Excreta Matters: Our Rivers are Sewers

Centre for Science and Environment,
New Delhi

Why are Rivers Sewers?

- Domestic Sewage
- Over-exploitation of water
- Encroachment
- Sand-mining

Urbanization

- 30% decadal growth, 2001 – 2011, in number of census towns
- Metro cities have grown larger
- Class 1 and Class 2 towns have grown
- About 3,000 new towns have emerged from rural India
- Little or no sewage treatment, most rely on septic tanks or casual disposal of liquid waste in rivers or lakes

Sewage generation

City category & population	Number of cities	Sewage generation, MLD	Installed treatment capacity, MLD (%)	Capacity gap MLD (%)
Metros	35	15,644	8,040 (51%)	7,604 (49%)
Class I cities	414**	26,164	6,047 (23%)	8605 (77%)
Class II towns	489**	2,965	200 (6.7%)	2,765 (93.3%)
Totals	938	44,774	14,287 (32%)	30,487 (68%)

Planning for **hardware**

Cities plan for treatment plants not sewerage

- Treatment plants are not simple answers
- Can build plants to treat, but there is no waste being conveyed for treatment
- Most cities do not have underground sewerage

Unsewered cities are the biggest cause of pollution
New growth cities are growing without sewers
Backlog and front-log impossible to fix
As cities fix one drain, another goes under

71-CITY SURVEY: AREA COVERED BY CLOSED DRAINS SHOWS REAL STATE OF SEWAGE COLLECTION

% of area covered	
0-10	Cuttack, Guwahati, Jabalpur, Jammu, Ranchi, Thane, Aizawl, Bathinda, Bhilwara, Siliguri, Srikakulam
10-30	Agra, Alwar, Aurangabad, Indore, Mathura, Meerut, Puducherry, Thiruvananthapuram, Dehradun, Dewas, Hubli-Dharwad, Jhansi, Kozhikode, Lucknow, Solapur, Tumkur, Udaipur, Ujjain, Dhanbad
30-50	Allahabad, Bengaluru, Bhopal, Delhi, Lucknow, Patna, Srinagar, Amritsar, Bhubaneswar, Jodhpur, Mumbai
50-70	Faridabad[2], Hyderabad, Jaipur[1], Kanpur, Kolkata, Nagpur, Gwalior, Mussoorie, Nainital, Rajkot, Vadodara, Yamunanagar
> 70	Chennai, Pune, Surat, Gurgaon[2]

[1]Claims 80% coverage in CSE survey, 65% in City Development Plan for JNNURM; [2]Faridabad and Gurgaon: only old-city within municipal limit included
Source: Anon 2011, *71-City Water-Excreta Survey, 2005-06*, Centre for Science and Environment, New Delhi

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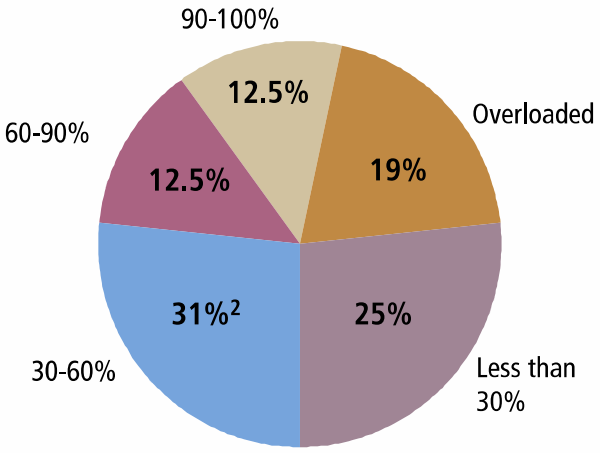
Guwahati, Jabalpur, Jammu, Ranchi, Thane, Aizawl, Bathinda, Bhilwara, Jammu, Jabalpur, Siliguri, Srikakulam

HOW DELHI USES SEWAGE TREATMENT PLANTS (2008)

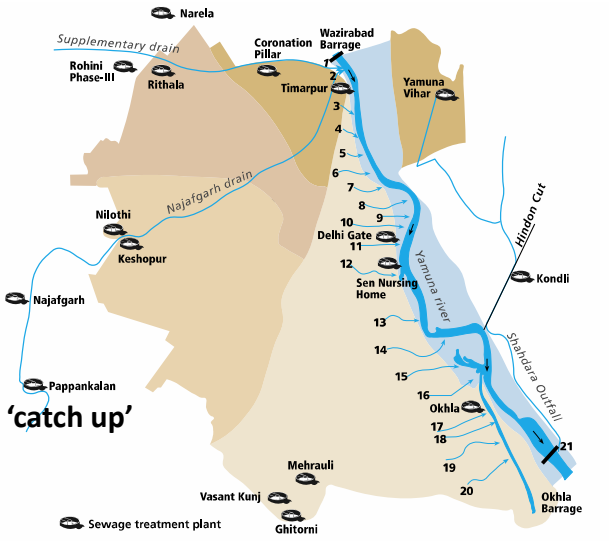


Source: Anon 2009, *Economic Survey of Delhi 2008-2009*, Planning Department, Government of NCT, Delhi

Delhi
Has 20 drains
Has 21 STPs

But Yamuna dead
Why?
Delhi keeps building to 'catch up'
Can't
Sewage reaches river
River has no water
Only sewage
To sewer all of Delhi will cost Rs 2,600 billion

MERRY-GO-ROUND III: DELHI'S ATTEMPT TO CLEAN THE YAMUNA IS THE MYTH OF SISYPHUS ACTUALISED



Source: Anon 2011, *71-City Water-Excreta Survey, 2005-06*, Centre for Science and Environment, New Delhi

Monitoring River Pollution

- Central Pollution Control Board and state boards have 2500 stations in 28 States and 6 Union Territories
- Monitoring is done on monthly or quarterly basis in surface waters and on half yearly basis in case of ground water
- Network covers 445 Rivers, 154 Lakes, 12 Tanks, 78 Ponds, 41 Creeks/Seawater, 25 Canals, 45 Drains, 10 Water Treatment Plant (Raw Water) and 807 Wells

River Pollution

Table-I: Comparative Assessment of BOD levels in Rivers

River	B.O.D. (mg/l)		River	B.O.D. (mg/l)	
	2011	2010		2011	2010
Kala Amb	535.0	1025.0	Ghaggar	68.0	70.0
Kundalika	12.0	250	Amravati (Tapi)	10.0	12.0
Hindon	50.0	278	Girna	10.0	12.0
Khan	1.3	120	Gomai	8.0	10.0
Bhavani	6.2	93.0	Wena	12.0	13.6
Mula	19.5	88.5	Gomti	10.5	12.0
Mula-Mutha	21.5	79.0	Hiwara	8.0	9.0
Mutha	23.5	68.0	Kalisot	5.4	6.4
Yamuna	41.0	84.0	Nira (Godavari)	8.5	9.2
Pawana	19.5	58.0	Kharkhla	7.5	7.8

Scarcity

How Much Water Is There?

Table 1.1 India's Water Budget

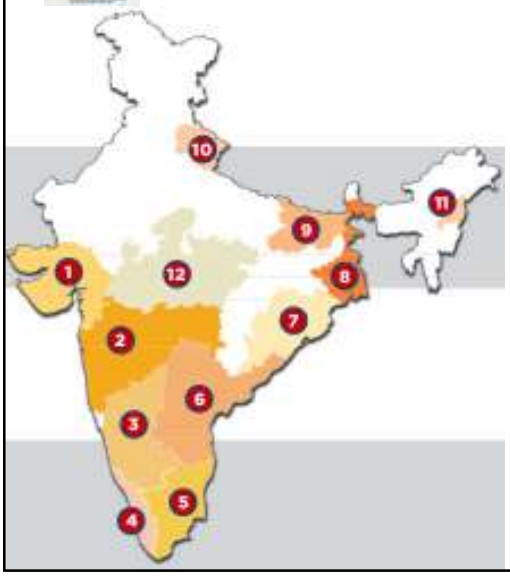
	Analysis based on Ministry of Water resources	Estimates based on worldwide comparison
	(Values in BCM)	
Annual rainfall	3840	3840
Evapotranspiration	3840−(1869+432)=1539 (40 per cent)	2500 (65 per cent) World-wide comparison
Surface runoff	1869 (48.7 per cent)	Not used in estimate
Groundwater Recharge	432 (11.3 per cent)	Not used in estimate
Available water	2301 (60 per cent)	1340 (35 per cent)
Utilizable water	1123 (48.8 per cent of 2301)	654 (48.8 per cent of 1340)
Current water use	634	634
Remarks	Current use (634) well below 1,123	Current use (634) close to 654

Source: Narsimhan, T.N. and V.K. Gaur (2009), cited in Mid Term Appraisal of 11th five year plan, 2010, pp. 443

THE FUTURE IS SALTY?

- The per capita availability in 1951: 5 ML/per capita
- Today: 1.6 ML/per capita
- Projections: 1.341 ML by 2025 and 1.140 ML 2050
- The overall water demand by 2050 will be 1447 bcm (utilizable water is 1123 bcm)
- Irrigation demand will be 1072 bcm

Sand Mining



- Sand is a minor mineral
- 2.28 MT mined in 2009-10 legally
- 62% from 15 large mines (50,000 tpa), 33% from 56 medium mines (5,000 – 50,000 tpa) and 5% from 62 small mines (>5,000 tpa)
- Illegal sand mining is rampant along all rivers especially outside the rainy season

Undermines a River

- Negative impacts of sand mining on
  - Land stability
  - Soil structure
  - River bed
  - Surface water
  - In-stream flora and fauna
  - Sand bars
  - Fishing
  - Agriculture

Encroachment

- Under the garb of urban renewal, cities are changing land use in river floodplains
- Real estate so created is being used for commercial and recreation purposes
- Floodplains are shrinking, rivers become flood-prone

Encroachment

- Sabarmati River, Ahmedabad
- Mulla-Mutha River, Pune
- Yamuna River, Delhi
- Mithi River, Mumbai

Rivers have been constricted

Reform agenda

1. Let rivers flow
2. Invest in local water systems
3. Reduce water demand
4. Spend on sewage not on water
5. Cut costs on sewage systems
6. Plan to recycle and reuse every drop

Quality, not quantity, of supply

Agenda: Improve the quality of water supply

- Assured supply
- Good quality
- Promote water-efficient appliances
- Promote **water-prudent** cities
- Promote **water-wise** societies

Plan for sewage

Agenda: **Plan for sewage before water**

- **No water scheme must be passed without sewage component**
- Costs of sewage must be designed
- Will force re-evaluation of technology to design for affordable solutions
- **Sewage must be our obsession**

Prioritise sewage

- **Do not give more water to cities unless they reduce wastage, reduce intra-city inequity, reduce demand of water**
- Do not wait for underground sewage drain, pipe, pump, treatment plant to be built, repaired, or inaugurated
- Plan for sewage treatment now
- Use open drains as treatment zones
- Use lakes and ponds as treatment zones
- Treat locally so that treated water can be used locally

Plan **deliberately** for reuse

Agenda: plan for reuse of every drop of sewage

Singapore treats waste to water

Expensive

We can treat waste for reuse in agriculture

Less expensive

Kolkata wetlands were city's kidney – flushed and cleaned waste. **But discounted**

Many other cities sewage used by farmers. But polluted. **Needs attention**

We all live downstream