



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

An agenda for water-prudent and
waste-wise Agra

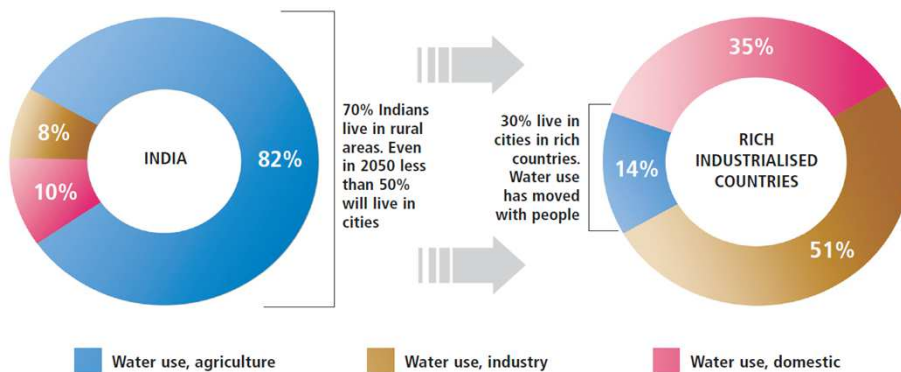


Water for growth?

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

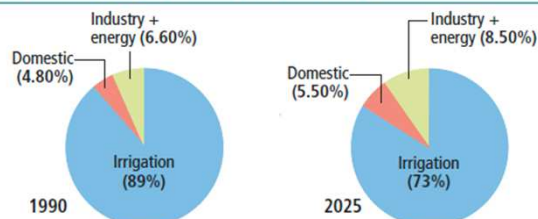




Vague old water sums

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 otherwise

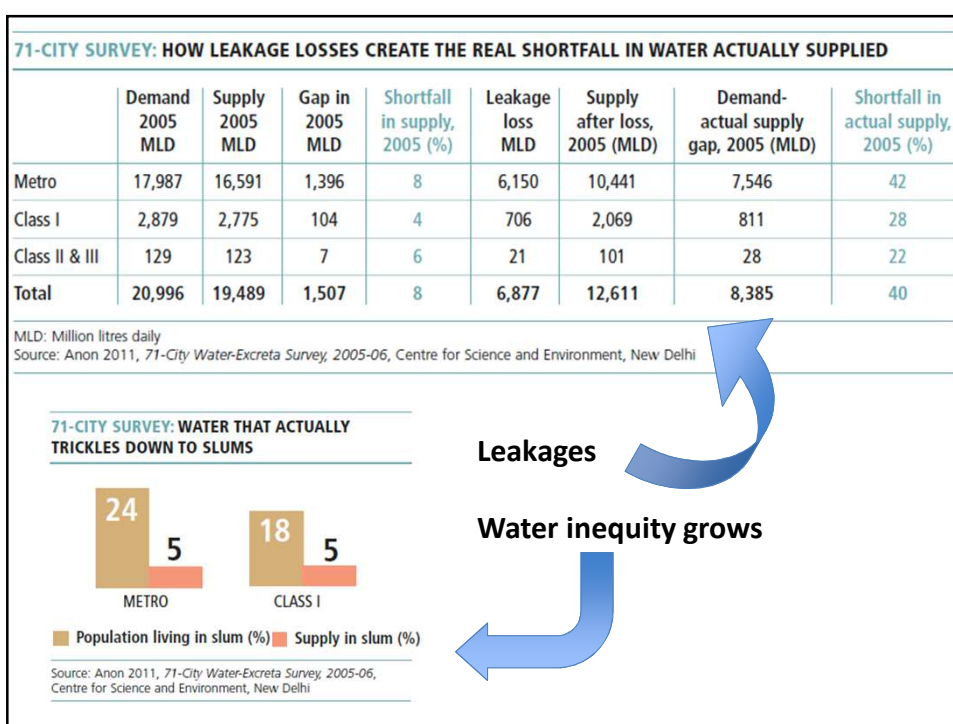
SOBERING PROJECTIONS: THE FUTURE OF SIX KEY INDUSTRIAL SECTORS (IN MLD)

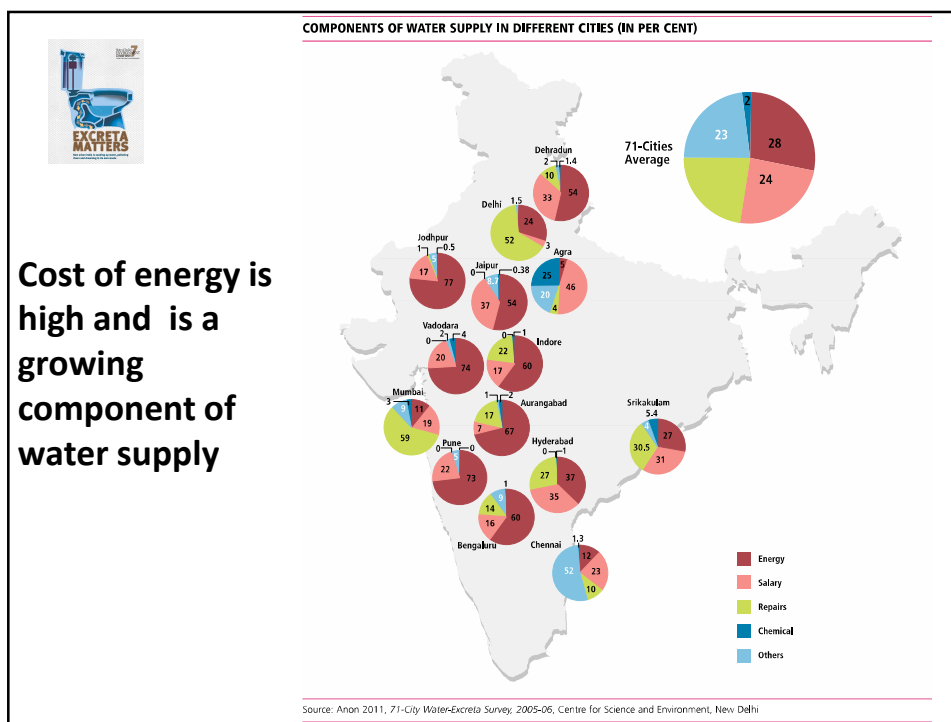
Sector	Freshwater withdrawal 2008-09	Freshwater consumption 2008-09	Projected withdrawal 2020-21	Projected consumption 2020-21
Power	108,334	13,995	117,940	23,597
Paper and pulp	2,375	238	3477	483
Iron and Steel	1,860	674	4482	1,901
Fertilizer	545	273	652	379
Cement	249	249	674	674
Aluminium	441	27	1246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



Urban Expansionism

- Cities have to source water from further and further
- Costs rise, leakages rise
- Conflicts – Urban-rural, industry-rural
- **Pipe-dreams sold by water establishment**





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

Crores depend on private wells, tanker mafia, bottled water

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



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**



Water in, sewage out

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



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. Generation of **lost rivers**



Partial treatment=pollution

6. Cities do not control pollution

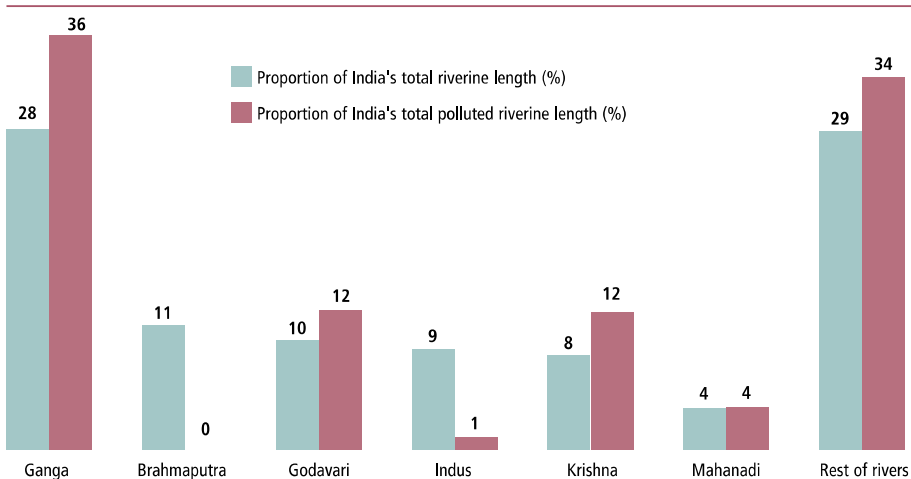
Cost of building system is high

- 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**



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**

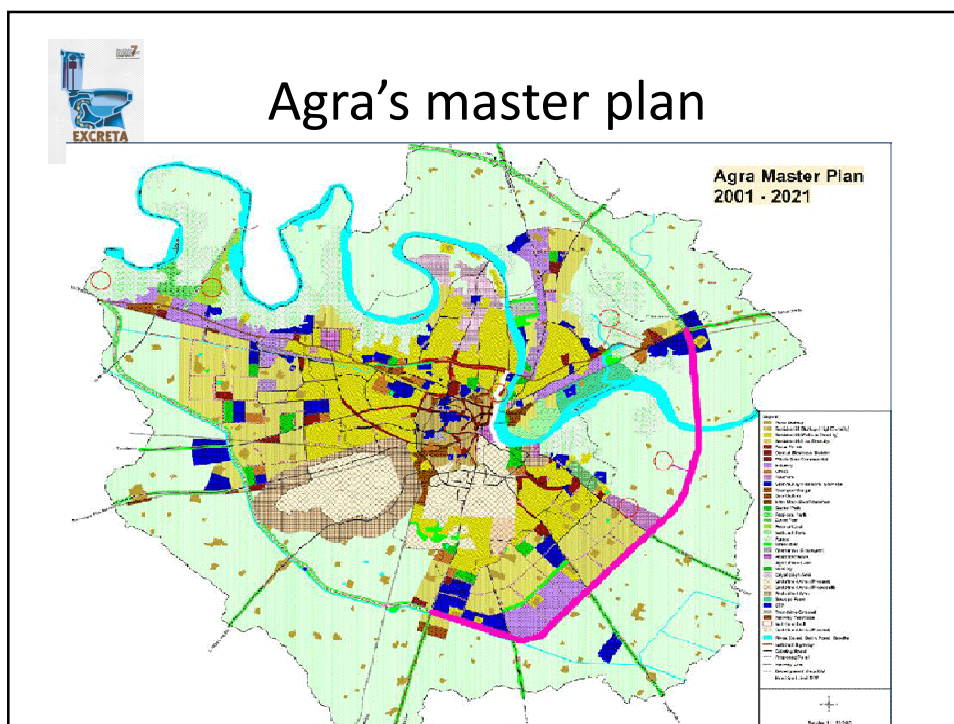


Cannot pay **full** costs

7. Infrastructure is not a simple answer

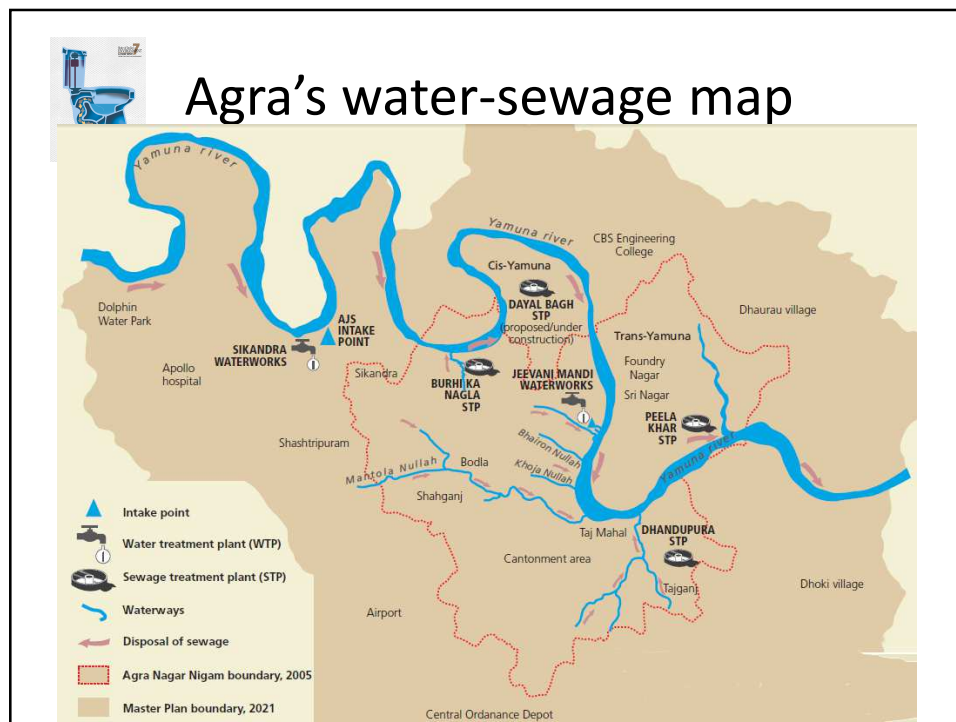
Assumption that infrastructure is about costs is **flawed**

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**



Agra's water-sewage sums

Municipal area: 122 sq km	Population 1.43 m (2005)	Population 1.7 m (2011)
	2005-06	2011
Water demand as per city agency (AJS)	245 MLD @ 171 LPCD	290 MLD, 18% increase
Per capita demand	171 LPCD	171 LPCD
Sources	Yamuna	Yamuna, new pipeline
Surface sources	100% (official)	
Groundwater	Groundwater = 75 MLD (CPCB)	
Actual supply after loss 45%	135 MLD	
Population served	75%	
Water treatment plants, capacity	2, 410 MLD	
Actual treatment	246 MLD	
Sewage generated	240 MLD (CPCB) 153 MLD (AJS)	232 MLD
Population covered by sewage network	30%	
Sewage treatment plants	4, capacity 90 MLD	4, 250 MLD
Actual treatment	66 MLD	

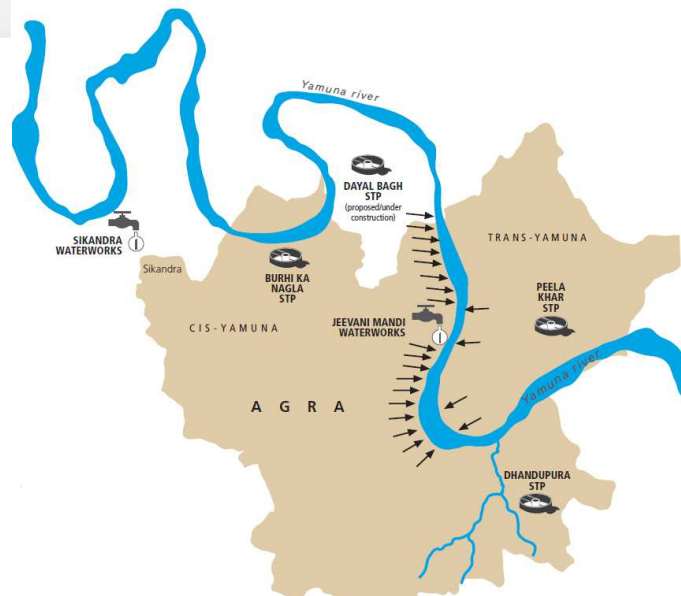


Water, not supplied

1. Water supply in cities: Planners obsessed with water, not supply
2. **In Agra, there is 45% shortfall between water supply and demand**
3. Main pipeline capacity is low, pumping and filtration plants in poor condition
4. How much water is supplied to industry?
5. Where does water come from
 1. Yamuna river
 2. Groundwater
 3. Palra Bulandshahr pipeline (Future source)
 4. New high-tech water treatment plant



How Agra pollutes its own water

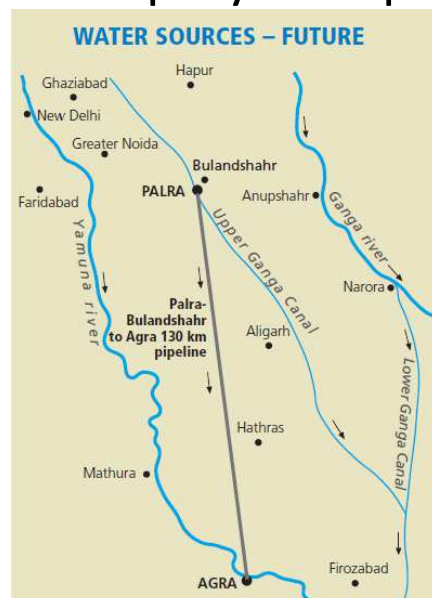


Severe quality issues

- All parameters are exceeded by a vast margin
 - Biological oxygen demand 10X stipulated level
 - Chemical oxygen demand 5.6X stipulated level
 - Ammonia 25X stipulated level
 - Coliform count 14X stipulated level
- Need alternative sources
 - 342 MLD from Upper Ganga Canal
 - 140 cusecs from Tehri
 - 134 MLD plant to process Yamuna's sewage laden water for drinking @ cost of Rs 156 crore



Agra falls prey to expansionism



Waternomics

TABLE: CLIMBING COSTS

Since 1996, the price of water in Agra has been steadily rising

Category	Metered or non-metered	1996-97	1997-98	1998-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Industrial	Metered	17.25	19.8	22.8	24.5	26.3	28.28	30.4	32.7	35.15
Commercial	Metered	8.6	9.9	11.4	12.2	13	13.94	15	16.1	17.3
Government	Metered	6.9	7.9	9.1	9.8	10.5	11.29	12.15	13	14
Cantonment	Metered	5.1	6	6.9	7.4	8	8.6	9.25	10	10.75
Domestic	Not metered	3.45	3.9	4.55	4.9	5.3	5.65	6.1	6.55	7.4

Source: <http://www.agrajs.com/tariff.html>, as viewed in May 2011

Note: Price figures in Rs per kilolitre

- **Agra Jal Sansthan largely in the black**
- **Despite rising costs, Agra's citizens get poor quality water**



Groundwater in Agra

- CGWB, 2005-06: 75 MLD
- Unknown number of private wells
- Groundwater level falling @ rate of 55 cm per year (2005); now reported to be 2 m in some parts of the city
- Serious quality issues
 - Hardness in 30%
 - Faecal coliforms
 - Fluorides and nitrates in 26%



Sewage sums

- Varying figures

CPCB	UPJN	AJS
211 (2001)	152 (2003)	191 (2006)
254 (2006)		

- Only 50% of drains intercepted
- 10 open into Yamuna upstream of water works
- Capacity to treat: 27% of generation (90 MLD)
 - Plants run improperly
 - Sewage network covers 30% of city area
- Treated waste mixes with untreated sewage = Pollution



**We all live
downstream**



Looking ahead

- Under YAP 1, Rs 78 crore spent, but no change in Yamuna water quality
- YAP 2 – Rs 124 crore sanctioned for sewers, enhancing STP to 144 MLD
 - Nothing for southern and eastern parts of Agra
- JNNURM – Rs 763 crore for sewer lines, treatment capacity and pumping stations
- Taj Trapezium – Rs 44 crore for sewerage and pumping stations
- New STP capacity of 160 MLD sanctioned



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 of sewage treatment – think laterally
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, mandated through building by-laws



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

- Decentralised treatment: small plants, soil biotechnology
- Bio-remediation

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: constructed wetlands
 - 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** 1.25
- As actual water supply not known, waste estimation off the mark



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**