	8857	9556	13
30	SAGAR GATE	1.10	8654	9337	85
31	LAHERGIRD (SECOND)	11.79	6966	7516	6

Ward No.		Area (sq. km.)	Population(2001)	Population(2011) with factor of 7.89 %	Population / Hector
32	NANDANPURA (SECOND)	0.50	7953	8580	172
33	OUTSIDE OF ORCHA GATE	1.47	7195	7763	53
34	NANDAN PURA (FIRST)	0.50	7169	7735	155
35	OUTSIDE ORAHAGATE (FIRST)	1.48	6680	7207	49
36	ALOGOLE (SECOND)	0.62	8063	8699	140
37	ALOGOLE (FIRST)	0.63	7716	8325	132
38	CHANNIYA PURA	1.00	8939	9644	96
39	NANDANPURA (SECOND)	0.50	7486	8077	162
40	TALIA	1.20	8902	9604	80
41	DARIYAPURA	0.80	8464	9132	114
42	CIVIL LINE (SOUTH) FIRST	0.73	8783	9476	130
43	CIVIL LINE (SOUTH) SECOND	0.72	7947	8574	119
44	OUTISIDE OF DATIA GATE (FIRST)	0.62	7937	8563	138
45	DARIYA PURA	0.80	8032	8666	108
46	MEWATIPURA	1.35	8578	9255	69
47	OUTSIDE KHANDERAO GATE	1.40	8725	9413	67
48	PREMGANJ (FIRST)	0.70	7514	8107	116
49	PREMGANJ (SECOND)	0.70	6896	7440	106
50	OUTSIDE OF DATIA GATE (SECOND)	0.63	6673	7199	114
51	CIVIL LINE (WEST PART)	1.20	6994	7546	63
52	CIVIL LINE NORTH PART	1.55	7780	8394	54
53	AZADGANJ	0.20	6712	7242	362
54	C. P. MISSION COMPOUND	0.75	6715	7245	97
55	NANAK GANJ	1.10	7166	7731	70
56	TAURIYA NARSINGH RAV	2.40	8254	8905	37
57	MUKARYANA	1.15	8701	9388	82
58	DARUBHONDELA	1.15	8830	9527	83
59		0.70	8964	9671	138
60	LAXMANGANJ	0.65	8993	9703	149
Total		151.96	470212	507312	33

ANNEXURE 6: SLUM PROFILE

S. No.	Name of the Notified slum	Total Pop.2011
1	Maharajpura	750
2	Tolabadluram	900
3	Purviya Tola	900
4	Biharipura	900
5	Schoolpura	2400
6	Villeshwar	1050
7	Silwatganj	450
8	Hirapura	750
9	Nainagarh	2550
10	Pratapura	750
11	Kasaibaba	2250
12	Mahaveeranpura	1800
13	Isaitola	1350
14	Khodan	600
15	Peeriya	750
16	Sumer nagar	750
17	Masihaganj	6600
18	Singalpura	750
19	Gwaltoli	1350
20	Gondu Compound	1500
21	Nai Basti	12000
22	Khanderakot	600
23	Toriya Narsinharao	3900
24	Datiya Gate	948
25	Datiya Gate	1500
26	Sarai	1350
27	Aligol	2124
28	Bhairo Khidki	1350
29	Mewatipura	6000
30	Unnao Gate	3150
31	Manderi gate	1350
32	Unnao Gate	1416
33	Bahar Bhanderigate	2700
34	Darigaran	2850

S. No.	Name of the Notified slum	Total Pop.2011
35	Tai Katajiya	1050
36	Mukaryana	3900
37	Bisatkhana	1500
38	Panaleel	900
39	Bajhai	3000
40	Saiyargate	5850
41	Mohinibaba	2550
42	Madakkhana	2100
43	Sujekhan Khidaki	1735
44	Gudri	2286
45	Baragaon Gate	3300
46	Dadiyapura	4756
47	Khushipura	9600
48	Chhaniyapura	810
49	Orcha Gate	600
50	Kushthyana	2400
51	Sagar Gate	3000
52	Lakshmi Gate	600
53	Taal pura	10650
54	Bangla Ghat	6000
55	Orcha Gate	5400
56	Puliya No. 9	10650
		152975

Source: DUDA 2011

ANNEXURE 7: WARD WISE ANALYSIS OF BASIC SERVICES

S.NO	WARD NAME	WARD NO	POPULATION (2001)	POPULATION (2011)	AREA (sq.km.)	DENSITY (persons/sq.km.)	HOUSEHOLDS	SEWER LINE YES/NO	D 2 D COLLECTION YES /NO/ PARTIAL	NO. OF CONTAINERS	WATER SUPPLY COVERAGE
1	HASARIGRAD	1	6933	7480	0.45	16622	1168	NO	NO	1	NO
2	HASARIGRAD	2	7142	7706	0.46	16752	1204	NO	NO	1	NO
3	OUTSIDE OF	3	8820	9516	1	9516	1486	NO	NO	3	YES
4	BHATTAGAON	4	6710	7239	2.03	3566	1131	NO	NO	4	YES
5	MASEEHAGANJ	5	7500	8092	1	8092	1264	NO	NO	5	YES
6	NAINAGARH	6	8760	8451	1.05	8048	1320	NO	NO	1	NO
7	SCHOOOL PURA	7	7664	8261	1.15	7183	1290	NO	NO	1	NO
8	TALPURA (FIRST)	8	7548	8144	0.8	10180	1272	NO	NO	4	YES
9	KHUSHIPURA	9	7365	7946	0.55	14447	1241	NO	NO	4	YES
10	SIMRADHA	10	8993	9703	35.73	271	1516	NO	NO	1	NO
11	NAI BASTI (FIRST)	11	8050	8685	0.75	11580	1357	NO	NO	1	YES
12	TALPURA	12	6690	7218	0.8	9022	1127	NO	NO	1	NO
13	GANDHIAGAON	13	6722	7252	12.28	590	1133	NO	NO	1	NO
14	KHUSHIPURA	14	7039	7594	0.55	13807	1186	NO	NO	4	YES
15	BIJOLI	15	7657	8261	12.06	684	1290	NO	NO	2	YES
16	ISAI TOLA	16	8975	9683	0.79	12256	1512	NO	NO	5	NO
17	KACHHIYA PULIA	17	6827	7366	1.15	6405	1150	NO	NO	2	NO
18	GADRI	18	8435	9101	1.1	8273	1422	NO	NO	3	YES
19	NAI BASTI	19	7782	8396	0.75	11194	1311	NO	NO	1	YES
20	BANGALA GHAT	20	8993	9703	1	9703	1516	NO	NO	3	YES
21	NAINAGARH	21	7482	8072	0.55	14676	1261	NO	NO	1	NO
22	ISAI TOLA (FIRST)	22	7856	8476	0.78	10866	1324	NO	NO	1	NO
23	SIMRAHA	23	7867	8488	9.93	854	1326	NO	NO	4	YES
24	LAHERGIRD (FIRST)	24	8804	9499	4.92	1930	1484	NO	NO	5	YES
25	HLLRAJRA	25	8489	9159	1	9159	1431	NO	NO	4	NO
26	KOCHHA BHAVAR	26	6869	7411	10.2	726	1157	NO	NO	3	NO
27	BAGICHA PULIA	27	6901	7445	1.2	6204	1163	NO	NO	1	NO
28	NAINAGARH	28	8101	8740	0.55	15890	1365	NO	NO	1	NO
29	PICHHORE	29	8857	9556	7.29	1310	1493	NO	NO	3	NO
30	SAGAR GATE	30	8654	9337	1.1	8488	1458	NO	NO	3	YES
31	LAHERGIRD	31	6966	7516	11.79	637	1174	NO	NO	5	YES
32	NANDANPURA	32	7953	8580	0.5	17160	1340	NO	NO	5	NO
33	OUTSIDE OF	33	7195	7763	1.47	5280	1212	NO	NO	3	YES
34	NANDAN PURA	34	7169	7735	0.5	15470	1208	NO	NO	5	YES
35	OUTSIDE	35	6680	7207	1.48	4869	1126	NO	NO	4	YES
36	ALOGOLE	36	8063	8699	0.62	14030	1359	NO	NO	1	YES
37	ALOGOLE (FIRST)	37	7716	8325	0.63	13214	1300	NO	NO	1	NO
38	CHANNIYA PURA	38	8939	9644	1	9644	1506	NO	NO	3	YES
39	NANDANPURA	39	7486	8077	0.5	16154	1262	NO	NO	5	NO
40	TALIA	40	8902	9604	1.2	8003	1500	NO	NO	3	YES
41	DARIYAPURA	41	8464	9132	0.8	11415	1426	NO	NO	3	NO
42	CIVIL LINE	42	8783	9476	0.73	12980	1480	NO	NO	4	YES
43	CIVIL LINE	43	7947	8574	0.72	11908	1339	NO	NO	4	YES
44	OUTISIDE OF	44	7937	8563	0.62	13811	1337	NO	NO	1	YES
45	DARIYA PURA	45	8032	8666	0.8	10832	1354	NO	NO	3	YES
46	MEWATIPURA	46	8578	9255	1.35	6855	1446	NO	NO	1	YES
47	OUTSIDE	47	8725	9415	1.4	6725	1471	NO	NO	4	YES
48	PREMGANJ	48	7514	8107	0.7	11581	1266	NO	NO	5	NO
49	PREMGANJ	49	6896	7440	0.7	10628	1162	NO	NO	4	NO
50	OUTSIDE OF	50	6673	7199	0.63	11426	1124	NO	NO	1	NO
51	CIVIL LINE (WEST	51	6994	7546	1.2	6288	1179	NO	NO	4	YES
52	CIVIL LINE NORTH	52	7780	8394	1.55	5415	1311	NO	NO	4	YES
53	AZADGANJ	53	6712	7242	0.2	36210	1131	NO	NO	5	NO
54	C. P. MISSION	54	6715	7245	0.75	9660	1132	NO	NO	5	YES
55	NANAK GANJ	55	7166	7731	1.1	7028	1207	NO	NO	5	NO
56	TAURIYA	56	8254	8905	2.4	3710	1391	NO	NO	1	YES
57	MUKARYANA	57	8701	9388	1.15	8163	1466	NO	NO	1	YES
58	DARUBHONDELA	58	8830	9527	1.15	8284	1488	NO	NO	5	YES
59		59	8965	9671	0.7	13815	1511	NO	NO	1	YES
60	LAXMANGANJ	60	8993	9703	0.65	14927	1516	NO	NO	2	YES
		TOTAL	**470212**	**507312**	**151.96**	**3338**	**79082**			**150**	

ANNEXURE 8: SWM SYSTEM: NNJ CIRCLES AND WARDS

Circle 1& 2	
No. of DP Containers 14	
3	HASARIGRAD (SECOND)
33	OUTSIDE OF SAYER GATE
58	DARUBHONDELA
18	GADRI
26	KOCHHA BHAVAR
29	Pichore
30	SAGAR GATE
38	CHANNIYA PURA
40	TALIA
41	dariyapura
45	DARIYA PURA
20	BANGLAGHAT

Circle 3 & 4	
No. of DP Containers 13	
10	SIMRADHA
11	NAI BASTI (FIRST)
19	NAI BASTI (SECOND)
36	ALOGOLE (SECOND)
37	ALOGOLE (FIRST)
44	OUTISIDE OF DATIA GATE (FIRST)
45	DARIYA PURA
50	OUTSIDE OF DATIA GATE (SECOND)
56	TAURIYA NARSINGH RAV
57	MUKARYANA
59	
60	LAXMANGANJ

Circle 5 & 6	
No. of DP Containers 49	
4	BHATTAGAON
23	SIMRAHA
8	ALPURA (FIRST)

12	TALPURA (SECOND0
9	KHUSHIPURA (FIRST)
14	KHUSHIPURA (SECOND)
35	OUTSIDE OF ORCHHAGATE (FIRST)
42	CIVIL LINE (SOUTH) FIRST
43	CIVIL LINE (SOUTH) SECOND
47	OUTSIDE OF KHANDERAO GATE
52	CIVIL LINE NORTH
54	C. P. MISSION COMPOUND

Circle 7 & 8	
No. of DP Containers 58	
5	MASEEHAGANJ
16	ISAI TOLA (SECOND)
53	AZADGANJ
34	NANDAN PURA (FIRST)
24	LAHERGIRD (FIRST)
31	LAHERGIRD (SECOND)
32	NANDANPURA (SECOND)
39	NANDANPURA (SECOND)
48	PREMGANJ (FIRST)
49	PREMGANJ (SECOND)
51	CIVIL LINE (WEST PART)
55	NANAK GANJ

Circle 9 & 10	
No. of DP Containers 16	
1	HASARIGRAD (FRIST)
2	HASARIGRAD (SECOND)
6	NAINAGARH
13	GANDHIAGAON
7	SCHOOOL PURA
22	ISAI TOLA (FIRST)
15	BIJOLI
21	NAINAGARH (SOUTH) FIRST
17	KACHHIYA PULIA NO. 9
27	BAGICHA PULIA NO 9

25	HLLRAJRA
28	NAINAGARH (SOUTH)

ANNEXURE 9: CONDITION OF COMMUNITY TOILETS IN JHANSI CITY

	Sr. No.	Name/Location of Commmunity Toilet	Current Situation
Circle 1& 2	1	Kusthayana Sayyar Gate	Rehabilitated / Operational by Pay & Use
	2	Subhash Ganj	Rehabilitated / Operational by Pay & Use
	3	Chaniyapura	Rehabilitated / Operational by Pay & Use
	4	Gudari Suje Khan	Rehabilitated / Operational by Pay & Use
	5	Sayyar Gate behind B.I.C.	Rehabilitated / Operational by Pay & Use
	6	Fish Market	Working, No water storahe facility
	7	Baga gaon Gate, Bahar ka pura	Closed Down
	8	Bangala Ghat	Working, No water storahe facility
	9	Inside Laxmigate, tooriya	Closed Down
	10	Outside Sagar Gate	Working, No water storahe facility
	11	Chaniyapura Nala	Dilapidated Building
	12	Outside Bada Gaon Gate, near Amjani mata Mandir	Working
Circle 3 & 4	13	Near new Chand Darwaja	Rehabilitated / Proceedings are going on to finalize O&M activity
	14	Ali Gol Emalipura	Rehabilitated / Proceedings are going on to finalize O&M activity
	15	Inside Unnao Gate, Zalkari bai	Rehabilitated / Proceedings are going on to finalize O&M activity
	16	Itawari Ganj, Kujandayana	Very Old, waste water going to nearby Nalla
	17	Near Natawali Mata Mandir	Very Old, waste water going to nearby Nalla
	18	Behind Wom Jejus School	Very Old, waste water going to nearby Nalla
	19	Near Laxmi Brigdage School	Rehabilitated / Operational by Pay & Use
Circle 5 & 6	20	Talpura , Near Kali Mandir	Rehabilitated / Operational by Pay & Use
	21	Khushipura, Behind B. C. I. Ground	Rehabilitated / Operational by Pay & Use
	22	Khushipura, Near Norman School	Rehabilitated / Operational by Pay & Use
Circle 7 & 8		No Community Toilet in Circle 7 & 8	
Circle 9 & 10	23	Pulia No. 9 Mahevia	Rehabilitated / Operational by Pay & Use
	24	Rail Ganj	Rehabilitated / Operational by Pay & Use
	25	Power House	Rehabilitated / Operational by Pay & Use

ANNEXURE 10: LENGTH OF PRIMARY AND SECONDARY DRAINS

Sr. No.	Name of the Drain	Length (m)	Width(m)	Depth(m)
Circle 1				
1	Chhaniyapura nala (Subhash ganj to Lakshmi taal)	1000m.	2m.	1m.
	a. Ranimahal nala	100m.	1m.	1m.
	b. Via Jharnagate gurudwara to Chhaniyapura	300m.	1m.	3m.
	c. Via Kalari bahar Saiyyar gate to the backside of fish mandi	300m.	1m.	1m.
2	Suje Khan nala	100m.	2m.	1m.
3	Shankar Singh park to Lakshmi Taal	500m.	1m.	1m.
4	Banglaghat toilet to Lakshmi taal	100m.	1m.	1m.
5	Bada gaon gate to Lakshmi taal mandir	100m.	1m.	1m.
6	Shivaji nagar Amba bhawan to Pichhor puliya	1000m.	2m.	1m.
7	Outside Lakshmi gate to Lakshmi Taal	200m.	2m.	2m.
8	Kailash Residency to Lakshmi Taal	500m.	3m.	3m.
Circle 2				
1	Natwali Nala			
	a. Upto Bhure Khan Khidki Tulsi Park	1500m.	1.5m.	1.5m.
	b. Behind Lakshman ganj Bhanu Sahai school	200m.	1m.	1m.
	c. Suje Khan Khidki	500m.	1m.	1m.
	a. Aantiya talaab to Nagariya kuan	2500m.	2m.	1m.
	b. Via Bansal colony to Pathauriya nala	600m.	1m.	1m.
	c. Imlipura to the backside of Gaffar park	700m.	1m.	1m.
2	Dr. Mehra lane to Rani Mahal	200m.	1m.	1m.
3	Bandariya nala to Subhash ganj	10m.	1m.	2m.
4	Baidyanath mandir to Ansal Colony	800m.	1m.	2m.

Sr. No.	Name of the Drain	Length (m)	Width(m)	Depth(m)
Circle 3				
1	Idrish Khan residence to Kije the king school	600m.	1m.	
2	Dr. Ramesh Sharma's residence to the backside of Kije the king school	400m.	1m.	
3	Jacob Sahab residence to Jail ki puliya	410m.	1m.	
4	Gondu compound nala	300m.	1m.	
5	Near Natraj cinema to Sadar bazaar near Arora Opticals	50m.	0.5m.	
6	Behind Maharani Lakshmi Bai eye hospital	150m.	1m.	
7	Behind Maharani Lakshmi Bai eye hospital	12m.	0.5m.	
8	Jhokanbagh hospital	500m.	1m.	
9	Jhokanbagh hospital	300m.	1m.	
10	Jai Maha Kali Colony Lakshmi gate road	150m.	1m.	
11	Jai Maha Kali Colony Lakshmi gate road	270m.	1m.	
12	Kali mai Taalpura	100m.	1m.	
13	Shivaji nagar	290m.	1m.	
14	Aantiya Talaab	410m.	1m.	
15	Aantiya Talaab	170m.	1m.	
16	Aantiya Talaab	130m.	1m.	
17	Aantiya Talaab	100m.	1m.	
18	Aantiya Talaab	100m.	0.5m.	
19	Aantiya Talaab	400m.	1m.	
20	Aantiya Talaab	370m.	1m.	
21	Near Railway line	120m.	1m.	
22	Khajoor Bagh, Nai basti	350m.	1m.	
23	Gondu compound nala	50m.	1m.	

Sr. No.	Name of the Drain	Length (m)	Width(m)	Depth(m)
Circle 4				
1	Pucca pul to the backside of Lehar ki devi	2000m.	1m.	1m.
	a. Dhyanchandra stadium to kuchha pul	600m.	1m.	1m.
	b. Tulsi hotel to Shahid park	300m.	1m.	1m.
	c. Officer colony to Railway boundary	150m.	1m.	1m.
	d. Mali ke haate to Mummy yadav	150m.	1m.	1m.
	e. Kalsi park	200m.	1m.	1m.
2	Taj compound to kabristan to Prem sahu parshad's house via Nandanpura puliya	600m	1m.-4m	1m.
3	Nandanpura puliya to Kalari ki puliya	600m.	1m.	1m.
4	Rajghat puliya to Amreek Vihar colony	100m.	1m.	1m.
5	Sangam Vihar nala	300m.	1m.	1m.
6	Mahendra puri colony to Baidyanath mandir	900m.	1m.	1m.
Circle 5				
1	Kasai Baba nala	400m.	1m.	1m.
	a. Rajeev nagar Kasai baba Nainagarh Mahaveeran nagar and all nalis	600m.	1m.	1m.
2	Raajgarh nala	600m.	1m.-4m.	1m.
3	Nandanpura puliya to Kalari puliya	600m.	1m.	1m.
4	Rajghat puliya to Amreek Vihar colony	100m.	1m.	1m.
5	Sangam vihar nala	300m.	1m.	1m.

ANNEXURE 11: JHANSI CITY POPULATION PROJECTIONS & INFRASTRUCTURE DEMAND

1.8. Population Projections

YEAR	By Geometric Increase method	By Incremental Increase method	By Arithmetical Increase method	Average of Three Methods
2012	629036	593724	570148	597636
2013	641458	602806	575862	606709
2014	654125	612092	581577	615931
2015	667042	621582	587291	625305
2016	680214	631277	593005	634832
2017	693646	641175	598719	644513
2018	707344	651278	604433	654351
2019	721312	661584	610147	664348
2020	735555	672095	615861	674504
2021	750080	682810	621575	684822
2022	764892	693729	627289	695304
2023	779997	704852	633004	705951
2024	795399	716180	638718	716766
2025	811106	727711	644432	727750

1.9. Infrastructure Demand for Projected Population

YEAR	PROJECTED POPULATION (AVERAGE OF 3 METHODS)	Water Demand (MLD) (@ 150 lpcd)	Sewerage Generation (MLD) @ 80%	Solid Waste Generation (TPD)(@ 0.45 kg per capita)
2015	625,305	93.80	75.04	281.39
2020	674,504	101.18	80.94	303.53
2025	727,750	109.16	87.33	327.49
2030	785,283	117.79	94.23	353.38
2035	847,370	127.11	101.68	381.32
2040	914,303	137.15	109.72	411.44
2045	986,405	147.96	118.37	443.88

ANNEXURE 12: UNIT RATES – SANITATION INFRASTRUCTURE PLANNING

UNIT RATES - SANITATION SERVICE COMPONENTS						
No.	**COMPONENT**	**CAPITAL COSTS**		**O&M COSTS**		**REMARKS**
		Unit	**Rate (Rs)**	**Unit**	**Rate (Rs)**	
A	**ACCESS TO TOILETS**					
1	Upgrading other latrine to septic tank based	Rs / seat	14350			
2	WC Connected to Septic Tank	Rs / seat	19500			
3	WC Connected to Conventional Sewerage	Rs / seat	10000			
4	Pit Latrine	Rs / seat	12750			
5	Community Toilet Block / PSC	Rs / seat	39900	Rs/Seat/Year	9000	
	Cost per seat per Household	Rs / seat /HH	5700			
6	Public Sanitary Convenience (PSC)			Rs/Seat/Year	11250	
7	Constructing Soak pit for existing WC with Septic Tank	No	1500			
8	WC Connected to Septic Tank with Soak pit	No	21000			
9	Connecting Septic/ Interceptor tank effluent to small bore sewer	No	3000			
10	WC Connected to Interceptor tank --> Small bore sewerage	No	16000			
11	Upgrading Pit latrine to WC Connected to Conventional Sewer	No	4000			
12	Upgrading Other Latrines to WC connected to Conventional Sewer	No	7500			
13	Upgrading Other Latrines to WC with Septic tank with small bore sewerage	No	17350			
14	Upgrading Other Latrines to WC connected to Septic tank with Soak pit	No	15850			
15	Upgrading WC with Septic tank to WC Connected to Conventional Sewer	No	4000			
B	**SEPTAGE MANAGEMENT**					
1	Vacuum Trucks	Rs/vehicle	800000	Rs/vehicle/ Year	452000	
2	Septage Sludge Drying Beds	Sqm	2000	Rs/ Sqm/ Year	1000	
3	Land	Hect				

UNIT RATES - SANITATION SERVICE COMPONENTS						
No.	**COMPONENT**	**CAPITAL COSTS**		**O&M COSTS**		**REMARKS**
		Unit	**Rate (Rs)**	**Unit**	**Rate (Rs)**	
4	Office and ancillary units	LS	1500000	Rs/ Year	60000	4% Capital
5	Septic Tank Clearance charge			Rs/HH	1200	
6	Septic tank clearance (O&M cost)			Rs/tank	560	
C	**SEWERAGE MANAGEMENT**					
	Conventional Sewerage					
1	Street collector sewer (generally 150 - 300 mm dia)	Rs/m	600	Rs/ m/ Year	48	8% Capital
2	Branch Sewer (400 mm to 800 mm)	Rs/m	1400	Rs/ m/ Year	112	8% Capital
3	Trunk Sewer (800+ mm)	Rs/m	3000	Rs/ m/ Year	240	8% Capital
	Small Bore Sewerage					
1	Street collector sewer (generally 100 - 250 mm dia)	Rs/m	300	Rs/ m/ Year	15	5% Capital
2	Branch Sewer (300 mm to 500 mm)	Rs/m	700	Rs/ m/ Year	35	5% Capital
3	Trunk Sewer (500+mm)	Rs/m	1500	Rs/ m/ Year	75	5% Capital
	Simplified sewerage					
	UGD	Rs/capita	6500	Rs/capita	390	6% Capital
	street Collector Sewer (generally 100 -250mmdia)	Rs/m	300	Rs/ m/ Year	12	4% Capital
	Branch Sewer	Rs/m	700	Rs/ m/ Year	28	4% Capital
	Wastewater Treatment					
	Primary Treatment	Rs/mld	3038750	Rs/mld/ Year	364650	12% of Capital
	Secondary treatment	Rs/mld	8206000	Rs/mld/ Year	984720	12% of capital
	Tertiary Treatment	Rs/mld	18937154	Rs/mld/ Year	2272458	12% of capital
	Decentralised Waste Water Treatment	Rs/mld	16412000	Rs/mld/ Year	328240	2% of capital
G	**STORM WATER DRAINS**					
	New Drains Construction	Rs/Percapita	630	Rs/Percapita	31.5	
	Upgrading kutcha drains to pucca	Rs/Km	1400000	Rs/Km	70000	5% Capital
	New Pucca Open Drains	Rs/Km	2100000	Rs/Km	105000	5% Capital
	New Pucca closed drains	Rs/Km	2400000	Rs/Km	120000	5% Capital
H	**SOLID WASTE MANAGEMENT**					
	SWM vehicles	Rs/unit	430000	Rs/unit	21500	5% Capital
	Dustbins	Rs/unit	750	Rs/unit	37.5	5% Capital
	SW Disposal	Rs/unit	250	Rs/unit	12.5	5% Capital
I	**IEC**					
	IEC Campaign	Rs/year	800000			

ANNEXURE 13: WATER TARIFF STRUCTURE ACROSS INDIA

Delhi Jal Board

Water Supply Related Charges:

Generally bills are issued on bi-monthly basis and in case of bulk connections, it is on monthly basis.Charges raised in Water Bill

- Service Charge
- Sewage Maintenance Charge
- Water Consumption Charge
- Meter rent if meter has been installed by DJB
- Cess Charge
- Arrears if any
- Surcharge, if payment is not deposited in stipulated time
- Other Charges

Present Rates for Service Charge

Category I	For Built up area upto 200 sq km	Rs 40 per month per connection
	For Built up area above 200 sq km	Rs 120 per month per connection
Category II	Non- Domestic	Rs 250 per month per connection
Category III	Non- Domestic	Rs 600 per month per connection

Volumetric Consumption Charges

Category I	
Consumption per Month	**Rs per KL**
Upto 6 KL	0
7 – 20 KL	2
21 – 30 KL	7
Above 30 KL	10
Category II	
Upto 25 KL	10
Above 25 KL and up to 50 KL	20
Above 50 KL	30
Category III	
Upto 25 KL	15
Above 25 KL and up to 50 KL	25
Above 50 KL and up to 100 KL	35
Above 100 KL	50

Chennai Metro Water

Metered Consumers Tariff

Category	Quality	Rate / KL Rs	Frequency of Billing
Domestic			
Residential 1) Domestic residential premises (Other than Flats or Block or line of Houses)	Upto 10 KL	2.50	Monthly
	11 to 15 KL	10	
	16 to 25 KL	15	
	Above 25 KL	25	
2) Flat or Houses in a block of Flats or line of houses respectively used wholly for residential purposes. Total Consumption divided by no of flats	Upto 10 KL	2.50	
	11 to 15 KL	10	
	16 to 25 KL	15	
	Above 25 KL	25	

Individual flats or Houses in a block of flats or line of houses respectively used for other than residential purposes	Partly Commercial	Rs 150 p.m. per flat	Monthly
	Non Water Intensive	Rs 400 p.m. per flat	
	Water Intensive	Rs 650 p.m. per flat	
	Private Hospitals	Rs 800 p.m. per flat	
	Institutional	Rs 300 p.m. per flat	
	Pvt. Educational Institutions	RS 400 p.m. per flat	

Commercial	Private Hospitals – upto 500 KL Rs 50 / KL		Rs 800* (water intensive)	Monthly
	All others upto – 500 KL Rs 35 / KL		Rs 400 (non-water intensive)	
	Private Hospitals – above 500 KL Rs 80 / KL for entire quality		Rs 800* (water intensive)	
	All others – above 500 KL Rs 60 / KL for entire quality		Rs 650* (water intensive)	
Partly Commercial	Upto 10 KL	5		
	11 to 15 KL	15	Rs 150	Monthly
	Above 15 KL	25		
Institutional	Pvt Edn Institution	40 KL entire quality	Rs 400	Monthly
	Govt Hospitals	20 KL entire quality	Rs 200	
	All others	30 KL entire quality	Rs	
Municipal Water Supply	Entire Consumption	15		Monthly
Municipal Bulk Supply	Entire Consumption	7 (wherever Local bodies met the cost of infrastructure)		Monthly
Sewage Charges at 25 % on water supply charges whenever sewer connections are provided				

Unmetered Consumers – Tariff

Category	Water Charges / Month (including sewage charges)	Sewer Charges / Month	Frequency of billing
A Domestic			
Residential i) Domestic residential premises (other than flats or block or line of houses)	Rs 50 per month per dwelling unit		Half yearly
ii) Flats or houses in a block of flats or line of houses respectively used wholly for residential purpose	Rs 50 per month per dwelling unit		Half yearly
	Half yearly		Half yearly
Partly Commercial	Rs 150 pm		Half yearly
Institutional	i) Private Educational Institutions Rs 400 pm ii) Govt Hospitals Rs 200 pm iii) All others Rs 300 pm		Half yearly
Public Supply Tube wells pumps or Mark II pumps	Rs 40	Rs 10	Half yearly

Sewerage Charges (Where there is no water supply connection)

a) Domestic	Rs 25 pm	Half yearly
b) Non Domestic	Rs 150 pm	Half yearly
c) Non Domestic with water main (water intensive)	Rs 650 pm	Half yearly

Hyderabad Metro Water

Domestic Category

Existing		Revised			
Slab	Water Charges (in Rs)	Slab	Water Charges (in Rs)	Sewerage Cess Charges	
(in Kilo Liters per month)		(in Kilo Liters per Month)			
0-15 (slums)	6	0-15 (slums)	7		
0-15	6	0-15	10		
16-30	8	16-30	12	35%	Over Water Demand
31-50	15	31-50	22		
51-100	20	51-100	27		
101-200	25	101-200	35		
Above 200 Entire quantity	35	Above 200 Entire quantity	40		

The following minimum charge based on pipe size diameter will be collected in case monthly tariff/consumption as shown above is less than minimum charges for Domestic consumers.

½"dia (slum) Rs.105.00

½"dia Rs.150.00

¾"dia Rs.418.00

1" dia Rs.905.00

1 ½"dia Rs.2120.00

2" dia and above Rs.4500.00

In addition to the above minimum water charges, sewerage cess charges will be levied at 35%.

COMMERCIAL CATEGORY:

<table>
<tr><td colspan="2">Existing</td><td colspan="4">Revised</td></tr>
<tr><td>Slab</td><td rowspan="2">Water Charges (in Rs)</td><td>Slab</td><td></td><td colspan="2">Sewerage Cess Charges</td></tr>
<tr><td>(in Kilo Liters per Month)</td><td>(in Kilo Liters per Month)</td><td></td><td rowspan="7">35%</td><td rowspan="7">Over Water Demand</td></tr>
<tr><td>0-15</td><td>6</td><td>0.15</td><td>20</td></tr>
<tr><td>16-30</td><td>8</td><td rowspan="3">16 - 100</td><td rowspan="3">35</td></tr>
<tr><td>31-50</td><td>15</td></tr>
<tr><td>51-100</td><td>20</td></tr>
<tr><td>101-200</td><td>25</td><td>101 - 200</td><td rowspan="2">50</td></tr>
<tr><td>Above 200 Entire quantity</td><td>35</td><td>Above 200 Entire quantity</td></tr>
</table>

The following minimum charges based on pipe size diameter will be collected in case monthly tariff/consumption as shown above is less than minimum charges for commercial consumers.

½"dia Rs.300.00

¾"dia Rs.965.00

1" dia Rs.1700.00

1 ½"dia Rs.3275.00

2" dia and above Rs.6675.00

In addition to the above minimum water rates, sewerage cess will be levied at 35% on water charges.

INDUSTRIAL CATEGORY:

Existing		Revised			
Slab (in Kilo Liters per Month)	Water Charges (in Rs)	Slab (in Kilo Liters per Month)		Sewerage Cess Charges	
0-15	6	0.15	25	35%	Over Water Demand
16-30	8	16 - 100	40		
31-50	15				
51-100	20				
101-200	25	101 - 200	60		
Above 200 Entire quantity	35	Above 200 Entire quantity			
Water Based Units (Entire Quantity)	60	Water Based Units with in GHMC (Entire Quantity)	100		
	60	Water Based Units Out side GHMC area (Entire Quantity)	120		

The following minimum charges based on pipe size diameter will be collected in case monthly tariff/Consumption as shown above is less than minimum charges for Industrial consumers. In addition to below rates 35% sewerage cess will be charged for all such consumers who are located within the GHMC limits.

½"dia Rs. 375

¾"dia Rs.1135

1" dia Rs.1975

1 ½"dia Rs.3775

2" dia and above Rs.7855

BULK & MSB CATEGORY :

S.No.	Category	Water Charges		Sewerage cess	Remarks
		Up to Agreed quantity	Beyond Agreed quantity		
I	**Within GHMC**				
a)	Housing colonies / Gated Communicates	Rs.10/- per KL	Rs.40/- per KL	35% on water demand	
II	**Out side GHMC area**				
a)	Housing colonies / Gated community	Rs.13.50 per KL	Rs.54/- per KL	No sewerage charges	
b)	Cantonment Board	Rs.13.50 per KL	Rs.54/- per KL	No sewerage charges	
c)	Commercial / Industrial connections	Rs.90/- per KL for entire		No sewerage charges	Minimum charges as

		quantity			per pipe size
III	**Tanker Supplies**				
a)	Tanker supplies for domestic purpose (including hire chares)	Rs.400/- per 5 KL			
b)	Tanker supplies for non-domestic purpose (including hire charges)	Rs.515/- per 5 KL			
IV	**Gram panchayats/ Municipalities**				
a)	Gram panchayats / Municipalities	Rs.10/- per KL		Rs.40/- per KL	No sewerage charges

For Multi storied Residential Apartment Complex(s) (Domestic) the minimum of 9 KL per flat per month shall be chargeable at the lowest rate of Rs.10/- per KL and thus workout to Rs.90/- per month for water charges per flat and sewerage cess @ 35% will be charged on water charges minimum monthly charges per flat will be Rs.121.50/- per month. To provide incentive to those customers and encourage them to set up sewerage treatment plant rebate will be given upto a maximum of 50% (i.e., 17.50%) in sewerage cess provide the entire quantity of water consumed including the bore well water is treated and recycled for other usage.

Bangalore Water Board

Water Tariff

Sanitary Charges

Consumption	Domestic	Non Domestic
0 – 25000 Lts	15 Flat	20 % of bill
25001 – 50000 Lts	15 % of bill	20 % of bill
50001Lts and above	20 % of bill	20 % of bill

Bore well charges

Domestic & apartment 50/- per month per individual house Non domestic Rs.300/- per HP. of borewell per month

Domestic	Minimum Rs.48
a) O to 8000 Litres	Rs.6.00 per KL
b) 8001 to 25000 Litres	Rs.9.00 per KL
c) 25001 to 50000 Litres	Rs.15.00 per KL
d) 50001 to 75000 Litres	Rs.30.00 per KL
e) 75001 to 1,00,000 Litres	Rs.36.00 per KL
f) 1,00,000 and above	Rs.36.00 per KL
g) Domestic consumers in respect of High rise building / Apartments charged at bulk supply	Minimum Rs.48 p.m. Pertenament of high rise building/ Apartments Total consumption its charged on average consumption domestic basis, for each tenament
h) Town Muncipal Council village Panchayat, Yelahanka, Hebbal etc. are charged at bulk supply basis	In case of Town Municipal Council / Village supply charged on bulk supply basis are charged at minimum of Rs.48/- per connection Total consumption are charged at

	an average domestic consumption basis for each connection
NON DOMESTIC	Minimum Rs.360
a) 0 to 10001 Litres	Rs.36.00 per KL
b) 10001 to 20001 Litres	Rs.39.00 per KL
c) 20001 to 40001 Litres	Rs.44.00 per KL
d) 40001 to 60001 Litres	Rs.51.00 per KL
e) 60001 to 1,00,000 Litres	Rs.57.00 per KL
f) Above 1,00,000 Litres	Rs.60.00 per KL
INDUSTRIES	Rs.60.00 per KL
SWIMMING POOLS	Rs.60.00 per KL

Domestic		
Bore Size		Meter Charge
Half Inch	0.5	20
Three Quarter	0.75	30
One Inch	1	36
One and Quarter	1.25	40
One and half	1.5	50
Two Inch	2	70
Two and Half	2.5	250
Three Inch	3	300
Four Inch	4	350
Six Inch	6	400
Eight Inch	8	500
Ten Inch	10	600
Twelve	12	800
Sixteen Inch	16	1200
Non Domestic		
Bore Size		Meter Charge
Half Inch	0.5	40
Three Quarter	0.75	60
One Inch	1	72
One and Quarter	1.25	80
One and half	1.5	100
Two Inch	2	140
Two and Half	2.5	500
Three Inch	3	600
Four Inch	4	700
Six Inch	6	800
Eight Inch	8	1000
Ten Inch	10	1200
Twelve	12	1600
Sixteen Inch	16	2400
Partially Non Domestic		
Bore Size		Meter Charges
Half Inch	0.5	30
Three Quarter	0.75	45

One Inch	1	54
One and Quarter	1.25	60
One and half	1.5	75
Two Inch	2	105
Two and Half	2.5	375
Three Inch	3	450
Four Inch	4	525
Six Inch	6	600
Eight Inch	8	750
Ten Inch	10	900
Twelve	12	1200
Sixteen Inch	16	1800

Prorata / Inspection Charges

Levy of Prorata charges for sanction of water supply and sanitary connection. Due to a spurt in the population, many of the buildings in Bangalore City have been dismantled and are reconstructed as multi storied complexes. These residential apartments and commercial complexes have resulted in increase in demand for multiple water and sewage disposal. The existing water supply and sanitary lines are old with lower diameter and are not capable of meeting the required water demand and also incapable of taking the additional sewage load. BWSSB is required to make heavy investments to meet this demand hence it is imperative to levy prorata charges to new structures and multi-storied complexes to meet the cost of improvement to the existing water supply and sanitary system. Prorata charges is a one-time payment collected from the owner/lessee/occupier, based on the area of construction, both for water supply connection and sanitary connection as detailed below

Prorata Charges – fee Structure Levy of Prorata charges for sanction of water supply and sanitary connection.

Due to a spurt in the population, many of the buildings in Bangalore City have been dismantled and are reconstructed as multi storied complexes. These residential apartments and commercial complexes, have resulted in increase in demand for multiple water and sewage disposal. The existing water supply and sanitary lines are old with lower diameter and are not capable of meeting the required water demand and also incapable of taking the additional sewage load. BWSSB is required to make heavy investments to meet this demand hence it is imperative to levy prorata charges to new structures and multi-storied complexes to meet the cost of improvement to the existing water supply and sanitary system. Prorata charges is a one-time payment collected from the owner/lessee/occupier, based on the area of construction, both for water supply connection and sanitary connection as detailed below

1.	**Prorata Charges**	
	Residential Building	Rs.150/- per sqmt on total built up area
	Multi storied Residential Apartments / Residential Apartments	Rs.200/- per sqmt on total built up area
	Buildings fully owned by State Government and Central Government (Not applicable to Govt undertaking organisations own buildings)	Rs.240/- per sqmt on total built up area
	Commercial Buildings	Rs.300/- per sqmt on total built up area
II.	**Inspection Charges**	
	Residential Buildings(single unit	Rs.250 per building

	Residential Apartments	Rs.2,500 per building
	Commercial Buildings	
	a. upto 1,000 Sq.ft	Rs.500 per building
	b. upto 1001-2000 Sq. ft	Rs.2,000 per building
	c. upto 2001-4000 Sq. ft	Rs.4,000 per building
	d. Beyond 4000 Sq. ft	Rs.5,000 per building
III.	**Sanitary Point charges**	Rs.120 per(minimum Rs.600 per house/flat

1. Up to & inclusive of 2400 Sq. ft area for up to G + 2 floors (Residential as well as commercial). Sub-committee headed by concerned ACEs is empowered with the approval of CE.
2. More than 2400 Sq. ft area (Residential as well as commercial) for beyond G + 2 floors – Committee headed by CE is empowered & approval of C is required.
3. Up to 2400 Sq. ft area for G + 2 (only residential), EE is empowered

ANNEXURE 14: FINAL CITY SANITATION PLAN PRESENTATION, AUGUST 30, 2012 AT JHANSI

City Sanitation Task Force Meeting cum
Final Presentation for
City Sanitation PlanJhansi

Government Museum at 11am on 30 August 2012

President: Ms. Kiran Varma, Mayor Jhansi
Convenor: Mr CP Chaurasia, Nagar Ayukt
Member: Mr. Rakesh Shrivastav, Sahayak Nagar Ayukt
MLA: Mr. Ravi Sharma
All Members of CSTF
All Corporators of Nagar Nigam

Presentation by: Col J Jamwal, Advisor, ASCI, Hyderabad
Gajanan Deshpande, SRA, ASCI, Hyderabad

Sr.	Issues Highlighted	Suggested by	Action to be taken
1	Prevalent open defecation Jhansi Forte area	Sr. Journalist	Issue will be addressed in Final Report CSP
2	Modification in name of Haathiya Taal to Aathiya Taal	Sr. Journalist	Issue will be addressed in Final Report CSP
3	Disincentives for citizens not complying with their civic duties	Arun Dwivedi (Ex. Corporator)	Decision to be taken in consultation with CSTF
4	Priority should be given to Community toilets and focus need to be given on immediate phase.	Mr. Ravi Sharma (MLA)	Issue will be addressed in Final Report CSP
5	Addressing problems of inner city and difficult access area	Mr. J. P. Chaurasia (Nagar Ayukt)	Issue will be addressed in Final Report CSP
6	Final CSP report may be submitted at the earliest.	Ms. Varma (Mayor)	ASCI assured to adhere to agreed time-line.










ANNEXURE 15: EXECUTIVE SUMMARY FOR DPR JHANSI WATER SUPPLY RE-ORGANISATION SCHEME

Jhansi city area faces acute water supply scarcity since the beginning and even after implementing new improvements, Re-Organization and Augmentation Scheme as described in detail in Project Report. This is mainly because of low and erratic rainfall, high run off and rocky terrain with negligible absorption/filtration capacity and very limited retention in available fractures fissures and joints etc. Availability of ground water in Jhansi and surroundings is limited and unreliable hence Jhansi city has to depend entirely on surface sources for its water Supply. At present Jhansi town is getting water from

a) Pahuj reservoir-6MLD
b) Matatila Reservoir 140 MLD

This Detailed Project Report of Water Supply is prepared for Nagar Nigam area which is created vide government notification no. 5092/9-7-2001-6J/2000 dated 7th February 2002 in which the boundaries of nearest while Municipal Board has been expanded along with inclusion of 15 surrounding villages. Details obtained from Nagar Nigam Jhansi the area is divided in 60 Wards. The existing conditions of Water Supply System have been studied in detail to identify the deficiencies and gaps in the existing system. The availability, Quantity and reliability of surface sources, water Treatment process, services reservoirs location and sizes, were also studied in detail.

The Proposals were finalized after study and discussions with U.P. Jal Nigam and Jhansi Division Jal Sansthan Authorities keeping in view the existing system and its fruits full utilization and robust water supply system in which sustainable operation and maintenance system along with environmental, health and safely, sanitation, aesthetic aspects are taken care of and also in line with CPHEEO water supply and Treatment Manual and guidelines given by U.P Jal Nigam. The scheme have been prepared by taking base year or commencement year as 2012 middle year 2027 and ultimate design year of 2042 as per guidelines.

This Comprehensive scheme consists of following Major works.

1. Intake well at matatila Reservoir - 210 MLD
2. Raw water rising main from intake well to C.P. Tank - 2.8 kms
3. C.P. Tank at Matatila - 750 k.L
4. Raw water gravity main from C.P. Tank to Babina treatment works - 20 kms
5. Treatment plant - 200 MLD at Babina
6. Gravity clear water Conveyance main from Babina to Jhansi - 30 kms.
7. Gravity feeder mains to different zonal pumping stations–For 24 zones
8. Service Reservoirs (CWR'S & O.H T'S) - For 24 zones.

Distribution System: In all 24 zones 538.083 - kms.

The whole city including newly extended areas consisting 15 villages have been provided with Drinking water @ 155lpcd and minimum terminal pressure as 17 mts. The whole city is divided in to 24 water supply zones and care has been taken that every household gets drinking water in required quantity and quality. The Economics of the scheme have been worked out in detail and found that scheme will run in profit from its Commencement year it self. The estimated cost of Jhansi water supply Re-Organization scheme comes out to Rs 42100 Lakhs Comprehensive general Abstract of cost is tabulated as below.

Sl.No.	Description	At the initial stage year 2012	At the Middle stage year 2027	At the ultimate stage year 2042
1	Total Population of the town	650000	1000000	1500000
2	Rate of water supply in lpcd	155	155	155
3	Clear water requirement per day MLD	100	155	230
4	Total production of clear water by this scheme annually (KL)	36500x10 3	56575x10 3	83950x10 3
5	Total Estimated cost (Rs. In Lakh)	43527	43527	43527
6	Total Annual recurring expenditure (rs. In Lakh).	640	1329	2222
7	Per capita cost (in Rs.)	6696	4353	2902
8	Per capita Recurring Expenditure (in Rs.)	99	133	148
9	Cost of Production of water per KL (in Rs.)	1.76	2.35	2.65
10	Total annual income (Rs. In Lakh)	1195	2403	4656
11	Net profit / Loss - Rs. In Lakh.	554	1074	2428

The estimate cost of Jhansi Water Supply Re-Organization Scheme comes out to Rs. 43527 Lakhs comprehensive generalAbstract of cost is tabulated as below:-

Sl.No.	Particulars	Total Cost (Rs. In Lakh)
A	Basic cost of water supply scheme	34924.83
B	Contingencies @3% on above	1047.74
C	Total Capital Cost (A+B)	35972.57
D	Preparation of Detailed Project Report @ 1.5% of C.	539.59
E	Capacity Building, IEC @ 1.5% of C.	539.59
F	Efficiency @ 1% of C.	359.73
G	Innovative Approach @ 1% of C.	359.73
H	Incentives (D+E+F+G)	1798.63
I	Third Party Project monitoring and Evaluation @ 5% of C.	1798.63
J	Department supervision charges @ 11%	3956.98
K	Total (C+H+I+J)	43526.82

ANNEXURE 16: BEST PRACTICES IN SANITATION

Case Study I-The first city in India where open defecation prevented in all slums

Tiruchirappalli City Corporation–The first city in India where open defecation prevented in all slums. Gramalaya's work is focused on implementation and filling critical knowledge gaps in the sector, up scaling community based pro poor approaches through our program and advocacy work. The 2001 census of India put urban sanitation coverage at 61 percent of the population having access to individual or public toilets. Low coverage of urban sanitation is due to the in ability of planned urban development to provide for sanitation access to the urban poor. Gramalaya started its urban intervention in the 186 slums of Tiruchirappalli City Corporation as the operational area aiming at declaring open defecation free zone. The involvement of community based organizations in the project coupled with City Corporation support in providing Integrated Sanitary complexes (ISPs),offering vacant sites for constructing community toilets with Water Aid, UK funding enabled the project a successfully demonstrated model.

Gramalaya played an active role in declaring India's first slum Kalmandhai as open defecation free(ODF) slum in Tiruchirappalli City Corporation in the year 2002 followed by 168 slums as ODF announced with the support of Trichy City Corporation and donor agencies. This has resulted in conversion of dry earth latrines into modern flush out community toilets and eradication of manual scavenging in the city. In Tiruchirappalli city Corporation, 126 slum Communities are maintaining sanitary complexes under pay and use system with the support city Corporation. The Corporation handed over the toilets to women self help groups after new construction or renovation of the toilet. The Corporation gave the permission letter to the groups for running the community managed toilet under pay and use system. The Gramalaya experience proved that adequate involvement of community and training in maintenance of public toilets and earning from user charge is are venue model for the slum communities with sustainable approach. It also generates tremendous confidence among women to take part in slum welfare and day-to-day decision making.

The review of Community managed toilets and bathing complexes in Tiruchirapalli, six years after the work began, has shown that achieving clean and healthy slums does not require huge financial investment. However,what it does require is a city authority sensitive to the problems faced by slum communities and supportive of community action, dedication of communities and their support NGOs. It has been proved that communities can manage their own toilet units and when they do this, the toilet are much cleaner than when managed by municipal authorities. There have been cases where the entire community can be declared open defecation free. Further, it has shown that managing toilets leads to empowerment of women with many positive impacts in terms of personal and community development. This experience shows that after reluctance, committees do pay for using toilets and bathing and washing facilities and these service scan be provided at affordable costs, even for the poorest.

Toilets are only apart of the sanitation solution. Sewage, waste water and solid waste management must also be tackled by city authorities and this is the area where they must play a lead role. Tiruchirapalli shows that community managed toilets and bathing complexes provide a model that can work at city-level when supported by city authorities where declaration of 168 slums as open defecation free made possible.

Case Study II – Alandur Municipality-Public- Private Community Participation In Implementation Of Underground Sewerage System

Alandur Municipality has succeeded in providing connections to an under ground sewerage system to all its residents, including the urban poor. This was achieved through a combination of effective leadership, political will, mobilizing people's participation, financial planning and forging the right partnerships.

City Profile

Alandur, a selection-grade municipality, is part of Kanchipuram district of TamilNadu. It is adjacent to Chennai, at a distance of 14km on the southern side, and forms apart of the Chennai Metropolitan Development Area (CMDA).With hardly any industrial base, the town has developed as a residential suburb of Chennai. According to the1991Census of India, the town has a population of 1,25,444, with 32,000 households spread over to19.5sqkm. Approximately one-fourth of its population lives in slums.

Context

Alandur municipality had no under ground sewerage system. Households had either septic tanks or holding tanks, and the municipality was responsible for collecting the sewage periodically in tankers and disposing it off in low-lying areas. To address these problems, an under ground sewerage system was designed for its current population, as well as for an estimated population of 3,00,000 in 2027,with the objectives of improving the standard of living of the residents; providing for disposal of sewage through an exclusive drainage network; avoiding recurring expenditure on septic tank cleaning; and preventing ground water contamination.

Implementation

In 1997, the Government of Tamil Nadu decided to provide a sewerage system in 12 selected major urban centers including Alandur, in the context of a World Bank Project. The Chairperson of Municipality, Mr.R.S.Bharati, took up the task of implementing this. It was decided that Tamil Nadu Urban Infrastructure Finance Services Ltd. (TNUIFSL), the state asset management company, be approached to finance the sewerage scheme. Considering the lack of financial and technical resources at the municipal level to undertake such an infrastructure project, it was decided by TNUIFSL that the municipality would undertake the projecton a BOQ(Bill of Quantities) basis. The sewerage treatment plant (STP) would be built on a BOT(Build, Operate andT ransfer) basis. The project entailed a) construction of an under ground sewerage scheme with a network of sewer pipe lines and man holes, of 120kms (including19km main and101kmbranch lines);b) construction of a pumping house and installation of pumping machinery ;and c)construction of a sewage treatment plant with a capacity of 24MLD (2 units12 MLD each) on BOT basis to IVRCL and VAT for a period of14 years.

The project work was carried out in two phases. In the first phase(the first two and a half years), 50% of the branch sewers, main sewers, pump house including installation of machinery, pumping main and one 12 MLD capacity sewage treatment plant, were completed and commissioned. The remaining work relating to the project was to be carried out in the next phase. The particular challenges addressed were communication and consultations with citizens to secure their buy-in and contribution to the sewerage scheme, technical bottle necks such as realignments necessitated by the construction of subways and MRTS,

terrain conditions, and procedural delays in approvals. To reduce the repayment burden on the local body, it was decided to collect deposits from at least10,000 residents before calling for tenders; this was also to ensure effective participation of people in the project. The names of the depositors were displayed in public places to motivate others to pay. Officials and non-officials, especially the chairperson of Alandur municipality, organised detailed discussions with the residents of the city and resident associations, in order to explain the project details and benefits of the sewerage project as part of assessing the willingness to pay. Effective and timely communication ensured participation of key stakeholders and beneficiaries in the initiative. An election-style campaign was launched. Television and newspapers were roped into motivate the public. Sanitary workers also conducted a door-to-door campaign in support of the project. To ensure the inclusion of the poor and slum residents, a provision was also made for community toilets connected to the sewerage system.

The total project cost was estimate dat Rs.34crores with a break-up shown in the table: Sources of Funds (Rs.inCr.)

SOURCE	CONTRIBUTION	%OfTOTAL
TNUIDCO Loan	16	47.06
Citizen's contribution	8	23.53
TNUIFSL Loan	3	11.76
TNUIFSL Grant	4	8.82
Interest on deposits	2	5.88
TNUIDCO Grant	1	2.94
Total	34	100.00

Tariff Structure HSC Tariff Domestic Category HSC Tariff Non Domestic- Commercial and Industrial Category

Square Feet Monthly Tariff (Rs)			
<500	60	<500	200
500-1500	80	500-1500	400
1500-3000	100	1500-5000	600
>3000	120	>5000	1000

To recover costs of operation, maintenance and debt servicing, the municipality decided the tariff structure through a consultative process. The tariff included a one-time deposit and a monthly tariff. They are given in Table2. On demand from the citizens, the municipality has subsequently reduced monthly charges from Rs.150toRs.110.

Impact

Of the 23,000 households who paid for the services, 8,350 households were connected in the first phase, i.e. by 2005. Nearly 500 slum households out of 7,000 had sewerage connections, and 43% of slum dwellers have opted for and paid for individual sewerage connections. In 2005, 14 community toilets were constructed to serve poor clusters. By the end of March 2008, all households had received sewerage connections.

Sustainability

The project is sustainable, as the cost towards maintaining the system is recovered from the users by means of monthly charges. There has been a regular flow of funds and timely repayment to financial institutions. A landur sewerage project is an innovative initiative for sustainable delivery of urban services in the country. Inspired by the Alandur example, many urban local bodies, including Trichy, Tanjavur, Tirunelveli, and Ambattur, have initiated similar efforts for under ground sewerage system. The Alandur experience demonstrates that mobilising people's participation for infrastructure projects is possible through effective leadership, collective efforts and transparent procedures. Political will, effective communications, transparency and partnership with community-based organisations, are the key factors for the success of the project. Inter-departmental coordination and active involvement of all stakeholders ensured successful completion and sustenance of the project.

http://www.waterawards.in/2008-winner-profileam.php

Case Study III- Kalyani Municipality-Community- Led Health Initiatives with Community Led Total Sanitation(CLTS) As The Entry Point

Kalyani Municipality's CLTS empowers local communities with the goal of creating an open, defecation-free environment, especially in slums, through a participatory approach of self- mobilization and facilitation. This brings about behavioural change to ensure 100% sustained usage of sanitary toilets, thereby making Kalyani an Open Defecation Free(ODF) area.

Context

Kalyani, located 65km north of Kolkata in West Bengal, is one of the 39 municipalities under Kolkata Metropolitan Area (KMA) with a population of 0.1million, of which approximately 50% lives in 52 slums. These people have mainly migrated from neighbouring Bangladesh. Over the past ten years, more than Rs.3 crore has been spent on different projects for constructing toilets for the urban poor, improving the sanitation profile of Kalyani. Despite a lot of investment from different projects, Kalyani was not open-defecation free (ODF), as this was a common practice even amongst those given toilets free-of-cost by donor agencies. This led to a lot of health problems amongst other citizens as well.

Initiative

Against the above background, CLTS was conceived in late 2005 under the Kolkata Urban Services for The Poor Programme (KUSP), funded by the Department For International Development (DFID).The chairperson of Kalyani Municipality showed political will and leadership in motivating its councilors and making Kalyani an ODF town. The Board of Councilors(BoC) unanimously accepted the proposal to pilot the CLTS project in Kalyani Municipal Area in January 2006. The chief health functionary of the ULB coordinated and facilitated the implementation of the entire programme.

Initially, the pilot project was implemented in five slums only. However, inspired by the success of the project, Kalyani decided to make all the 52 slums ODF. A team of experts, including a Participatory Development Consultant and medical doctors, were involved in the initiative that conducted a series of awareness-creation workshops. Regular interaction with slum dwellers, nurturing of community leaders, and continuous monitoring by the CLTS team, made it possible to make all the slums ODF. Strategies adopted include not providing further subsidy for toilet construction, providing technical support to slum dwellers on low- cost sanitary toilets, increasing awareness regarding the ill-effects of open defecation, motivating and mobilising communities through participatory methods, using PRA tools and incentives for community leaders, and awards for clean ward/slum/area/school/class etc.

Key Features

The CLTS programme is community-led and not dependent on external support. It results in sustained behaviour change and builds self-respect, dignity and self-confidence, especially in women. People are encouraged to build toilets with their own resources, creating ownership and sustained usage. Unlike free toilets, which are poorly maintained and even abandoned, people are interested in maintaining these. Proper triggering, facilitation, interaction, motivation and incentives are necessary initially. There is great potential for replication. Once people realize the need for a behavioural change to maintain sanitation, and its direct bearing on health, they do it willingly. The CLTS programme methodology makes people realize the need.

Impact

Kalyani was declared open-defecation free by th estate of West Bengal on 29 Jan 2009. It got a c ash prize of Rs.25 lakhs to expand and continue its health programme on "Correction Of Anaemia" which is directly related to open defecation. As a first ODF town in India, Kalyani is much cleaner. Its slums have benefited not only from sanitation, but also from other developmental works. This is because ODF slums are given priority for all ULB development works. There is the visible impact of the urban poor recognizing that health is linked to sanitation. Records of the health department show a considerable decrease in gastro-intestinal disorders, and an increased number of man-days. Demand has been generated for more pay-and-use public toilets in Kalyani.

http://www.waterawards.in/2009-winner-profile-km.php

ANNEXURE17: DECENTRALIZED WASTE WATER MANAGEMENT PAPER – AN OVERVIEW OF COMMUNITY INITIATIVES

Er. Ajit Seshadri, Head- Environment , The Vigyan Vijay Foundation, New Delhi

Abstract:

This paper demonstrates that the use of decentralized systems such as DEWATS (Decentralized Wastewater Treatment Systems) approach to wastewater treatment have had more success and there is a need to make wastewater treatment people-centric and effective through the "waste to resource"-approach. The paper explores a few initiatives implemented which uses natural methods DEWATS for use in Sewage Treatment Plants (STPs) with household, urban and rural effluents. Such decentralized initiatives succeeded after broad issues of funding were taken into consideration. There is a need for capacity building of community institutions and participation by rural bodies in order to become aware, scale up and improvise these innovative approaches in the future at rural centers .

Key words: DEWATS systems, "waste to resource", bio-remediation.

Introduction:

Decentralized Wastewater Treatment Systems (DEWATS) is rather a technical approach than merely a technology package. Generically, DEWATS are locally organized and people-driven systems that typically consist of a settler, anaerobic baffled septic tank , filter bed of gravel, sand, plantation-beds and a pond (Fig. 1) . The open pond or the polishing tank stores the remedied water and keeps it available for re-use.

The system operates without mechanical means and sewage flows by gravity through the different components of the system. Up to 1,000 cubic metre of domestic and non-toxic industrial sewage can be treated by this system (Tency Baetens, 2004). DEWATS applications are based on the principle of low-maintenance since most important parts of the system work without electrical energy inputs and cannot be switched off intentionally (BORDA).

DEWATS applications provide state-of-the-art-technology at affordable prices because all of the materials used for construction are locally available. DEWATS approach is an effective, efficient and affordable wastewater treatment solution for not only small and medium sized enterprises (SME) but also for the un-served (rural and urban) households in developing countries, especially South Asia. For instance, DEWATS can operate in individual households, at the neighborhood level and even in small and big factories not connected to sewage lines. DEWATS can also treat municipal waste. The recycled water is used for irrigation or for growing plants and is absolutely safe for human use. In certain urban areas the processed water is taken for use as flush- water in toilets.

The need for decentralized initiatives in wastewater treatment:

In India, many rural and urban households do not have access to latrines and defecate in the open. Some households use community latrines and others use shared latrines. But still a large number of households do not have access to a drainage network and are connected to natural surface drains. The assessment of open- defecation takes a different dimension which is not discussed in this paper.

Thus it is evident that a large amount of human excreta generated is unsafely disposed. This imposes significant effect on public health, working- man days and environmental costs resulting in loss in National revenues. Impacts of poor sanitation are especially significant for the rural and urban poor, women, children and the elderly. Inadequate and un-safe discharge of untreated domestic/ municipal wastewater has resulted in contamination of 75 % of all surface water i.e at the rivers, ponds and lakes across India.

The Millennium Development Goals (MDGs) enjoin upon the signatory nations to extend access to improved sanitation to at least half the population by 2015, and 100% access by 2025. This calls for providing improved sanitation, and with facilities in public places at both rural and urban habitats also make the spaces free of open-defecation.

The quantity of wastewater is increasing in Rural- India because of the reasons as below:

i) Rapid mechanization with the use of piped water supply , continuously widening the gap between waste water generation and its process and treatment;

ii) Rural electrification is on the rise and with semi-urbanization of rural households.

(iii) Inadequate financial resources and capacity for infrastructure required for treating wastewater through a centralized approach.

Specifically in India, domestic wastewater, including sewage that is often not even collected, is a major source of pollution of surface water. This contributes to contamination of groundwater which is an important or only source of drinking water for many rural and peri-urban areas. In addition, the economies of scale required for using conventional technologies would not be achieved in all settlements for various reasons, including: i) different climatic conditions; ii) topography; iii) geological conditions and water tables; iv) levels of livelihood ; and v) population densities and size of settlements.

In selected locations, small-scale decentralized plants are also found frequently at community level. Numerous initiatives have been developed, in particular, as a result of the unbearable and poor waste-water treatment. Such initiatives have been taken up at small- city level similar to rural conditions and have yielded satisfactory results. The waste water processed is considered for reuse for local landscaping and also for irrigating agricultural fields.

Appropriate Wastewater Treatment Technologies in India:

A single wastewater treatment technology would be inappropriate for a country like India which has several different geographical and geological regions, varied climatic conditions and levels of population. It is more appropriate to address the potential of identifying appropriate solutions for different regions. In addition, the solutions for wastewater treatment are a response to several factors including: i) the volume of wastewater; ii) type of pollutants; iii) the treatment cost; iv) extent of water scarcity, and v) dilution of pollution in the water resources.

The five main wastewater treatment technologies that are commonly used are as given below: i) waste stabilization ponds; ii) wastewater storage and treatment reservoirs; iii) constructed wetlands; iv) chemically enhanced primary treatment; and v) up flow anaerobic sludge blanket reactors. These are suitable for different conditions and have advantages and disadvantages, especially in terms of requirements for land, cost, remediation efficiency and other factors.

All these solutions for wastewater treatment aim at innovations across a broad range of environmental issues including: i) reuse of wastewater; ii) removal of nutrients from effluent; iii) management of storm water; iv) managing solid wastes; v) flood mitigation; and vi) tackling erosion around water bodies, including ponds, lakes and riverbank.

However, from the sustainability aspect, the selection of the appropriate solution must be balanced between simple systems that do not require use of chemicals and those that have high pathogen removal. Motivating the community as a whole to work towards effective functioning of a local system is one of the critical prerequisite for DEWATS to succeed.

Approaches to DEWATS- Systems and adaptations by Vigyan Vijay:

Details of 9 DEWATS–Systems considered in the case-study ranging in capacities 300 Litres per day to 60,000 (60 Kl) Litres per day are given with the project details as below:

(Name, location, project type, design flow, process, inflow sourced, quality, quantity, outflow, use of remedied water - area of irrigated land, other purposes Etc.)

1. MCD Nursery, Vasant Vihar, Delhi : WWT 50 KLD, Anaerobic, aerobic with bio-remediation, Inflow at 50 KL & 350 BOD, producing 45 KL Re-use water & 30 BOD, for 25,000 Sq.m - greens

2. Centre for Science & Environment, Institution : WWT 10 KLD, Anaerobic, aerobic bio-phyto-remediation, 10 KL / 300 BOD, out 8 KL / 20 BOD, 1,500 Sq.m – greens, flush water for toilets

3. IIT-Delhi : WWT 10 KLD, anaerobic with bio-phyto-remediation, 10 KL / 200 BOD, 8 KL / 20 BOD, 3,000 Sq.m – greens and water for floor cleaning at canteen- mess and research purposes.

4. Scindia School, Gwalior: WWT 15 KLD, anaerobic with bio-phyto-remediation, Inflow 15 KL / 300 BOD, 12KLD / 20 BOD, 2,000 Sq.m – greens and flush water for toilets and cleaning of floors.

5. Residential Home, Sec-54 , Gurgaon : WWT 300 LPD, anaerobic with bio-phyto-remediation, Grey water Inflow 300 Lit per day / 200 BOD, outflow 250 Lit per day / 30 BOD irrigating 80 Sq.m house garden, spray- fountains, rock-garden, lily-pond Etc.

6. Mehtab Bagh off Taj Mahal , Agra : WWT 60 KLD, anaerobic with bio-phyto-remediation, Inflow 60 KL / 200 BOD, 55KLD / 30 BOD, irrigating 30,000 Sq.m – agriculture , vegetable farms,

7. Annamaye Ashram, Kasauni : WWT 60 KLD, anaerobic , bio-phyto-remediation, Inflow 60 KL/ 300 BOD, 50KLD / 30 BOD, irrigating 30,000 Sq.m – agriculture farms, development of pond.

8. Regency Park, High-rise flats, Residential complex, Gurgaon : WWT 15 KLD, anaerobic with bio-phyto-remediation, In 15 KL / 300 BOD, 13KLD / 30 BOD, irrigating 5,000 Sq.m – Horti-culture

9. 3-star Hill Resort, RamNagar- Nainital cottage homes : GWT 3 KLD, anaerobic with bio-phyto-remediation, In 3 KL / 300 BOD, 2.5 KLD / 30 BOD, irrigating 1,000 Sq.m – Horti-culture, pool.

Waste Water Treatment Plant- Vasant Vihar Drain, New Delhi.

The Vasant Vihar plant treats waste water to a standard sufficient for landscaping. This plant was set up in coordination with the Residential Welfare Association and the Municipal Corporation of Delhi (MCD). The plant has a 50 KLD (Kilo-litre per day) capacity with 90-95% remediation efficiency and the water supplied meets the desired municipal standards and is supplied to 5-6 acres (25,000 sq. m.) of parks and green-belt.

The driver of this innovative venture was the need to build a cost-effective plant which would help to reduce the flow of polluted waste water into the Yamuna and also to supply water for irrigating landscapes. Technical specifications of the plant are as below: Project Concept: Colony waste water sourced for bio-remediation. Processed water used in parks and lawns easing shortage situation with environmental benefits.

Project Design:

Waste water inflow quantity: 50 KL per day

General parameters quality at in-flow: 300 ppm

Processed water available for re-use: 45 KL per day General parameters at out-flow: <30 ppm

Project Data:

Cost of all elements (mid 2003): Rs. 8.0 lakh

Process used - simple technology: DEWATS, anaerobic, part aerobic filters, settlers Prospects feasible: Both for smaller and larger flows at local-level, the concept of "constructed wetlands" can be applied both for rural habitats and for large flows at polluted river flows Etc..

Decentralized Approach for Rural and Urban Services:

The basic philosophy behind these community based initiatives is conversion of waste into resource (as far as possible), by reusing or recycling, and rendering this philosophy practically possible by using less-costly methodology. While a normal STP requires large amounts of power, chemicals, and has a high-cost element, waste-water treatment (to make it up to the mark for landscaping or agriculture), is a cost-effective and sustainable initiative.

The Foundation believes that decentralized initiatives promise easy maintenance, low cost and efficiency and have proven to be successful if the community shows interest and participates actively. Even in instances when the power supply fails, these natural treatment plants continue to work. The concepts/methodology used in these initiatives using principles and practices of bio-remediation are sustainable and do not fail.

The initiatives developed and implemented by the Foundation are quite cost effective and yield benefits such as: i) reduced use of manure; ii) reduced use of fresh surface water and drawing of ground water; iii) reduced load on ground water, hence low cost of infrastructure; iv) reduced pollution of rivers; v) re-charge of rain-water effluents when clean water flows in urban drains; vi) production of biogas and manure; vii) lower emissions and GHGs abatement.

Other initiatives done by The Vigyan Vijay Foundation using Decentralised Approach for Rural and Urban Services are given in brief as below :

Rain- Storm water management:

At certain sites old dug wells have been deployed for rain-harvesting for recharging of groundwater. These old village dug-wells are dried up due to depletion of ground-water tables. They have proven to be very useful in conveying rain water to ground water regimes. This is especially true for institutions located at low-lying areas where rain-water harvesting has been very useful in avoiding flooding Etc.

Pond- cleanup with remediation:

This has also been done for enhancing rain-water conveyance and effluent streams from village homes/ habitat are remedied using DEWATS before its entry into the village pond at the down-stream. For instance, certain institutional campuses are adopting water-initiatives under the guidance of The Foundation, such as the TATA Chemicals Township, Babrala, UP, Anand Group of Companies , Gurgaon. Etc.

Solid waste management: Several interventions have been initiated and all waste is handled and safely disposed off. Bio-wastes are composted to make manure while non bio-wastes are led on the re-cycling mode. Also has experience in kitchen- waste from a girl's hostel is led for feeding in biogas plant. This yields biogas for energy and compost-manure as bio-fertilizer.

Ecological sanitation: Eco-San approaches have been practiced, in association with IIT- Delhi on development and implementation of water-less urinals, and urine used as manure.

Conclusion:

Given the overall sanitation situation in India, there is a need to promote decentralized initiatives in waste water treatment by providing incentives and a supporting policy environment and through capacity building of implementing institutions and stake holders.

Further, there is a need to support implementation of pilots and projects which demonstrate not only the decentralized and low-cost treatment of wastewater, but also demonstrate how communities and local administration can partner to implement the interventions in ways that make the facilities more durable and sustainable in the long run.

Decentralized and low-cost options are commonly viewed as solutions for the poor and / or for underdeveloped areas, raising of the profile of low-cost options and alternative technologies as well as of making it 'fashionable' to minimize waste going out of the habitats at micro-level and also at a macro-level at village precincts etc., can go a long way in changing people's mindsets towards waste- minimization and up-gradation of the environment. (A. Dzikus, 2009).

More specifically, there is a need for exchange of information and innovations amongst rural and urban bodies and technical support for introducing alternative technologies and processes. Intensive capacity building programs, appropriate IEC materials, technical manuals and documentation, and sharing of best practices amongst facilitators are required urgently so that practices such as DEWATS can provide solution to the many sanitation crisis that are unfolding.

Finally, concept – "DEWATS" presents an opportunity to change the mind-set in the waste management sector away from "flush and forget" systems to recycling in the form of "waste to resource" systems thus aspiring to conserve and optimize all natural resources such as water.

Acknowledgement:

The data on design and DEWATS methods sourced from the project experiences in decentralized initiatives of The Vigyan Vijay Foundation is gratefully acknowledged.

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ANNEXURE 18: SEPTAGE MANAGEMENT

De-sludging of Septic Tanks :

In Indian cities, most of the septic tanks are de-sludged manually. The Government of India has enacted the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993. This Act serves as a primary instrument to eradicate practice of manual scavenging. The definition of manual scavenging as per the Act, 1993 does not specifically cover manual cleaning of septic tanks and sewers cleaning, though as outlined above, this is clearly implied. The most satisfactory method of sludge removal is by vacuum tankers. Periodical de-sludging also helps reduce the pollution levels in the liquid effluent, which normally enters waterways untreated. However, a small amount of sludge should be left in the tank to ensure that a minimum level of the necessary microorganisms responsible for anaerobic digestion remain in the tank. Normally, the vacuum/suction hose sucks up to a point where 1 to 2 inches (about 2.5 to 5 cm) of sludge remains at the tank bottom to facilitate future decomposition The gas generated due to anaerobic digestion might escape when tank is open for de-sludging. Hence, it is highly advisable to avoid using fire (or any incendiary material) in these cases. The sludge after removal should be transported in a controlled manner to avoid leakage or spillage en-route.

Treatment of Septage at Sewage Treatment Plants :

Co-treatment of septage along with domestic sewage at a sewage treatment plant (STP), if available, is the most desirable option. Though septage is more concentrated in its strength than domestic sewage, its constituents are similar to municipal wastewater. The sewage treatment plants should have adequate capacity to accept the septage without hampering the functioning of the sewage treatment plant. The municipality should monitor the incoming wastewater load to the STP and accept the septage, if the design norms are not violated with the increased load (on account of the septage). If the STPs are working close to the design capacity, additional loads due to disposal of septage will necessitate expansion or up-gradation of the.

The main factors in treating septage in a sewage treatment plant are:

Septage addition at the nearest sewer manhole- Septage could be added to a sewer upstream of the sewage treatment plant, and substantial dilution of septage occurs prior to it reaching the sewage treatment plant, depending on the volume of sewage flowing in the sewer.

Septage addition at the STP- Septage could be added to sewage immediately upstream of the screening and grit removal processes.

Septage addition to sludge digesters/sludge drying beds- Septage could be processed with the sludge processing units of STP.

If septage is to be co-treated with sewage, it will be necessary to construct a septage receiving station. Such a station will consist of an unloading area (sloped to allow gravity draining of septage hauling trucks), a septage storage tank, and one or more grinder pumps. The storage tank is used to store the septage so that it can be discharged to the treatment plant. The septage in storage tank should be properly mixed by mixers, air diffusers for odor control. Discharge of septage at the upstream is preferable for the removal of grit and screenings. If there are no screening facilities ahead of the septage discharge facility, the septage should be transferred from the storage tank to the treatment plant with

grinder pumps. In some cases, this transfer can be accomplished by gravity flow. If the septage is strong, it can be diluted with treated sewage. Chemicals such as lime or chlorine can also be added to the septage in the storage tank to neutralize it, to render it more treatable, or to reduce odors.

Advantages and disadvantages of septage treatment at sewage treatment plant

Method	Description	Advantages	Disadvantages
Treatment at STPs	Septage is added to the pumping station, upstream manhole or sludge treatment location for co-treatment with sewage sludge. Septage volumes that can be accommodated depends on plant capacity and types of unit processes employed.	Most STPs in India are underutilized and will have the capacity to to handle additional septage. As skilled perosnnel and laboratory facilities are available in STPs, it is easy to operate and maintain.	STP performance may be hampered by addition of septage if the STP is running at full capacity. Need to be especially concerned with the increased BOD and NH4-N load. Increased girt and sludge treatment cost (on account of increased volume of septage)

Treatment at Independent Septage Treatment Plants

General Aspect and Treatment Process

When an STP does not exist for a city, or the distance or the capacity of the available plant becomes a limiting factor, it is not a feasible option to transport and treat the septage at the sewage treatment facilities. Hence, a treatment plant specially meant for septage treatment becomes the option to consider. Independent septage treatment plants are designed specifically for septage treatment and usually have separate unit processes to handle both the liquid and solid portions of septage. These include:

Lime stabilization – Odour control, conditioning and stabilization of the sludge.

Dewatering – sludge drying beds or mechanical dewatering

Anaerobic / aerobic wastewater treatment – liquid from the sludge drying beds and mechanical dewatering systems

Co-composting with organic solid waste.

The choice of mechanical dewatering or sludge-drying beds would be dependent on the land availability, with mechanical dewatering systems being preferred where land is scarce and sludge drying beds being adopted where land availability is not a constraint. The benefit of using these treatment plants is that they could provide a regional solution to septage management. Many septage treatment plants use lime to provide both conditioning and stabilization before the septage is de-watered, and this de-watered sludge can be used as organic fertilizer after drying and composting. Additionally, lime stabilization also helps to reduce / minimize odour. The common practice is to add lime to raise the pH to 12 and hold it for a period of 30 minutes. The filtrate from the dewatering units needs to be further treated through treatment process such as waste stabilization ponds, anaerobic baffled reactor, constructed wetland or aerobic treatment systems before discharging into the environment.

However, the choice of an appropriate septage management system is dependent on land availability, hauling distance, technical requirements, availability of skilled labour, legal and regulatory requirements. The management option selected should be in conformity with local, state, and central regulations.

The following table summarizes the septage treatment options for two conditions, namely, when space is a constraint and otherwise:

Septage Treatment Options

Unit Operations			
Space not a constraint			
Conditioning and stabilization	Lime treatment	2.4 – 3.0 kg/1000 l of septage	
Dewatering	Sludge drying beds	0.09 – 0.23 m2/capita	2000/m2
Wastewater treatment (Filtrate / liquid from dewatering units)	Any one of the options below could be adopted		
	Anaerobic baffled reactor	2- 3 m2/m3 of septage	35000 – 70000 m3/septage
	Aerobic / stabilization ponds	Storage volume 2 – 3 years	
	Constructed wetland	5 – 10 m2/m3 of septage	
Space is a constraint – dewatering with mechanical dewatering system and liquid waste from dewatering units in an anaerobic baffled reactor. The other unit operations are the same.			
Dewatering	Mechanical dewatering		

Cities will need to ascertain availability of land and land costs along with preparing preliminary estimates for options for the above technical options. These preliminary estimates will be utilized at the time of conducting feasibility analysis.

Pretreatment of Septage :

Pretreatment/stabilization includes physical and or chemical treatment to decreases odours and ease in handling for further treatment.

Septage Storage Tank: To store and homogenize the collected sepatge.

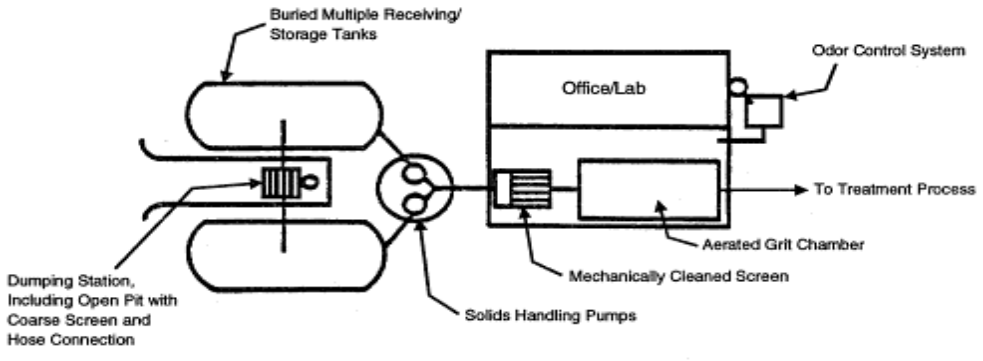
Pumps: To pump the septage from storage tank to the screens.

Mechanical/manual screens: To remove large size particles, such plastic, rag from the sepatge and protect downstream treatment facilities.

Grit channels or aerated grit chambers: To remove coarse sand and cinder from the septage to prevent abrasion of downstream mechanical equipments, such as pumps, etc. Aerated grit chambers can also help in reducing odor emissions from the septage.

Odor control System (optional): To eliminate or reduce odour through treatment either in biological or carbon adsorption system.

Pretreatment of Septage



In addition, lime stabilization is also practiced to stabilize, control odor, vector and pathogen destruction. Lime stabilization involves adding and thoroughly mixing lime (alkali) with each load of septage to ensure that the pH is raised to at least 12.

Lime addition could be done at any of these three points:

i) In the hauler truck before or while the septage is pumped,

ii) In a septage storage tank where septage is discharged from the hauler truck.

Septage Dewatering

The septage after lime dosing is pumped to screw press or any other mechanical dewatering machine Polyelectrolyte is added to improve the dewatering efficiency. The liquid residual/ /filtrate from dewatering machine needs to be further treated before disposal. The dewatered sludge needs to be dried or composted prior to reuse as soil conditioner / organic fertilizer.

Instead of Screw Press the other options can be:

Centrifuge

Belt Press

Filter Press

Many companies are manufacturing sludge dewatering machines.

Advantages and Disadvantages at Independent Septage Treatment Plant

Method	Description	Advantages	Disadvantages
Treatment at independent septage treatment plants	A facility is constructed solely for the treatment of septage. Treatment generates residuals, i.e., de-watered sludge which must be dried and composted (de-watered sludge) and filtrate which must be properly treated (filtrate) prior to being disposed off.	Provides regional solutions to sepatge management. Also makes available organic fertilizer.	High capital and operation and maintenance cost (compared to co-treatment at a sewage treatment plant). Requires high skilled manpower for the operation of of mechanical de-watering machines.

Composting of Dewatered Septage or Sludge

Another feasible option is composting where bulking agents are easily available. The humus is produced after composting which can be used as a soil conditioner.

Composting is another popular method of treating septage. Compost is defined as "**the stabilization of organic material through the process of aerobic, thermophilic decomposition.**" During the composting process organic material undergoes biological degradation to a stable end product. Approximately 20 percent to 30 percent of the organic solids are converted to carbon dioxide and water. As the organic material in the septage decomposes, the compost heats to temperatures in the range of 50 to 70 degrees Centigrade and harmful pathogens are destroyed. The resulting humus-like material is suitable as a soil conditioner and source of nitrogen and phosphorus. Septage can be composted directly. The basic procedure for composting is as follows:

Septage is mixed with a bulking agent (e.g. wood chips, sawdust) to decrease moisture content of the mixture, increase porosity, and assure aerobic conditions during composting.

The mixture is aerated either by the addition of air ("aerated static pile") or by mechanical turning ("agitated") for about 28 days.

The most common "agitated" method is windrow composting: the mixture of septage or wastewater solids and bulking agent is pushed into long parallel rows called "windrows", about 1 to 2 meters high and about 2 to 4.5 meters at the base. The cross-section is either trapezoidal or triangular. Several times a week the mixture is turned over. Although specialized equipment has been developed for windrow composting, it is possible to use a front-end loader to move, push, stack, and turn the mixture. Factors affecting the composting process (US EPA 1984) include moisture content (40 percent to 60 percent); oxygen (5 percent to 15 percent); temperature (must reach 55 to 65 oC); pH (6 to 9); and carbon-to-nitrogen ratio (30 to 1) and are detailed in the Table 5 below:

Operational parameters for de-watered septage composting

Parameter	Optimum range	Control mechanisms
Moisture content of compost mixture	40-60%	Dewatering of septage to 10 to 20% solids followed by addition of bulking material (amendments such as sawdust and woodchips), 3:1 by volume amendment: dewatered septage.
Oxygen	5-15%	Periodic turning (windrow), forced aeration (static pile), mechanical agitation with compressed air (mechanical).
Temperature (compost must reach)	55-65 oC	Natural result of biological activity in piles. Too much aeration will reduce temperature.
pH	5-8	Septage is generally within this pH range, adjustments not normally necessary.
Carbon/nitrogen ratio	20:1 to 30:1	Addition of bulking material.

For effective operations there should be sufficient laboratory equipment to monitor these parameters during the compost process. Moisture can be added and turning can be increased based on monitoring results. The operator should measure temperature at least once per day by placing a thermometer into the mixture at various locations. Maintaining temperature of 50 to 60 oC for the compost period assures destruction of pathogens. Co-composting septage or wastewater solids with the organic fraction of municipal solid waste (MSW) is possible. The organic fraction includes food wastes, paper, and yard-wastes (e.g. leaves, branches, shrubbery, etc. cut or removed during landscaping). The MSW serves as the bulking agent.

Compost from septage or wastewater solids can be used as a soil amendment to reclaim land or used in landscaping or horticulture. Agricultural use or use that may include human contact (e.g. at parks or playgrounds) requires detailed laboratory analysis to confirm concentrations of pathogens and heavy metals are within safe limits. In order to produce treated septage of suitable quality for soil amendments, limiting septage collection to residential housing is required.

Source:

This document on septage management in urban India providing the strategies and guidelines for the national level septage management is prepared by Ministry of Urban Development, Government of India (MoUD, GoI) in collaboration with Water and Sanitation Program (WSP), Central Public Health and Environmental Engineering Organisation (CPHEEO) and Center for Science and Environment (CSE). Full document can be accessed on following link:

http://indiasanitationportal.org/2980

ANNEXURE 19: GLOSSARY OF TERMINOLOGIES

1. **Activated sludge:** An aerobic treatment process in which oxygen and micro-organism concentrations in wastewater are artificially elevated to facilitate rapid digestion of biodegradable organic matter.
2. **Aerated pond or lagoon:** A natural or artificial wastewater treatment pond in which mechanical or diffused air aeration is used to supplement the natural re oxygenation processes.
3. **Aerobic treatment:** Treatment of wastewater with the help of micro-organisms that rely on oxygen.
4. **Anaerobic digestion:** Decomposition of organic material by anaerobic bacteria in the absence of air.
5. **Anaerobic lagoon**: A system for treatment of high-strength wastewater and sludge that involves retention under anaerobic conditions.
6. **Biochemical oxygen demand**: A measure of the organic pollutant strength of wastewater.
7. **Bio solids**: See Sewage sludge.
8. **Black water:** Wastewater discharge from toilets.
9. **Bucket latrine:** A traditional but unhygienic form of sanitation in which faeces is deposited into a bucket which is collected regularly (usually at night) and taken away (usually by 'sweepers').
10. **Composting latrine:** A latrine designed to receive both faeces and waste vegetable matter with the aim of reducing moisture content and achieving a carbon-to-nitrogen ratio that promotes rapid that promotes rapid decomposition.
11. **Dry latrines:** All forms of latrines that do not require water for flushing.
12. **Desludging:** Removal of sludge or settled solid matter from treatment tanks such as septic/Imhoff tank, interceptor tank or sedimentation tanks.
13. **Disposal:** Discharge, deposition or dumping of any liquid or solid waste onto land or water so that it may enter the environment.
14. **Domestic sewage:** All forms of wastewater derived from residential properties, as well as black water and grey water from commercial and institutions buildings.
15. **Dry sanitation:** Disposal of human excreta without the use of water for flushing or anal cleansing.
16. **Ecological sanitation (ecosan):** A form of dry sanitation that involves separation of faeces and urine in order to facilitate recycling of nutrients in local agricultural systems.
17. **Effluent:** Any form of wastewater or liquid waste that flows from an operation or activity.
18. **Excreta:** Faeces and urine.
19. **Faecal sludge:** The undigested sludge that is collected from pit latrines and leach pits.

20. **Grey water (also known as sullage):** Wastewater produced by washing and bathing activities.
21. **Lagoon:** See technology data sheet on 'Wastewater and Faecal Sludge Treatment: Waste Stabilization Ponds'.
22. **Leach field:** A trench filled with sand, soil, gravel and brickbats for disposal of septic tank overflow into the surrounding soil.
23. **Leach pit** (sometimes known as a cesspit): An underground tank that is used where there is no sewer and household wastewaters are drained into them to permit leaching of the liquid into the surrounding soil.
24. **Night soil:** Human excreta, with or without anal cleansing material, which are deposited into a bucket or other receptacle for manual removal.
25. **On-plot sanitation:** A sanitation system that is wholly contained within the plot occupied by a private dwelling and its immediate surroundings. Commonly, on-plot sanitation is equivalent to 'household latrine', but may also include facilities shared by several households living together on the same plot.
26. **On-plot facilities:** The components of a sanitation system located within a householder's plot.
27. **Off-site sanitation**: A system of sanitation that involves collection and transportation of waste (wastewater either by sewerage or septage/fecal sludge by vacuum truck) to a location away from the immediate locality.
28. **Pathogens:** Micro-organisms such as bacteria, viruses and protozoa that cause disease.
29. **Percolation rate:** The rate at which liquids move through soil.
30. **Pit latrine:** A form of on-plot sanitation with a pit for accumulation and decomposition of excreta from which liquid infiltrates into the surrounding soil.
31. **Pour flush toilet:** A type of latrine where a water seal trap is used to prevent smells and to reduce insects.
32. **Sanitation:** Interventions (usually construction of facilities such as latrines) that improve the management of excreta and promote sanitary (healthy) conditions.
33. **Septage:** Mixture of wastewater and sludge removed from a septic tank during cleaning operations.
34. **Septic tank:** A form of on-plot sanitation for the anaerobic treatment of sewage/black water.
35. **Sewage:** A mixture of wastewater from all urban activates from residential, commercial properties. It may also contain a component of industrial wastewater.
36. **Sewer:** A conduit, usually a pipe, which is used to collect and convey wastewater away from its point of production to its point of disposal.
37. **Sewage sludge** (sometimes referred to as bio soilds): A semisolid residue generated during the treatment of domestic sewage including both solids removed by sedimentation and biological sludge produced by biological treatment.

38. **Sewerage:** A network of interconnected sewers in an area, district or town.
39. **Soak pit/Soak away:** A pit, typically after a septic tank from where wastewater slowly seeps into the ground through perforated sides and bottom.
40. **Sullage** (also known as grey water): Wastewater from bathing, laundry, preparation of food, cooking, and other personal and domestic activates.
41. **Superstructure:** Screen or building enclosing a latrine to provide privacy and protection for users.
42. **Suction truck:** A vehicle used for mechanized sludge removal from septic tanks and lined latrine pits.
43. **Ventilated improved pit latrine (VIP):** A dry latrine system, with a dark interior and a screened vent pipe to reduce odour and fly problems.
44. **Vent pipe:** A pipe that facilitates the escape of gases and odours from a latrine or septic tank.
45. **Wastewater:** Liquid waste from households or commercial or industrial operations, along with any surface water/storm water.
46. **Wastewater treatment:** A combination of physical, chemical and biological processes to remove suspended solids, dissolved pollutants, and pathogens and render the water harmless to the environment.
47. **Water closet:** A pan, incorporating a water seal, in which excreta are deposited before being flushed away using water.
48. **Water seal:** Water held in a U-shaped pipe or hemispherical bowl connecting a pan to a pipe, channel or pit to prevent the escape of gases and insects from the sewer or pit.