



Excreta Matters: 7th Citizens' Report on the state of India's Environment

An agenda for water-prudent and
waste-wise India

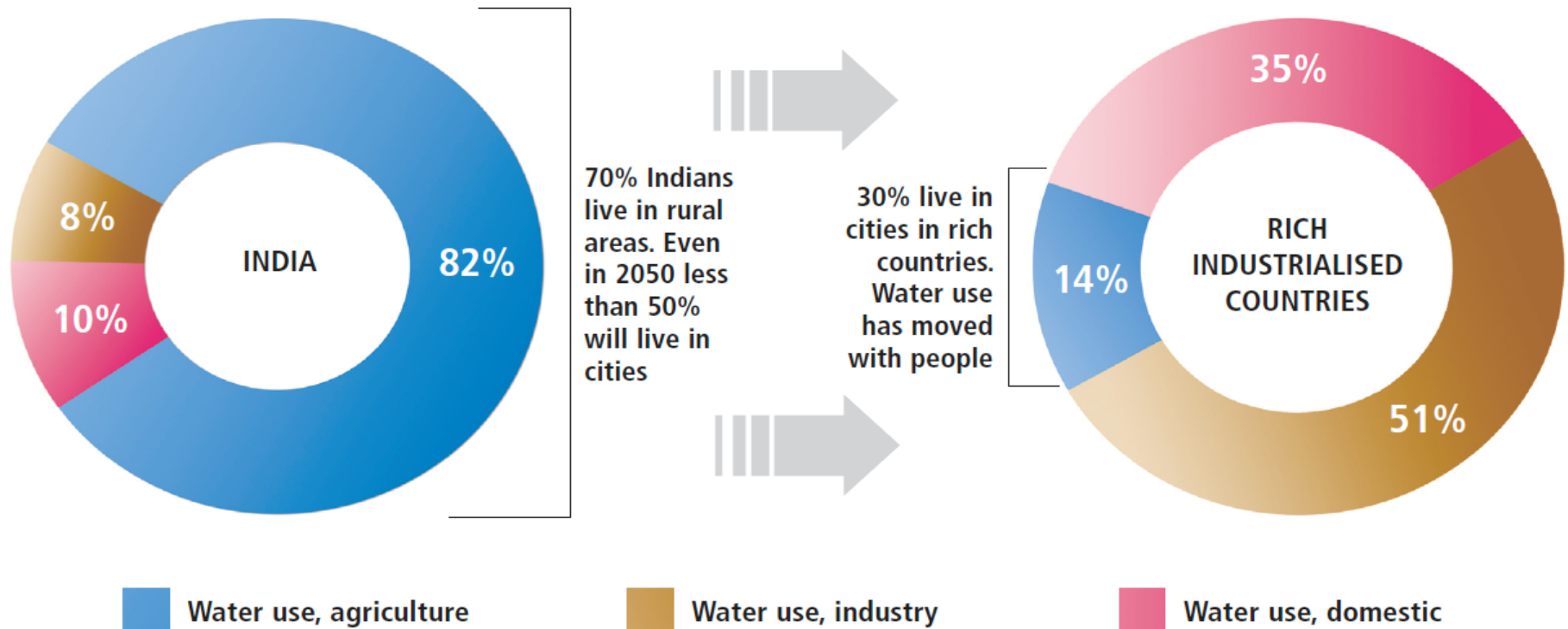


Water for growth?

Cities-industries need water for growth

WATER TRANSITION THAT WILL NOT HAPPEN

Urban-industrial growth needs water but in India, even as this sector will grow, people will continue to live in rural areas and depend on agriculture

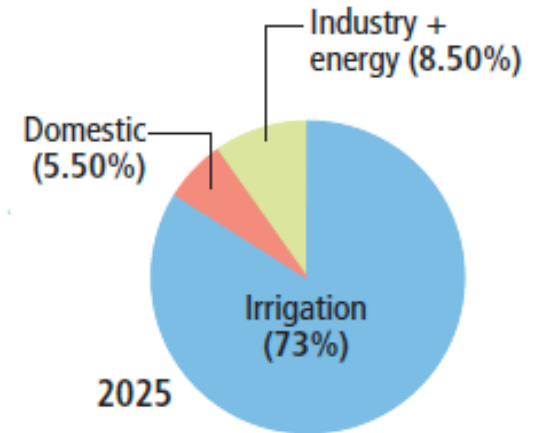
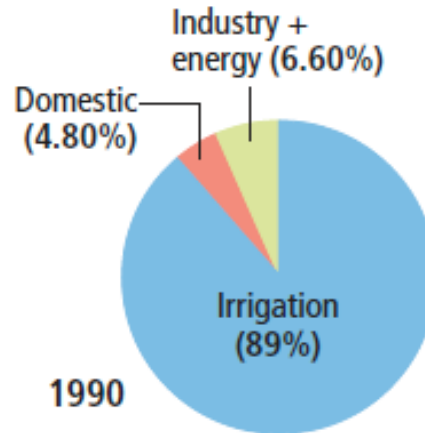




Vague old water sums

UPDATE REQUIRED: THE LAST TIME INDIA ESTIMATED ITS FUTURE WATER USE WAS IN 1999

Category	1990 (BCM)	2025 (BCM)
Irrigation	460	688
Domestic	25	52
Industry + energy	34	80
Total	519	942



BCM: billion cubic metres

Source: Anon 1999, National Commission on Integrated Water Resources Development, Ministry of Water Resources, Delhi



Recent information shows otherw

SOBERING PROJECTIONS: THE FUTURE OF SIX KEY INDUSTRIAL SECTORS (IN MLD)

Sector	Freshwater withdrawal 2008-09	Freshwater consumption 2008-09	Projected withdrawal 2020-21	Projected consumption 2020-21
Power	108,334	13,995	117,940	23,597
Paper and pulp	2,375	238	3477	483
Iron and Steel	1,860	674	4482	1,901
Fertilizer	545	273	652	379
Cement	249	249	674	674
Aluminium	441	27	1246	94
Total	113,803	15,455	128,471	27,132



Need to reinvent

- Violence will grow
- Already cases of protest and police firing over water allocation to industry or city
- **Indian cities need to become prosperous without more water**
- How is that possible?



Gurgaon's water-sewage sums

Municipal area	120 sq km			
	2007		2021	
	Official	JAFRA	Official	JAFRA
Population	0.9 m	1.8 m	3.7m	6 m
Water demand as per city agency	162 MLD	324 MLD	666 MLD	1080 MLD
Per capita demand	225 LPCD			
Sources	Yamuna, groundwater			
Surface sources	94%			
Groundwater	6%	36%		
Actual supply after loss 15%	91 MLD (107)			
Population served	58%			
Water treatment plants	3, capacity 273 MLD		Addition of 300 MLD by 2016	
Sewage generated	129.6 MLD	259.2 MLD	532.8	864
Population covered by sewage network	30%			
Sewage treatment plants	3, capacity 150 MLD		255	255
Actual treatment	137 MLD			



Water, not supplied

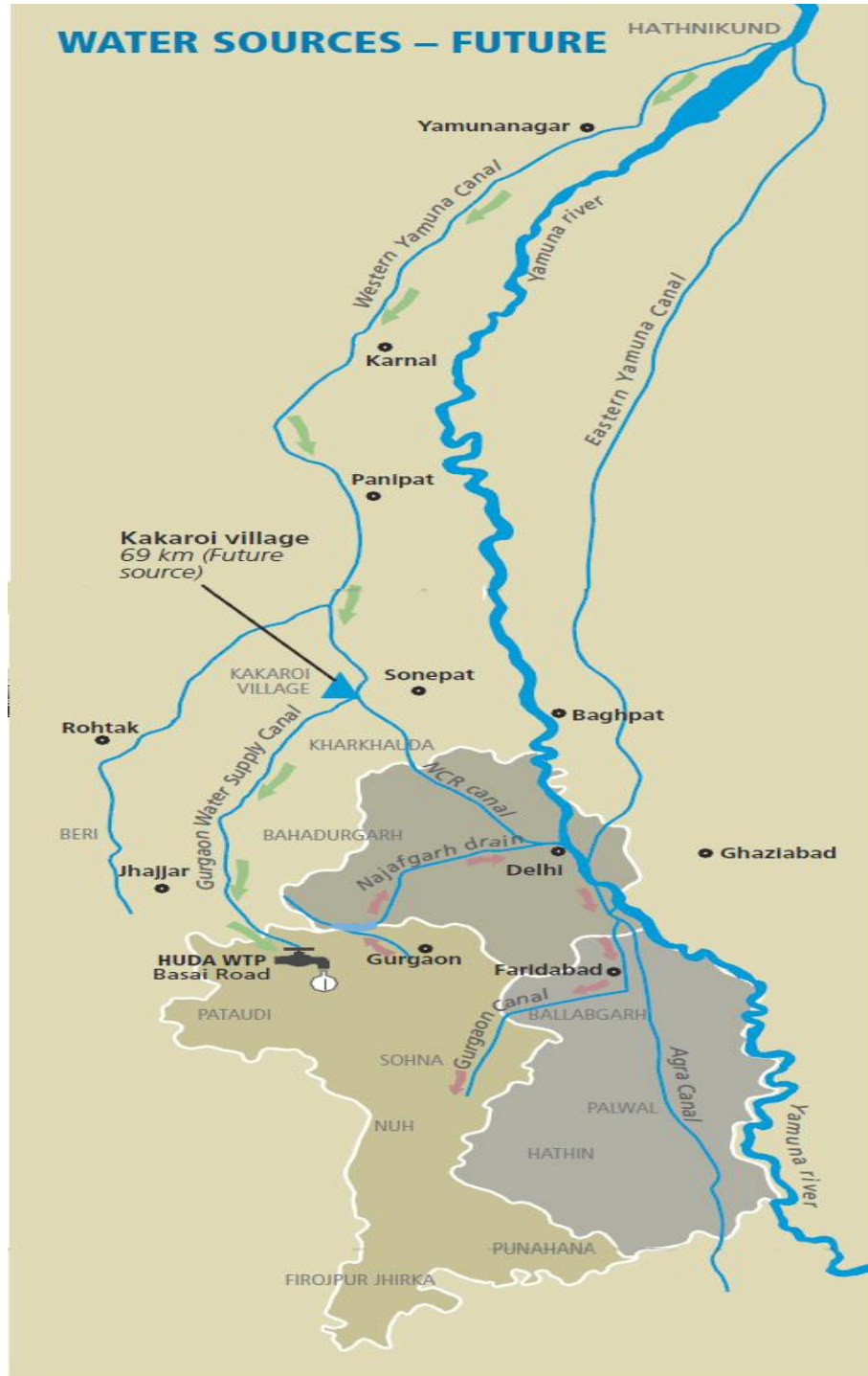
1. Water supply in cities: Planners obsessed with water, **not supply**
2. **Official estimation of Gurgaon's water needs = 1.5 X CPHEEO norms (225 LPCD VS 150 LPCD)**
 1. 42% shortfall
 2. 64% had piped water supply (2005-2006)
3. How much water is supplied to industry?
4. Where does water come from
 1. Tajewala headworks through Western Yamuna Canal
 2. Groundwater
 3. Gurgaon Canal



Securing Gurgaon's water future?

While the 300-MLD plant at Chandu Budhera is expected to double capacity, it may not be enough to meet Gurgaon's needs

Location of WTP	Capacity (MLD)	Targeted date of completion	Source of water
Basai	273	On-stream	Gurgaon water supply canal and groundwater
Chandu Budhera (new)	100	April 2012	NCR Canal (Yamuna)
	100	April 2014	
	100	April 2016	
Total augmentation	300		
Projected demand	666 MLD for a population of 3.7 m in 2021		



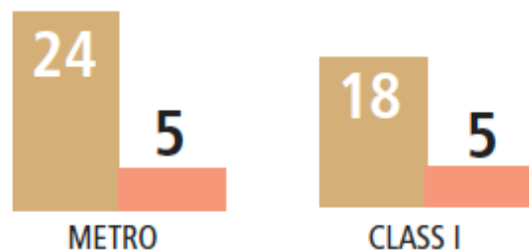
71-CITY SURVEY: HOW LEAKAGE LOSSES CREATE THE REAL SHORTFALL IN WATER ACTUALLY SUPPLIED

	Demand 2005 MLD	Supply 2005 MLD	Gap in 2005 MLD	Shortfall in supply, 2005 (%)	Leakage loss MLD	Supply after loss, 2005 (MLD)	Demand-actual supply gap, 2005 (MLD)	Shortfall in actual supply, 2005 (%)
Metro	17,987	16,591	1,396	8	6,150	10,441	7,546	42
Class I	2,879	2,775	104	4	706	2,069	811	28
Class II & III	129	123	7	6	21	101	28	22
Total	20,996	19,489	1,507	8	6,877	12,611	8,385	40

MLD: Million litres daily

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

71-CITY SURVEY: WATER THAT ACTUALLY TRICKLES DOWN TO SLUMS

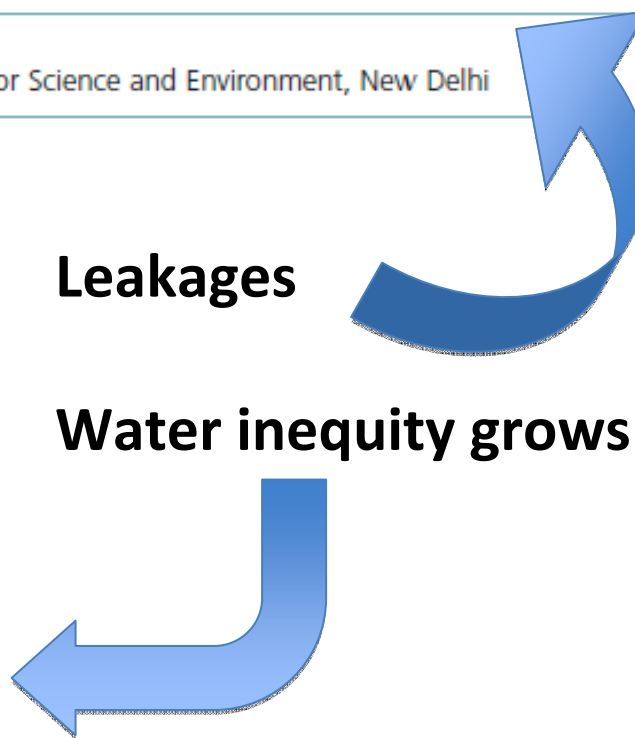


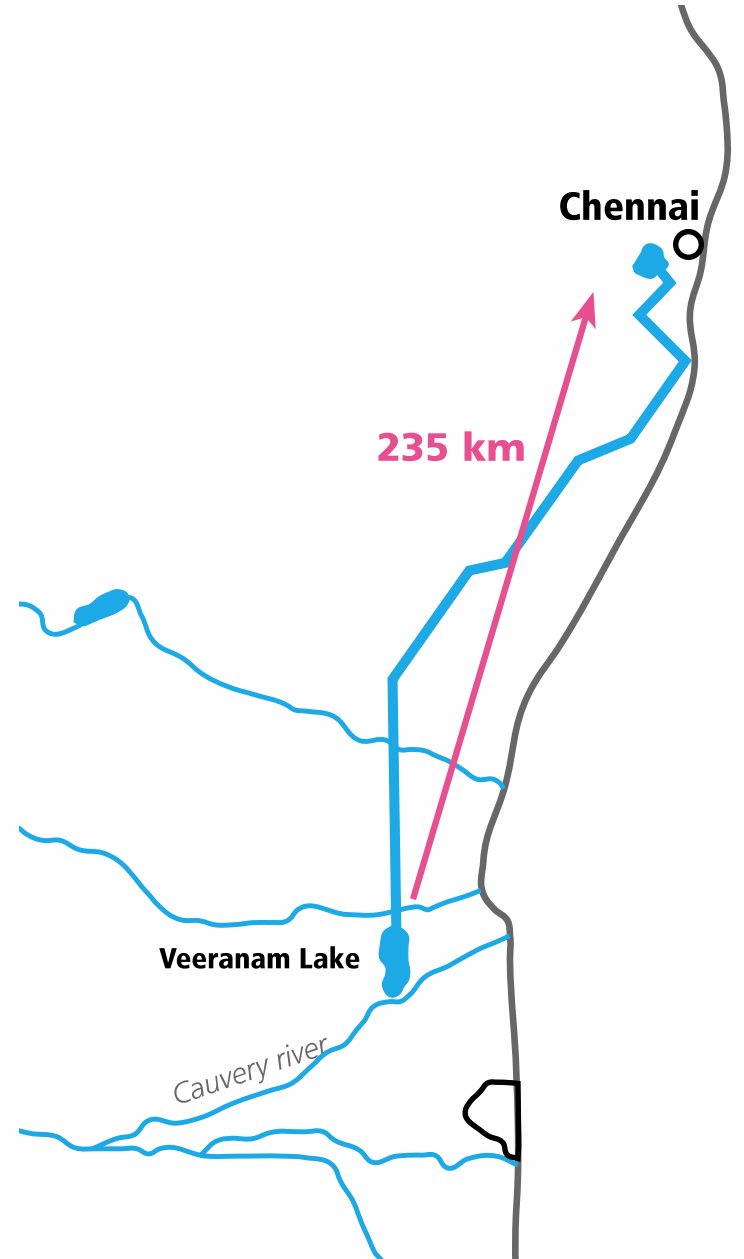
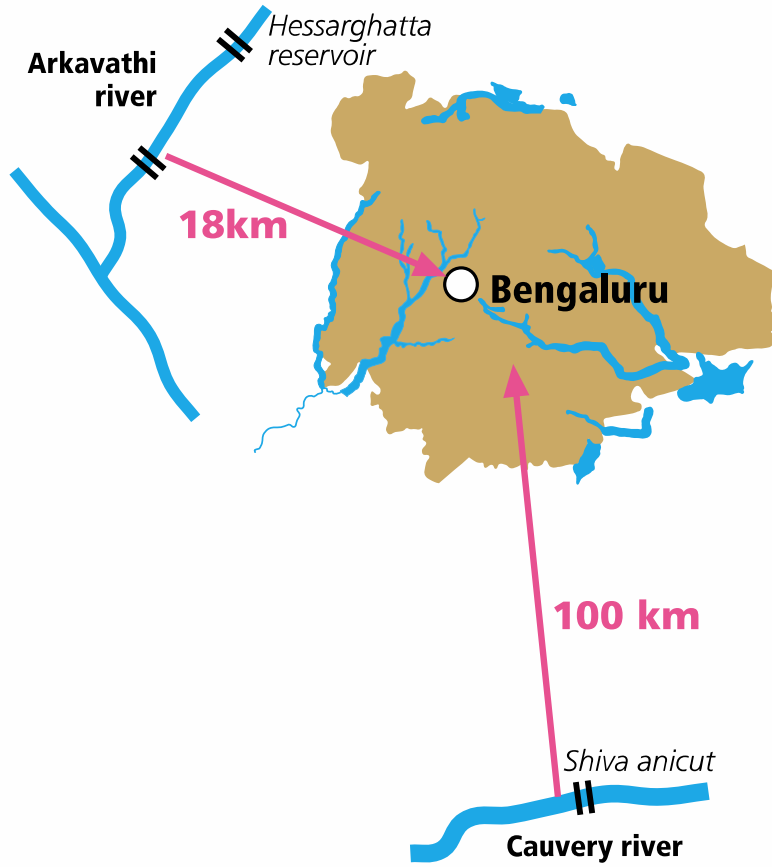
■ Population living in slum (%) ■ Supply in slum (%)

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

Leakages

Water inequity grows

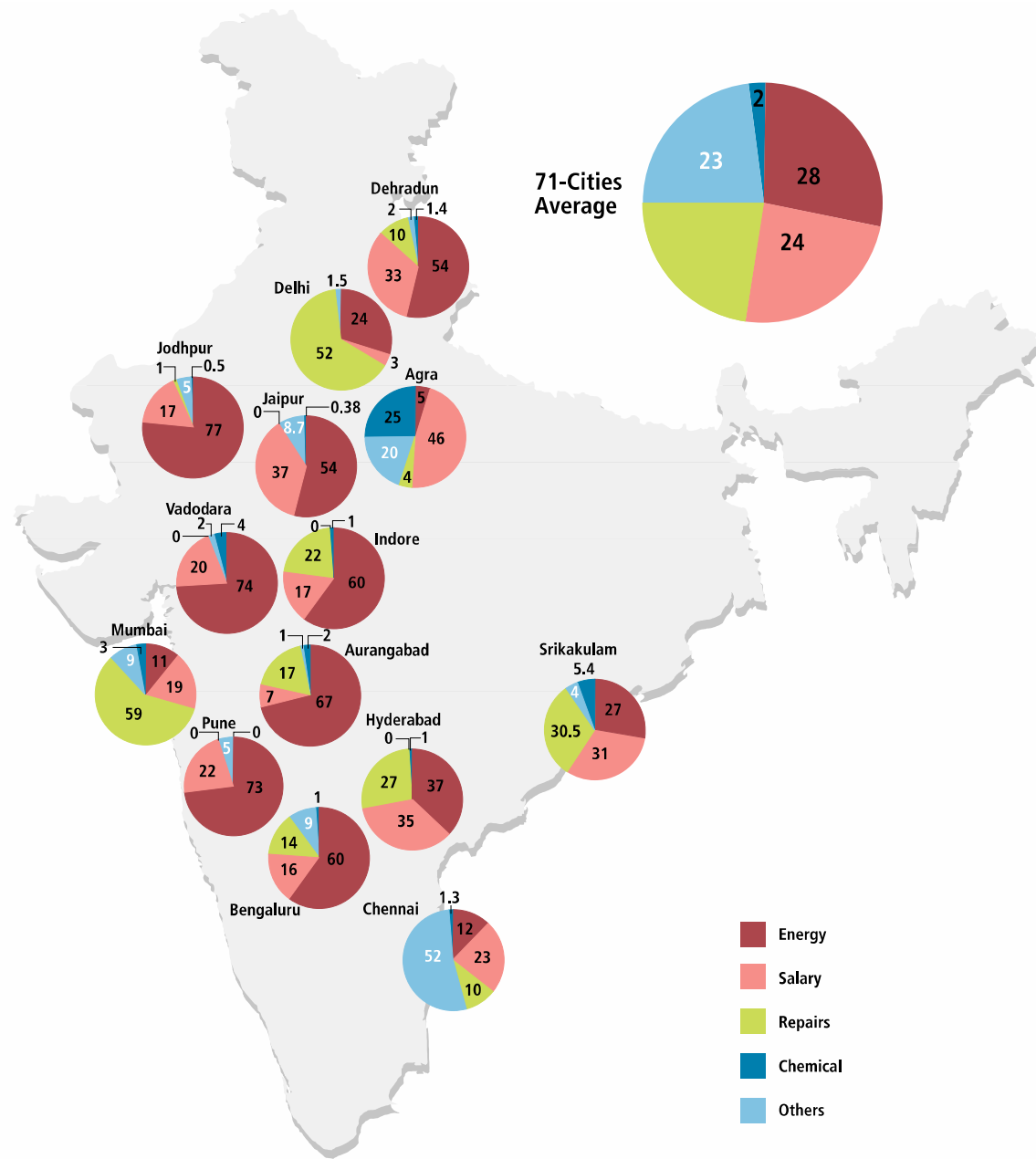






COMPONENTS OF WATER SUPPLY IN DIFFERENT CITIES (IN PER CENT)

Cost of energy is high and is a growing component of water supply



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



Groundwater: **abused**

2. Those that do not get piped water suck out groundwater

But this is not accounted for

Cities only consider 'official' groundwater use

Lakhs depend on private wells, tanker mafia, bottled water

No recognition of this water source; **no respect** for its management



Groundwater in Gurgaon

- CGWB, 2005-06: 70% of supply comes from underground through 9,140 registered tubewells (half the actual number)
- These produce ~86 MLD water
- 2011 estimates: Over 30,000 tubewells
- **Water table declining @ 1.2 m per year**



No Deposits, account emptying

3. Groundwater is critical for water supply, but recharge is neglected

•Reasons:

- Land is valued, **water is not**
- There is no legal protection for recharge zones and drainage systems
- No protection for lakes or ponds

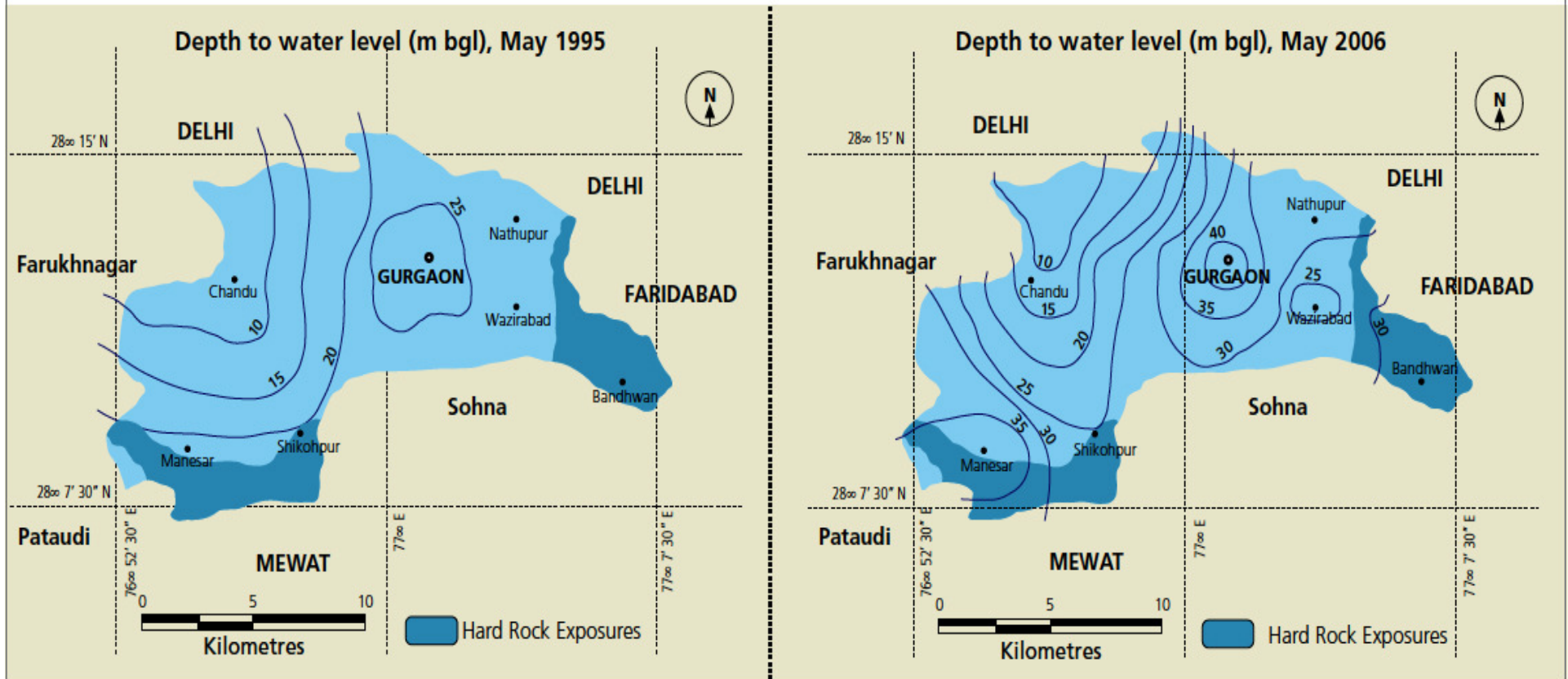
Sponges of cities being destroyed. **Deliberately**



Race to the bottom

MAP: SUCKING IT ALL UP

The groundwater table has been falling at a rate of 1-1.2 metre in Gurgaon



Source: D Uma Kumar 2007, *Groundwater scenario in Gurgaon – need for groundwater conservation*, Central Ground Water Board, Faridabad



Water=waste

4. Cities plan for water, **forget waste**

About 80% water leaves homes as sewage

More water=more waste

There is **no account** for sewage

Cities have **no clue** how they will convey waste of all, treat it, clean rivers

Cities **only dream** of becoming New York or London



Sewage **sums**

Sewage generated = 38,255 mld

Capacity to treat = 11,788 mld (30%)

Sewage actually treated = 8,251 mld (22%)

Cost of treating remaining 26,467 MLD ranges from
Rs 26,500 to Rs 105,868 crore

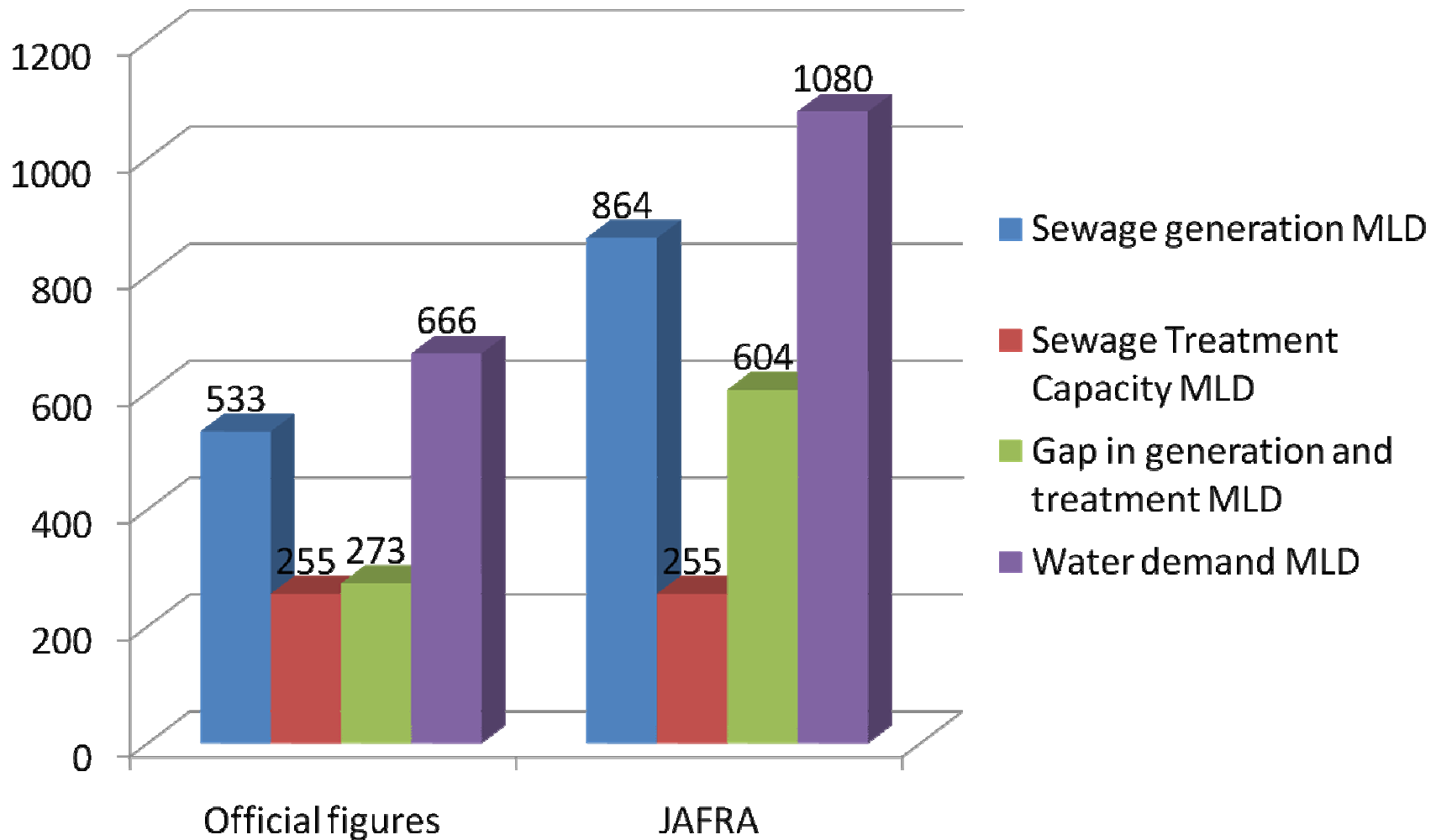
Delhi and Mumbai alone have **40 per cent** of
sewage treatment capacity in the country

78 % sewage is officially untreated and disposed off
in rivers, lakes, groundwater

Fill it, flush it, forget it



Gurgaon's sewage sums 2021





Planning for hardware

5. Cities plan for treatment not sewage

- 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 sewage but engineers sell pipe-dreams of **catching up with infrastructure**
- Politicians buy pipe-dreams
- We lose rivers. Generations of **lost rivers**



Partial treatment=**pollution**

6. Cities do not control pollution

Cost of building system is high

- City can build sewage for **few** not all
- Spends on building pipes, repair and energy costs of pumping to treatment plant of this waste
- Spends to treat waste of **few**
- Treated waste of **few** gets mixed with untreated waste of **majority**
- The result **is pollution**



Disposing Gurgaon's excreta

- In 2005, Gurgaon produced 80 MLD official sewage
- CPCB: 160 MLD; JAFRA: 260 MLD
- 50-60% covered by sewage network
- Rest flows into Badshahpur nalah → Najafgarh drain → Yamuna
- Treatment: Mostly primary, some secondary



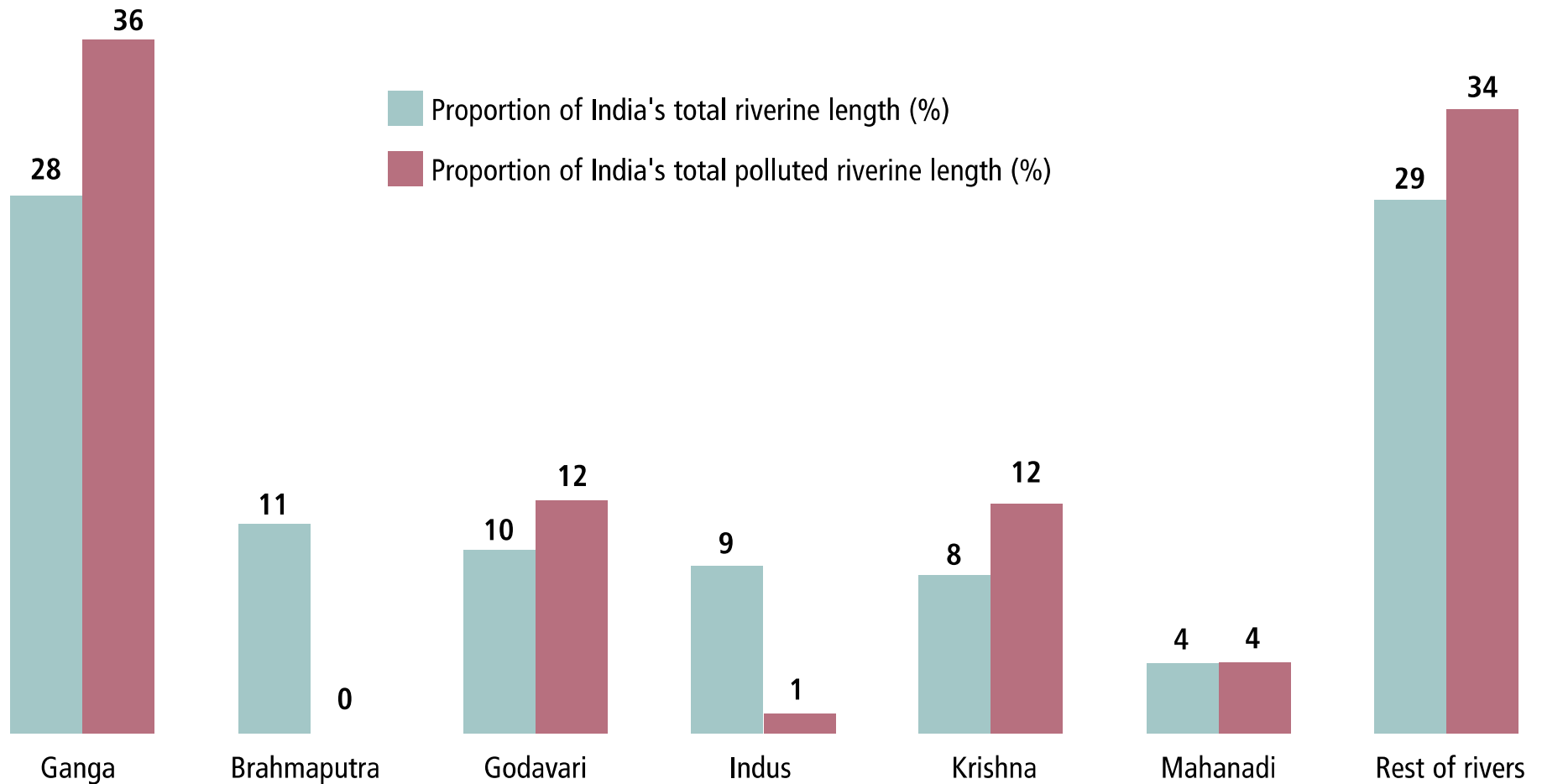
We all live downstream





Rivers: **Hydrocide**

THE STATE OF INDIA'S RIVERS: THE EXTENT RIVER STRETCHES ARE POLLUTED



Source: R C Trivedi 2007, *Pollution in our rivers: the CPCB perspective*, presentation, New Delhi, June, mimeo



Generation of **lost** rivers

- Delhi knows only Najafgarh – a dirty drain of Yamuna. It was Sahibi – which once flowed from the Aravalli into a jheel
- Mumbai knows only Mithi – a dirty drain. It even calls it a drain. But this was its river
- Ludhiana knows Budha Nullah as a drain. But this was a darya – a river

Generation of lost rivers. **How many more will we have to lose before we remember**



Cannot pay **full** costs

7. Infrastructure is not a simple answer

Assumption that infrastructure is about costs is **flawed**

1. Water tariffs are high in many cases
2. Tariffs are high but recovery is poor because meters do not work
3. Poor pay high costs; money or with their health
4. Where tariffs are high, people move to groundwater
5. Water-sewage-pollution costs are high and **unaffordable by all**



Gurgaon's meter map

	Metered	Unmetered
Domestic	10,209	16,998
Commercial	371	12
Industrial	149	19
Total	10729	17029

- Domestic metering is poor; unmetered connections charged at flat rates. Rs 25 for houses with a single toilet, Rs 48 for houses with more than one
- PHED Metering @ Re 1 / Kl for water, Rs 8 per toilet seat
- Industrial and commercial metering is better:: Cross subsidy?
- PHED loses Rs 3.3 crore a year on water treatment



Cities cross-subsidize with high tariff on industries and commercial
But industries move to groundwater
Unsustainability grows
Cities unable to recover costs

IT IS A CROSS-SUBSIDY: WHAT CITIES CHARGE FOR INDUSTRIAL WATER USE

City	Commercial (Rs/kl)	Industrial (Rs/kl)
Agra	17.50	35
Amritsar	6.40	6.40
Allahabad	7.50	12.50
Alwar	4.68	11
Aurangabad	16	39
Bengaluru	36-60	60
Bhilwara	11-16.50	11-16.50
Bhubaneswar	8	8
Chennai	50-60	50-60
Cuttack	2.88	2.88
Delhi	10-100	10-100
Dhanbad	7	7
Gwalior	20	30
Hyderabad	35	35
Indore	11	22.50
Jabalpur	10.50	10.50
Kolkata	10	NA
Lucknow	6	6
Nagpur	12	20
Pune	16	16
Rajkot	12	12
Ujjain	25	25
Vadodara	10.80	10.80

kl: kilolitre;
 Source: Compiled



Reform agenda

1. Prioritize public investment differently
2. Plan to cut costs of water supply
3. Invest in local water systems
4. Reduce water demand
5. Spend on sewage not on water
6. Cut costs on sewage systems
7. Plan to recycle and reuse every drop



Affordable water

Action: Cut costs of water supply

- Augment local sources. Afford them legal protection. These include lakes, ponds, feeder channels and catchments
- Recharge groundwater based on geo-hydrological studies
- Maximise rainwater harvesting



WateRR

Action: Reduce demand and supply through better management and planning

Action: Reuse/ Recycle water. Grey water for gardening

Treat sewage for industry/farming :: Use a mix of technology

Treat for used water domestic use



Plan for **sewage**

Action: Plan for sewage before water

Sewage = resource

- **No water scheme must be passed without sewage component**
- **Sewage must be our obsession**
- **Plan differently** for sewage treatment **now**
- **Mantra is decentralisation**
 - Use open drains as treatment zones
 - Use lakes and ponds as treatment zones
 - Treat locally so that treated water can be used locally



Plan **with** knowledge

- Last assessment of industrial-urban water demand was in 1999
- Water supply is a **simple** calculation:
water demand **x** population
- Waste is simple calculation:
water supply **x** 0.80
- As actual water supply not known, waste estimation off the mark. Water demand is not known



Excreta does **Matter**

- Is about **affordable** urban growth
- Is about **inclusive** urban growth – planning for all and not some
- Is about **sustainable** urban growth – planning for true-green cities
- Is about our need to re-invent **growth without pollution**