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

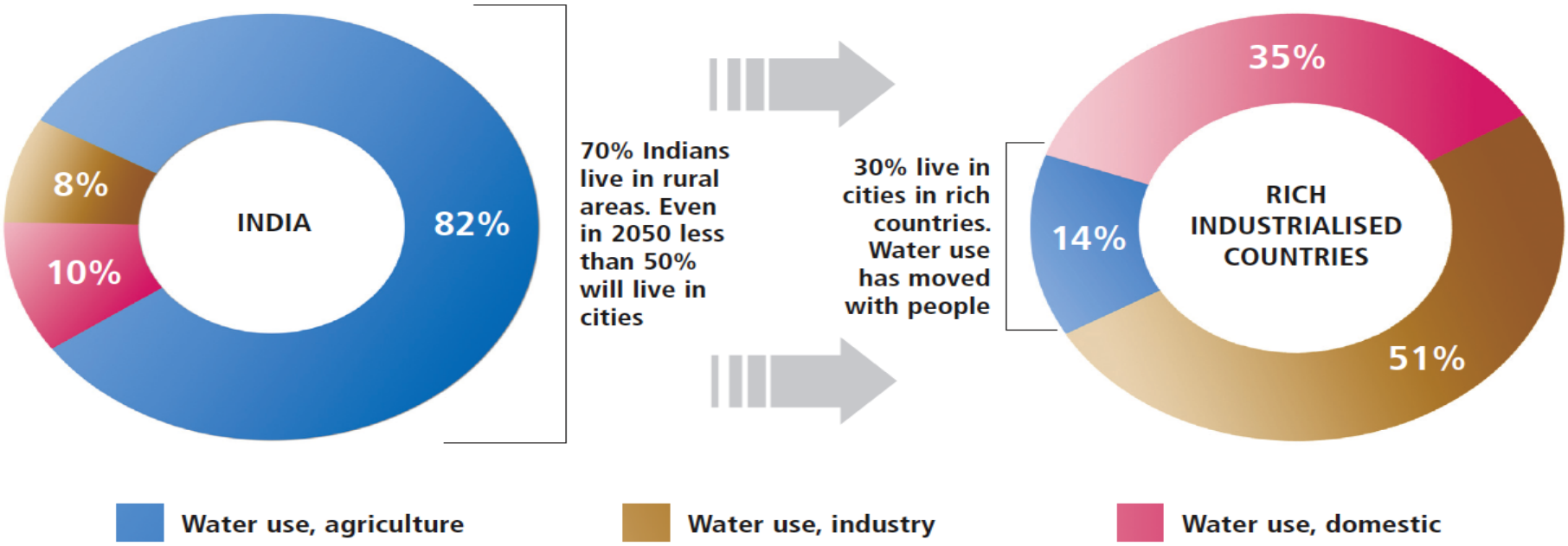
An agenda for water-prudent and waste-wise India

Water for growth?

Cities-industries need water for growth.
Will create/exacerbate conflict with rural areas

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

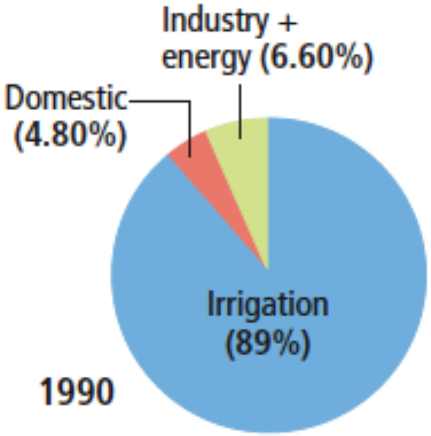


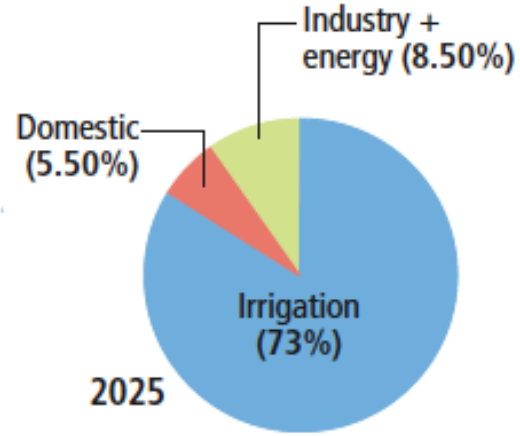
Source: Anon 2009, *Water in a Changing World*, Third UN World Water Development Report, UNESCO, Paris

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 otherwise

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**

MLD: Million litres daily
Source: Chandra Bhushan 2010, *Challenge of the New Balance*, Centre for Science and Environment, New Delhi

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 master plan

Gurgaon’s water-sewage sums

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 vastly augment capacity, it may not be enough to meet Gurgaon's growing needs

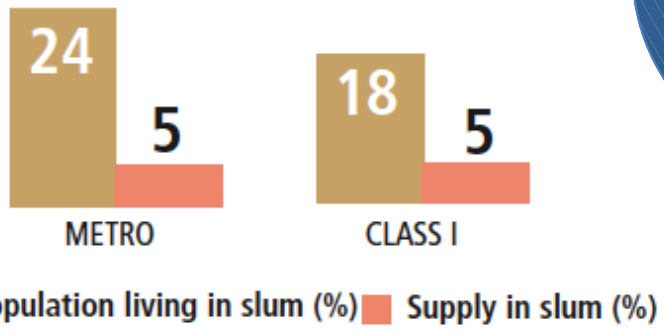

EXCRETA
MATTERS

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



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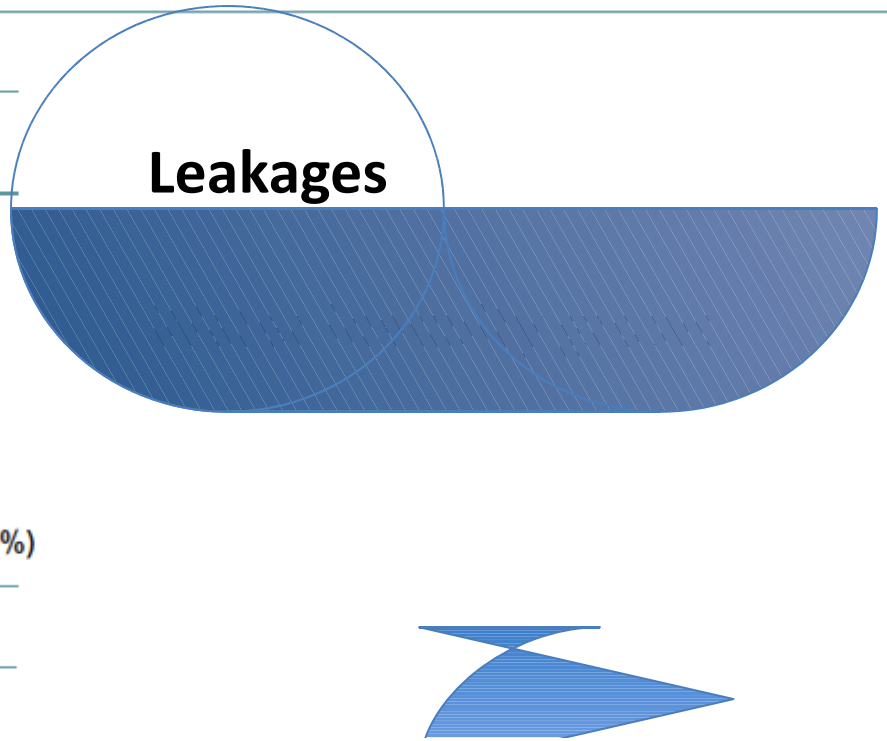
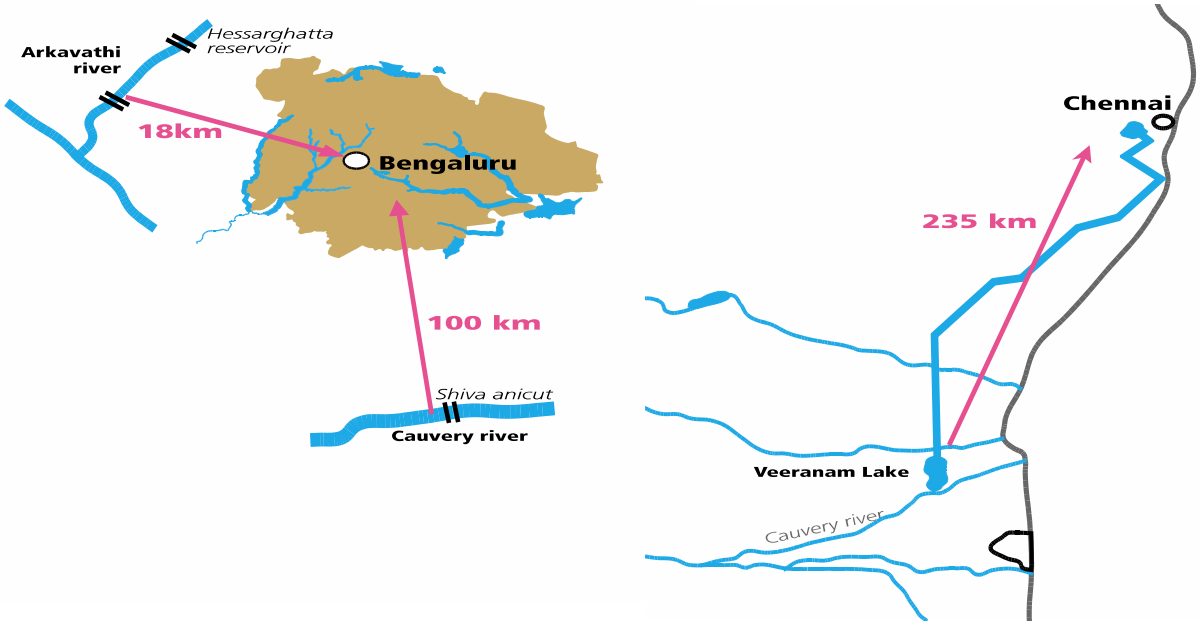


IT TAKES MORE MONEY TO SUPPLY WATER, THE FURTHER...

City	Source	Distance	Cost to supply (Rs/kl)
Aizawl	River Tlwang	1,000 metres down the valley, 18 km away	53.90
Bengaluru	River Cauvery	100 km from the city	12.70
Chennai	Lakes, groundwater and Veeranam lake	60-235 km	11.60
Delhi	River Yamuna and groundwater	Across the city	8.70
Indore	River Narmada	70 km	11.00
Jodhpur	Indira Gandhi Canal	205 km	8.70
Mussoorie	Springwater: Bhilaru, Jinsi, Khandighat, Murray, Mount Rose and Dhobighat	6-7 km down the valley	16.80
Mumbai	Bhatsa, Vihar, Tulsi, Tansa, Upper Vaitarna	100-110 km	10.70
Hyderabad	River Krishna	116 km	6.40-18

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



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

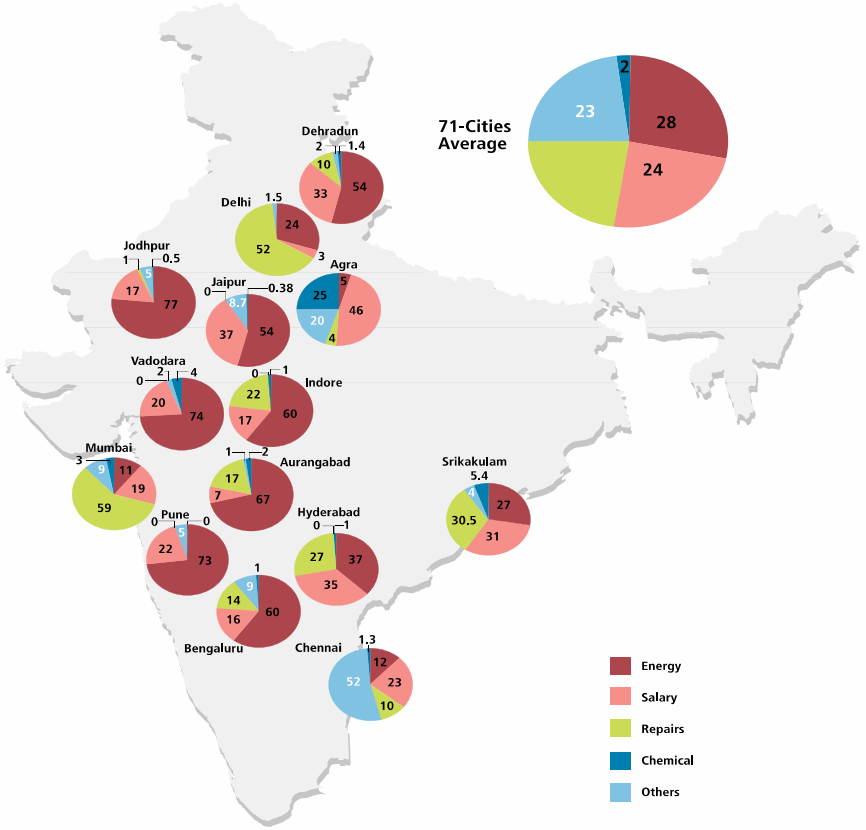
Cost of energy high and growing component of water supply

of bad health: waterborne diseases remain the biggest burden on the country's health system. Clearly, these costs are not imaginary and must be factored in.

Water agencies rarely have a separate budget head for this component of its work. It therefore remains the most neglected, in terms of planning as well as spending. While building a sewage network is part of capital expenditure, the cost of its refurbishment is not. All costs, of pumping and treatment, are combined and covered within the overall costs of operations.

It is, therefore, difficult to assess what these are and will be in the future.

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



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

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 of some **few**
Spends to treat waste of some **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 Khost canal → Najafgarh drain → Yamuna
- Treatment: Mostly primary, some secondary

- Large percentage sewage not intercepted
- Flows to Najafgarh jheel
- Flows to Najafgarh nallah
- Down the Yamuna
- Gurgaon picks it up after Okhla for use
- What goes round, comes around

Gurgaon

Gurgaon is Delhi's fast-galloping neighbour. It has all the characteristics of new India's cities: malls, high-rise glass buildings with swanky offices, residential areas which are fenced and guarded and no public amenities to speak of. Worse, its private-builder mode of development, where the state has sold its land to developers, ensures nobody even knows how many people live in this city. The government uses the 2001 census estimates to calculate numbers, but forgets growth rates have soared since then. In 2001, it was estimated the entire district's (Gurgaon is a large district in Haryana) population was 1.6 million, of which the 'town' of Gurgaon had 0.17 million people. The district administration says based on growth rates, the 'urban' population is 0.3 million in the municipal area and 0.6 million in the 'developer' paradise, or HUDA areas (known after the original land development department, the Haryana Urban Development Authority). But a survey of resident associations suggests the number could be more like 2 million and growing each day, roughly double the official estimates.

This staggering mismatch creates part of the problem for provisioning of services like water and sewage. Part of the problem also lies in the sheer mindlessness of the plan for sewage and its disposal.

Step 1: At great cost and with over 50 per cent losses, bring water into the city.

Step 2: Make no appraisal of how much sewage the twin cities of Gurgaon generate. When asked about it, refer to only the old city and quote estimations for it.

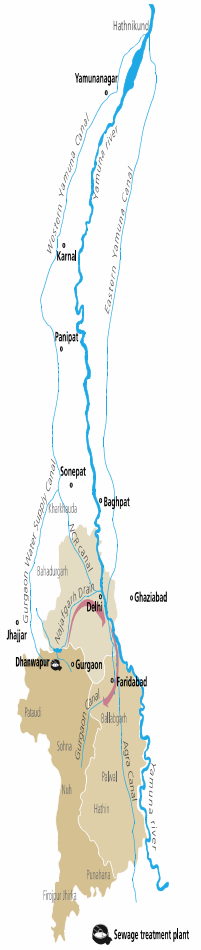
Step 3: Dump treated and untreated sewage into the Badshahpur Nullah and that flows into Najafgarh Jheel and joins the Najafgarh drain.

Step 4: As the drain passes through Delhi en route to the Yamuna, allow Delhi's sewage to mix in.

Step 5: Divert Yamuna water, loaded with treated and untreated sewage, to the Gurgaon Canal at Okhla.

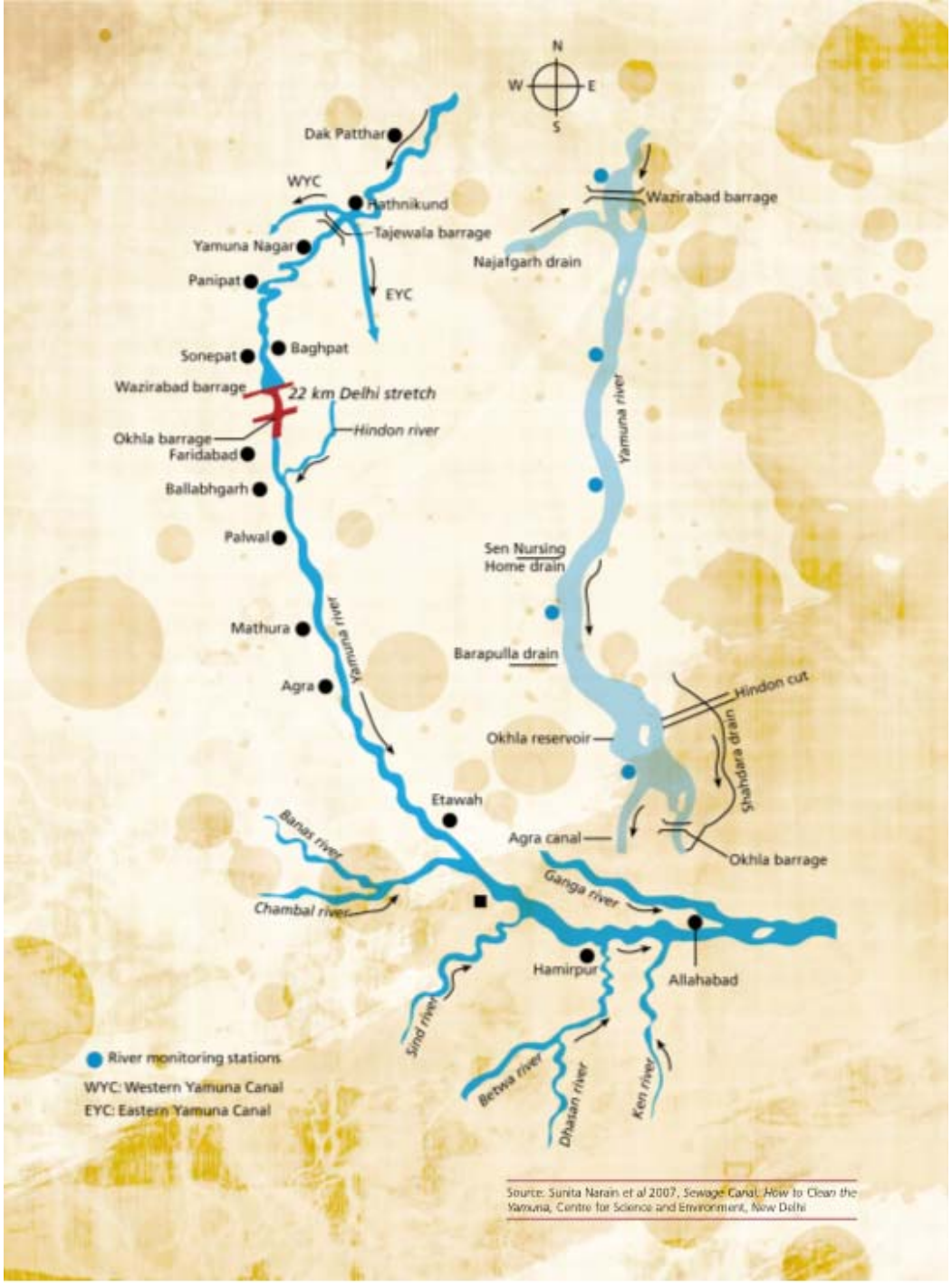
Step 6: Use that water!

Step 7: Repeat steps 1 to 7, endlessly.



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

We all live downstream



Rivers: **Hydrocide**

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 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

- 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

water supplied, the billing amounts to almost 40 per cent. Bengaluru, which charges Rs 6/kl for the lowest domestic slab and Rs 36/kl for the highest, charges as much as Rs 60/kl for industrial and commercial use.

Chennai uses the same maths to score well on its water accounts. It charges Rs 50-60/kl for commercial and institutional usage. Private hospitals are charged Rs 50-80/kl, depending on consumption. It also ensures water-intensive industries, not metered, pay Rs 600-800 per month for usage.[2] So it is that with 11 per cent of the water usage, billing for the commercial and industrial sectors contributes 66 per cent of the revenues of this city's water agency.[3] It is no wonder, then, MetroWater remains one utility whose books are balanced.

The industrial town of Visakhapatnam, which also boasts of good municipal services, does the same. Its commercial usage is roughly 32 per cent, and forms 90 per cent of its billing. State capital Hyderabad has also revised its tariff, arguing other metropolitan cities charge higher rates for non-domestic use. Its tariff is now Rs 35/kl, against Chennai's Rs 50-60/kl. Interestingly, Hyderabad is the only city which charges differently where water is used as a raw material – in bottled water, soft drinks or alcoholic beverages. In this case, the rate is Rs 60/kl, irrespective of consumption.

Bhopal is the reverse, which perhaps explains this city's perpetual thirst. Commercial and industrial usage here accounts for roughly 60 per cent of the city water supply, but billing only 14 per cent. The city taxes its domestic consumers, who use 40 per cent of the water supplied but whose bills take care of 86 per cent of the revenue (see Table: *Who pays what...*).

It is logical cities, struggling to find ways to meter all houses that use water, will recover costs from high-end users. These are institutional buyers, easier to locate and easier to bill (see Table: *It is a cross-subsidy...*). But this cross-subsidisation does not please economists. The World Bank's water and sanitation programme, in its paper on tariff structures in South Asian cities, argues this cross-subsidy is leading large industrial users to "exit the system". It uses a 1998 study by global consultancy company KPMG which found industries in Bengaluru had steadily reduced their dependence on municipal-supplied water because other sources were cheaper. Even when it found that in Chennai industries had invested in their own treatment plants to recycle used water because of this high cost, the bankers frowned on this approach, saying it put an "unfair" burden on industry.[4]

It is logical cities, struggling to find ways to meter all houses that use water, will recover costs from institutional buyers, easier to locate and easier to bill. But economists frown on this approach.

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
Supply to all and not some
Protect local water sources and bodies such as lakes and ponds so water can be sourced locally. This includes catchments and feeder channels
Demarcate groundwater recharge zones based on geo-hydrology study

WateRR

Action: **R**educe demand and supply through management

Action: **R**euse/ **R**ecycle water. Grey water for gardening

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

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**
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**