7 February 2013

BLUE & GREEN

agenda for water efficiency for greener buildings

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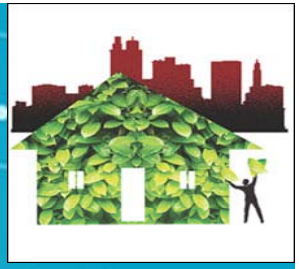
Sustainable Building Programme, CSE

Spotlight: Cities

policies, investment and public attention



Urban explosion

-- By 2025 around 65 per cent of the world's population is projected to live in cities – equal to the global population in 1986. -- A billion more will be added over the next three decades in Asia – almost adding a whole new India. More than half of them will be living in cities

India's urbanisation is still modest at 30 per cent and is expected to be 40 per cent by 2030. But this is more than the population of the United States.

India's urban mosaic

Skewed growth: 70% of urban population are in about 400 cities. The rest in about 4000 towns and cities. About one third of the total urban population in the megacities..

Shadow growth: Top rung cities show strong trend towards suburbanisation.

Slow growth at the bottom: Lower rung towns stagnating. Some have grown due to infrastructure investments and rural to urban migration.

The urban population of Rajasthan in the last 10 years has increased by 29.26 percent.

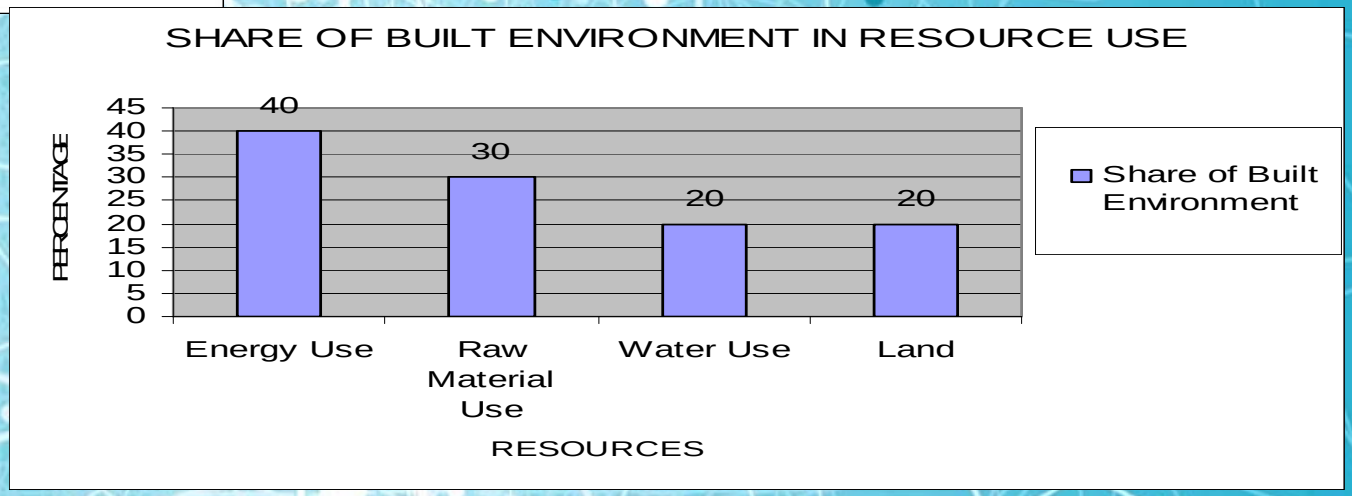
The Hindu/New Delhi/June 27, 2012

Greening the urban jungle

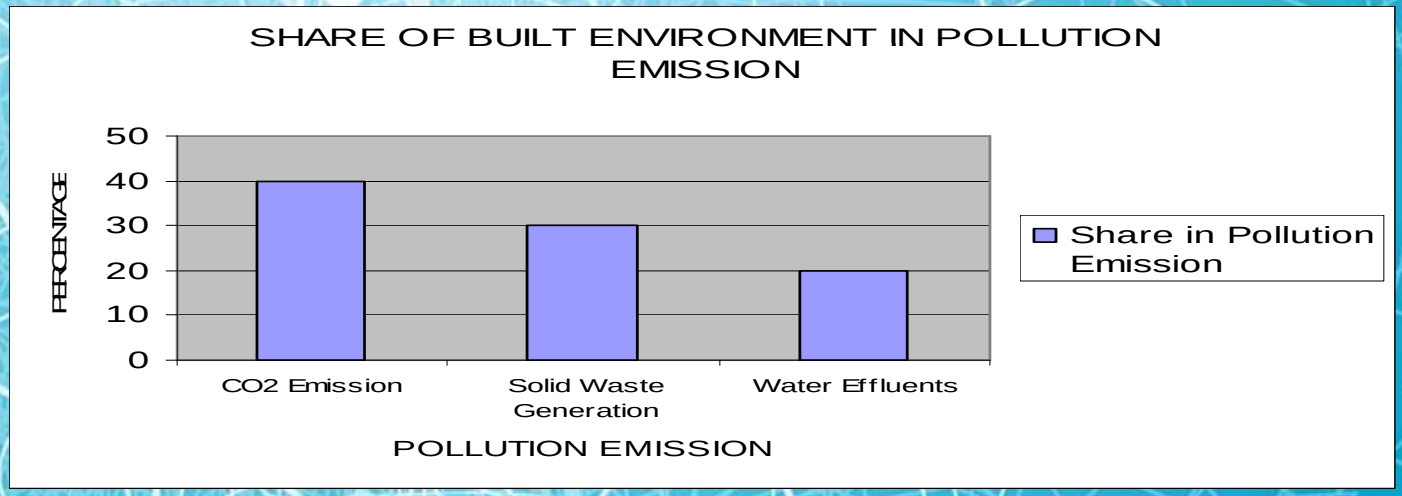
Urbanisation took centre-stage at last week's Rio+20 conference for good reasons. Cities collectively consume 75 per cent of world's natural resources, generate 50 per cent of waste and emit about 70 per cent of the greenhouse gas. With no slowing down of urbanisation in sight, this consumption is bound to increase. It is now abundantly clear — as UNEP's recent report on sustainable cities convincingly demonstrates – that unless cities become resource efficient and reduce waste generation, national and global sustainable development would be impossible to achieve. This is a warning bell to Indian policymakers, who have so far focused on the economic growth of cities and ignored their environmental performance. Consuming 40 billion tonnes of raw material every year has its consequences. The first visible challenge is the staggering waste cities produce. Conventional wisdom has been to find more landfill sites. This approach would demand more land over time and cities cannot endlessly appropriate the resources of their region. It would lead to potential conflicts and the loss of productive agricultural land would partly offset the economic benefits provided by the cities. Pursuing standard solutions and treading the beaten path of town planning would not help. Only a radical change in course will create zero-carbon, zero-waste habitats, which is imperative.

It would be impractical to cap the growth of cities. Neither is it the objective of the current debate. The question is how to transform them. Certain cities have taken the lead and shown a way forward. For instance, Copenhagen recycles most of the waste it generates and lets only 3 per cent go to the landfill. Extending the idea of recycling, Kitgum town in Uganda traps used water from houses and utilises it to grow food in grey-water gardens. Cities in Malta have opted for a smart bi-directional grid system to regulate their power consumption. There are more inspiring examples. With the Central government dithering on commitments to reduce emission levels and the National Mission on Sustainable Habitats failing to offer anything substantial, Indian cities can no more rely on centrally directed policies and projects. They have to adopt best practices on their own and launch projects with clear green benchmarks. A good beginning would be to promote non-motorised transport. Even in larger cities such as Chennai, the share of bicycle trips, despite poor arrangement, is as high as 12.5 per cent of the total trips. Building dedicated bicycle tracks would significantly reduce transport related emissions. If Indian cities are keen to improve the quality of life and remain economically competitive, they have to leapfrog to become desirable green places to live in.

Buildings: Earthscrapers

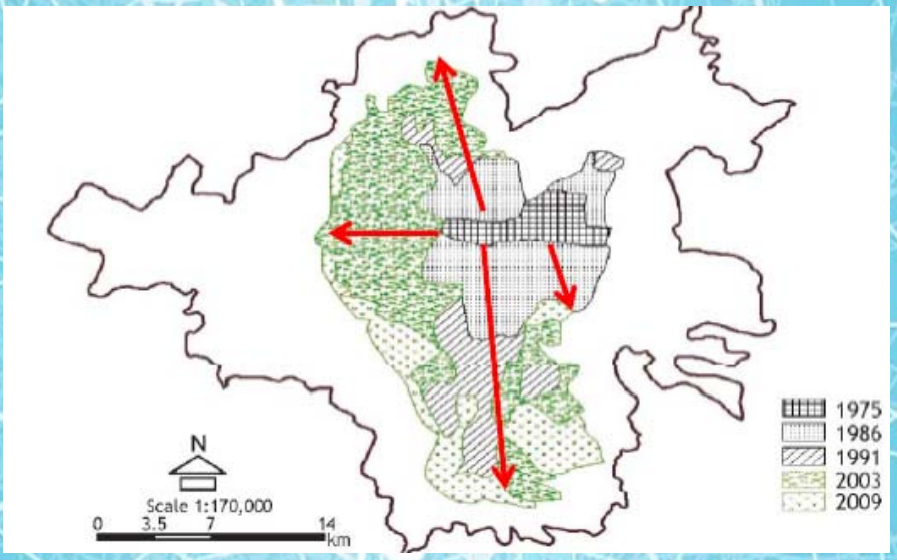


Burden of Built Environment



Source: Anon, 2008, Green Buildings – an overview, Capacity Building Series (2008-2009), June 2009, TARA Nirman Kendra, New Delhi

Jaipur: Urban growth 1975 to 2009: The compact city design under pressure



• Recent report published by the UN-HABITAT on the "State of The World's Cities 2012-13; **Jaipur**

• expected population of 4.2 million by 2025,

• will rank 10th in the list, jumping 4 spots from 1990

• the average population increase of Jaipur UA from 1990-95 to 2020-25 will be 26.3%

• seven new townships over 20,000 Ha along the proposed Delhi-Jaipur Expressway, hyper real estate growth along the 265-km road.

• Built up land increased from 46.39 sq km in to 197.96 sq km whereas the maximum expansion is observed in low density built up land.

• Residential area has higher rate of expansion after 1975

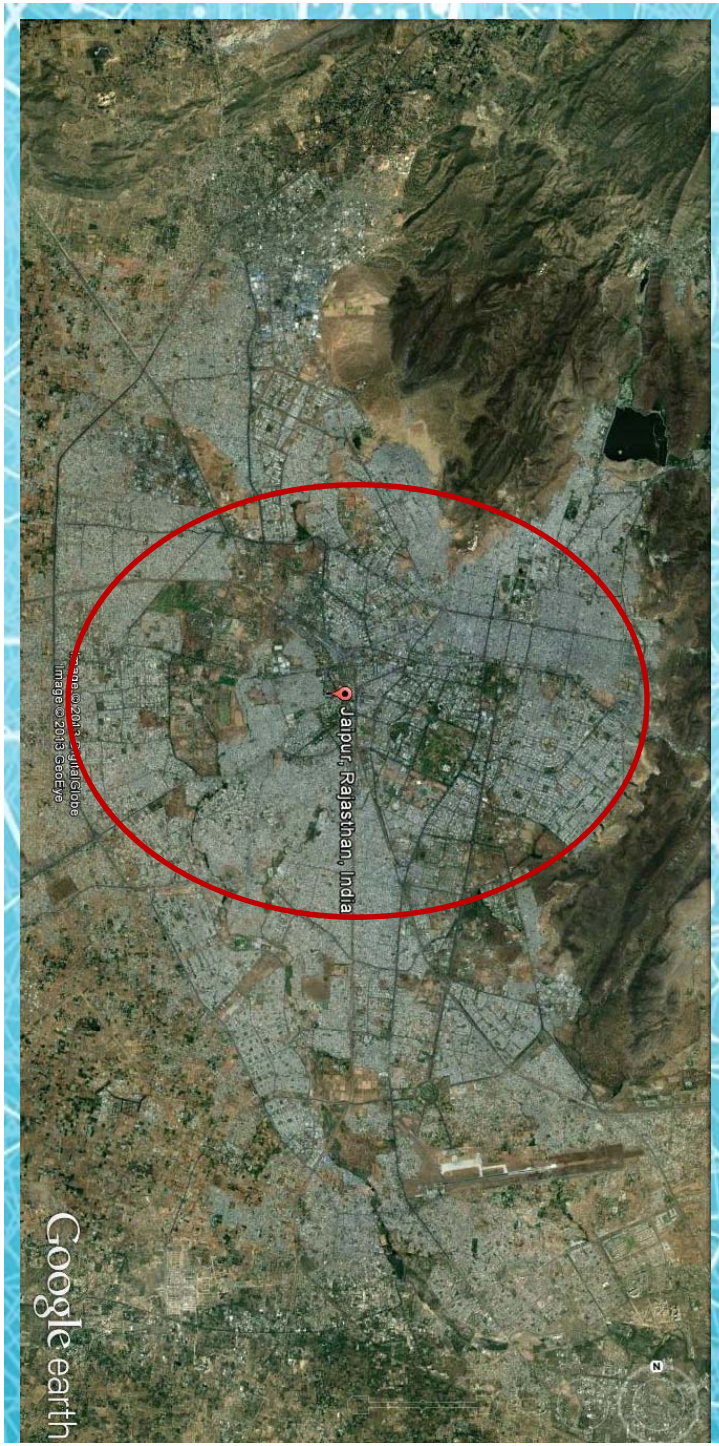
• the major expansion is observed in the western, southern and south-eastern parts and along the national highways 8, 11 and 12.

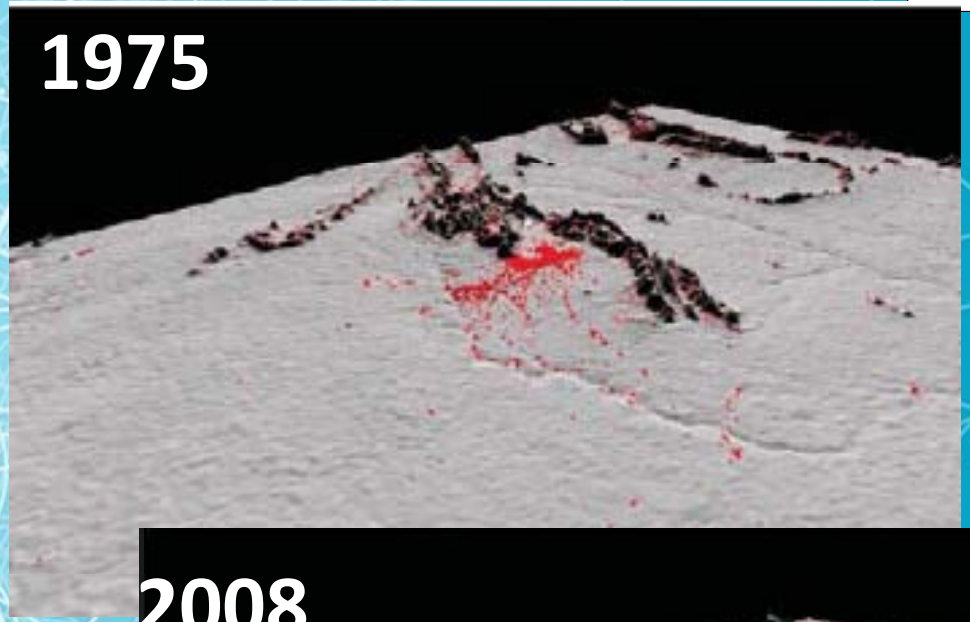
City's built-up area has increased with the rate of 4.46 sq km per year or 1.02 percent per year.

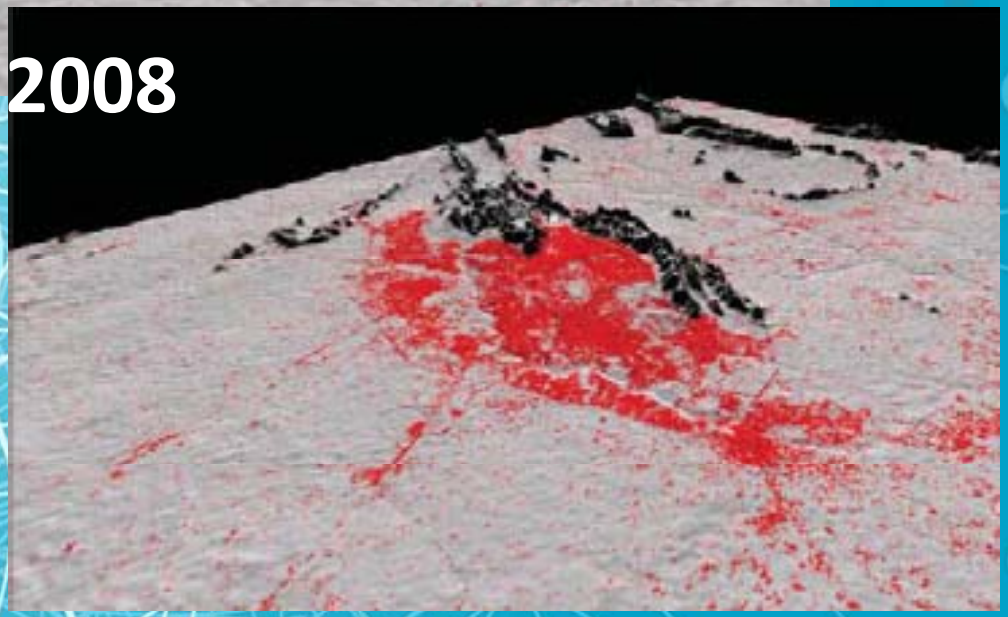
The crop area has shrunk by 1.60 sq km per year, fallow land 2.94 sq km per year, and wasteland 0.59 sq km per year in last 34 years

Source: Rupesh Ku. Gupta 2011, Change Detection Techniques for Monitoring Spatial Urban Growth of Jaipur City, Institute of Town Planners, India Journal 8 - 3, July - September 2011, 88 - 104

Sprawling Jaipur

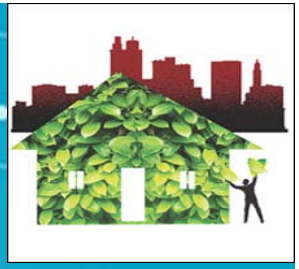






Source: http://sapiens.revues.org/932

City: The focal point of climate mitigation and energy security discussions



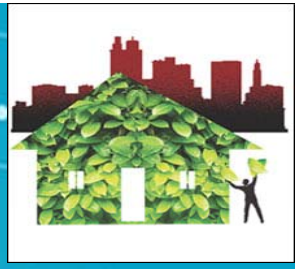
Cities: the central focus of discussion in the Rio+20 conference ….

Energy Outlook 2009 tracks cities for the first time

- Already 2/3rd of world's energy is consumed in cities – by half of world's population.
- By 2030 cities will be consuming 73% of world energy.
- Globally cities account for 70% of CO2 emissions.
- Big increase in global CO2 from increase in floor space in buildings of various types, -- especially in non-OECD countries.
- Massive increase expected in ownership of household appliance

Cities collectively consume 75% of world natural resources, generates 50% of waste, and emits 70% of greenhouse gases.

Water for Growth

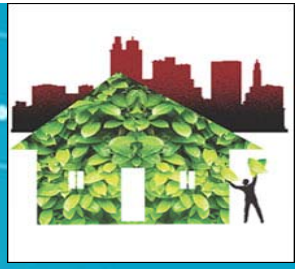


- Though energy issues are dominating the city and green buildings debate

- But water is emerging as a major limiting factor for real estate growth

- Reduce water imprints of urban consumption – buildings represent the microcosm of urban demand

Trends in building spaces – how big is the problem?



We don't know enough…….. Real estate sector lacks transparency

Very poor data base on trends in building spaces in India:

Ministry of housing and poverty alleviation tracks demand for housing but not other built up areas. Planning commission and others on trends in the construction sector. But buildings are a very small component of the construction industry…..

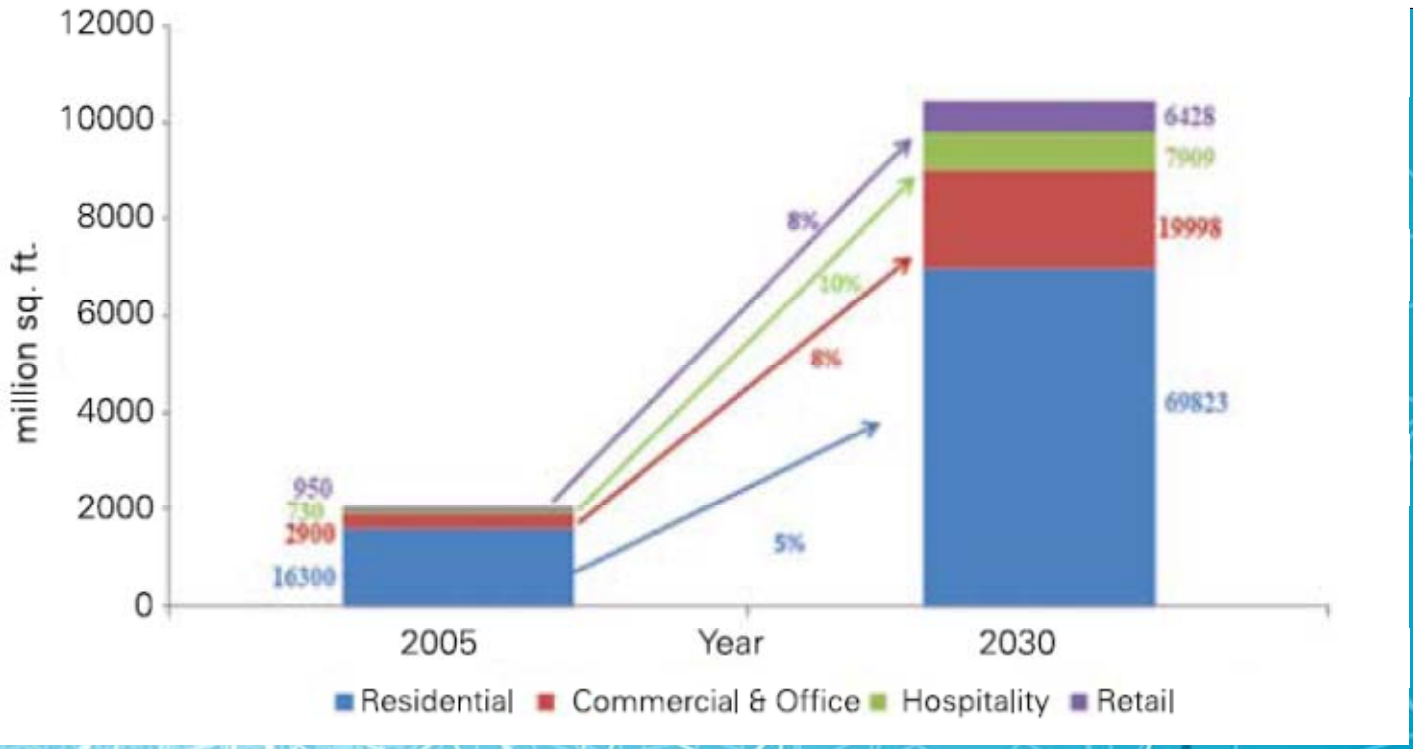
Real estate service providers, investment banks, and research foundations are the principal source of information……But very opaque and not verifiable……

A few cities – Hyderabad, Bangalore, Chennai, Delhi, Mumbai have a little better data due to new growth etc.

Disparate estimates make a curious jigsaw ….. But indicative of an explosive trend: Eg.

Constructed area in 2005: close to 25 billion square feet.
Expected to be 5 times and reach to approximately 104 billion square feet by 2030. A CAGR between 5 to 10 percent to be achieved …..
Hospitality and Retail to achieve higher CAGRs -- 8– 10%. By 2030, -- 7 to 11 times of the level in 2005.
Maximum growth in residential and commercial sector -- four to five times of 2005 figures. (EDF)

Building sector: explosive growth

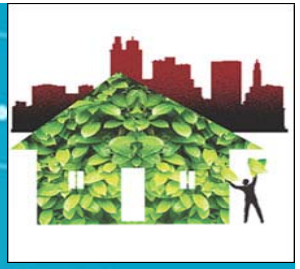


Source: Planning Commission - Environmental Design solutions 2010/CW

India's challenge: The ECO-III forecasts - 70% of building stock that will be there in 2030 is yet to come up in the country.

Developed countries, a very small addition is made to the building stock each year. In the UK, at least 80% of the homes to stand in 2050 have already been built. In France buildings constructed before 1975 thermal regulations will represent over 50% of the building stock in 2050

Lifestyle pressure



Middle class growing rapidly:

The 2010 McKinsey study on urban infrastructure estimates that the seeker class (with household income of 200,000 – 500,000 per annum) will be the most dominating income class and is expected to be half of all urban households by 2025

Cities will see more concentrated buying power, transformation of lifestyle and aspiration for high end resource intensive comfort level.

The seeker class will demand

- Luxury services
- Uninterrupted supplies
- Services at par with western world

Townships: Made to order

A report by McKinsey states that there is a need to build around 20-25 new townships closer to 20 metros and cities across the country.

IDFC's India Infrastructure report 2009 states -- the size of private 'integrated' townships ranges from 100 to over 1000 acres

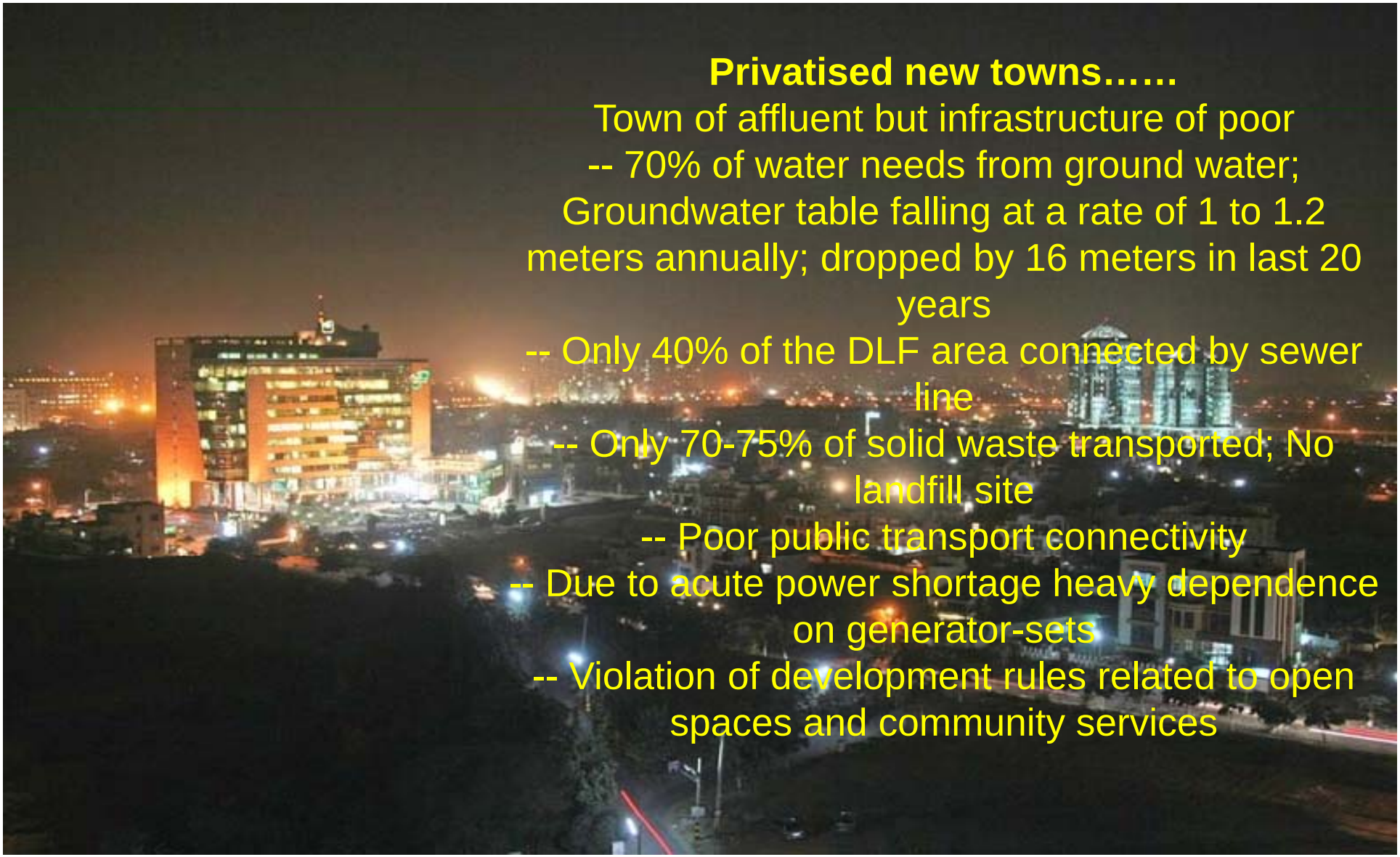
Around 32 townships coming up around the major metros with an aerial coverage between 30000-40000 acres alone. This is increasing.

On Delhi Mumbai Industrial Corridor (DMIC), 6 townships are on the cards.

Reliable government estimates on actual number of townships and their actual aerial coverage are still scarce.

Touted as Walk to Work Green Towns – without green benchmar

Glitzy towns in dark shadows…..
Gurgaon: Slum of the rich



Privatised new towns……

Town of affluent but infrastructure of poor

-- 70% of water needs from ground water; Groundwater table falling at a rate of 1 to 1.2 meters annually; dropped by 16 meters in last 20 years

-- Only 40% of the DLF area connected by sewer line

-- Only 70-75% of solid waste transported; No landfill site

-- Poor public transport connectivity

-- Due to acute power shortage heavy dependence on generator-sets

-- Violation of development rules related to open spaces and community services


STOP
FAKE PROMISES OF JMB LTD
JMB SELLS CLUB MEMBERSHIP BUT DOESN'T PROVIDE CLUB FACILITIES

Manglam's AANANDA The Complete City

Project Name: **Manglam's Aananda**
Project Type: Residential
Location: Near Sanganer Railway Station, Jaipur

Download E-Brochure

Possession Date: **April, 2014**

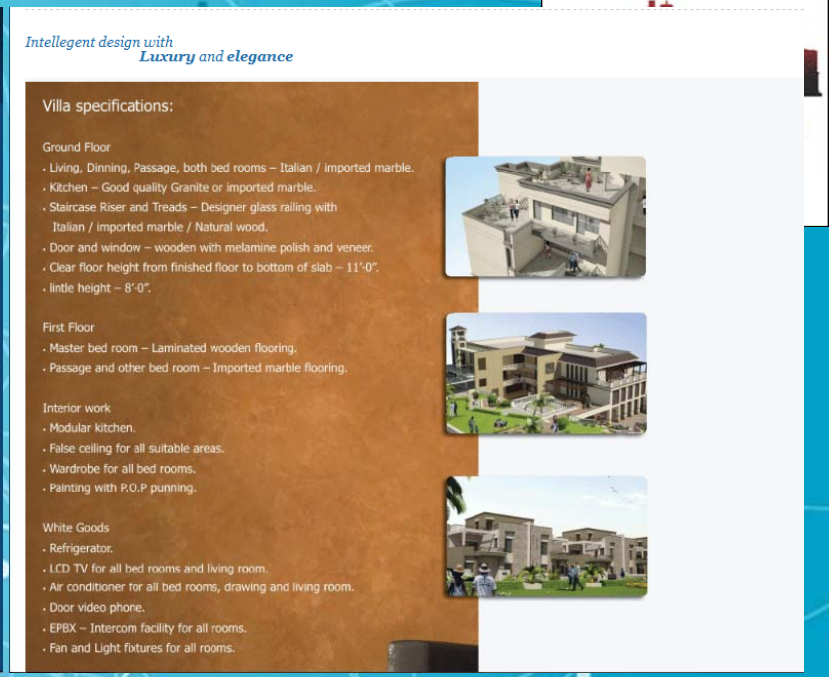
Manglam's Aananda is located opposite Sanganer Railway station. It is just 1.5 km from Galaxy Multiplex in Mansar[illegible] KM from B2 Bypass situated at famous Tonk Road. From Jaipur Airport it is about 5 kms and well within the city. The lo[illegible]ion is centrally situated having multiplex, school, hospital and industrial area in vicinity. In recent years, the town has [illegible]

Questions

real estate keeps growing unabated

The desert state's cities are not far behind

Examples from Jaipur



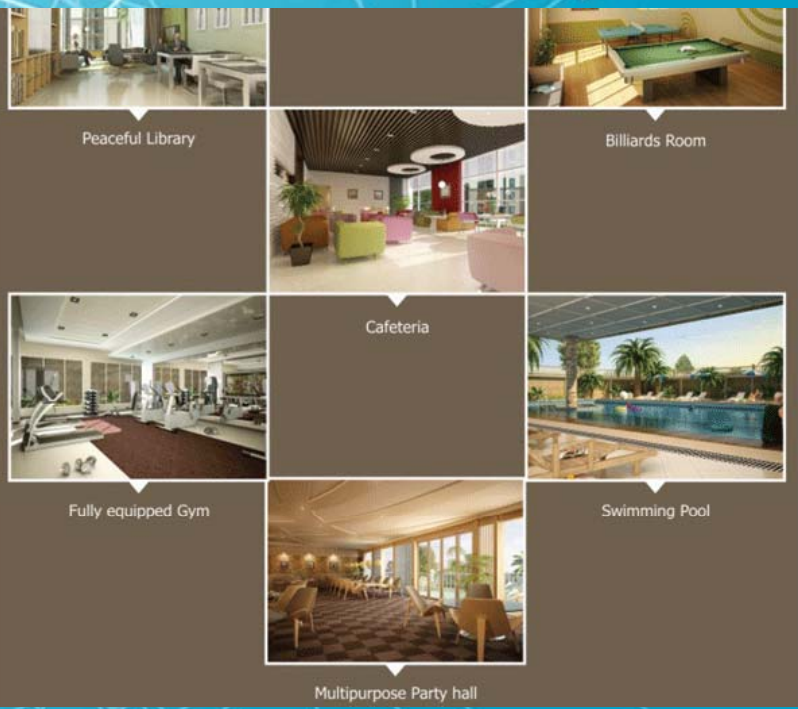
Promise the world, but is it feasible or sustainable?

community of families.

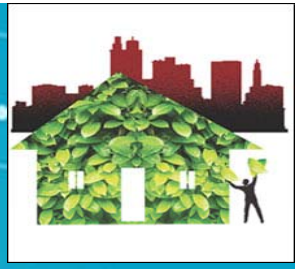
A home as a retreat. A place you can escape from the stress of busy schedules. ARG Rosewood Villas & Penthouses has been conceptualized to create a unified theme with variations to provide individuality for each neighborhood. Accordingly, a well-planned residential environment is being built to provide an array of housing choices-villas and luxury penthaouse...to cater to the needs andf tastes of the discerning people.

FEATURES:

- Double Height Squash Court
- Swimming Pool
- Separate Kid's Pool
- Steam Bath
- Table Tennis
- Billiards Room
- Elegant Lobby
- Multipurpose Party Hall
- Indoor Games Room (Chess & Carrom)
- Fully equipped Gymnasium
- Peaceful Library
- Cafeteria
- Open Air Theater & Paved Court



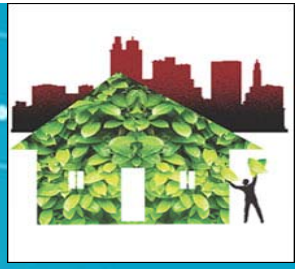
Water is a major limiting factor



- Punjab Haryana High Court imposed a moratorium on further construction if the builder was using groundwater
- Greater Noida too, CGWB permission is now a major requirement for getting building clearances
- Prices and property market is responding to water availability and quality
- Buyers are becoming vary of projects/areas with water concerns

Green Regulations and Good Practices

comes to the rescue



- Rainwater harvesting bye laws
- Wastewater treatment is emerging as a mandatory requirement in several clearances
- Dual plumbing is been prescribed
- increased impetus to reuse of treated wastewater in horticulture etc.

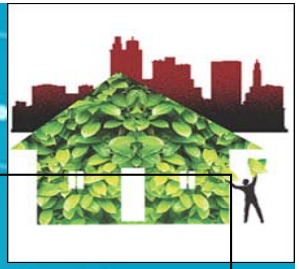
But, Safeguards are Extremely Crucial

accountability is the key

- Benchmarking- how much is been consumed and generated
- Monitoring – against the set benchmarks set
- Appropriate Practice - doing it the correct way
- Regular Operation and Maintenance- sustaining the systems

Safeguards Extremely Crucial

accountability is the key



NO BENCHMARK

CSE reviewed Minutes of the Meetings Haryana's SEAC, 2008- 2009

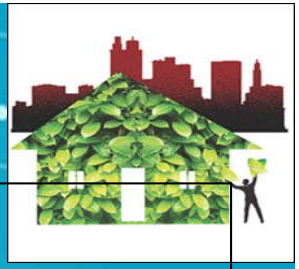
- 2%of the total residential projects had actually stated 135 lpcd (CPHEEO)
- 22% projects had per capita water consumption >150 lpcd
- Variation 48- 226 lpcd
- 47% have lpcd 50-100
- Either these buildings are highly water efficient or these are unsubstantiated estimates

ECs IN WATER STRESSED AREAS

- Haryana SEAC held in March 2009 have granted EC to 3 projects from DLF despite recognizing water scarcity in the area
- Project falls in the 24 villages notified by the CGWA
- CGWA bans exploitation of groundwater in such areas HUDA will not be able to supply water to this project in 3 years

Safeguards Extremely Crucial

accountability is the key



Proposed Residential colony ‘estate one’ Ludhiana Punjab - Contradictions.

- Form 1 states the total domestic water requirement as 902 KLD
- **Project water requirement has three different values in 2 different forms**

Bestech India’s proposed IT-Complex, Parkview Business Tower, Gurgaon.

- Water requirement stated 1048 KLD
- Wastewater generated 330 KLD (only 30% will be wastewater generated)
- STP capacity 400 KLD
- **Thumb rule of 80 % - WW should be around 838 KLD, STP very low capacity**

Low Hanging Fruits

water efficiency is attainable

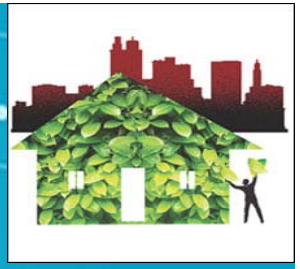
Water Use….

prescribed by CPHEEO

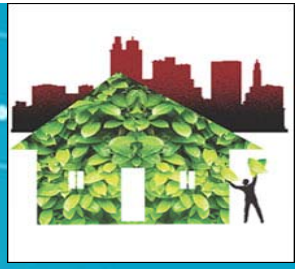
S.No.	Use	Consumption in litres/day/person*
1	**Drinking**	
2	**Cooking**	**5 Litres**
3	**Bathing (incl. ablution)**	**55 Litres**
4	**Washing clothes**	**20 Litres**
5	**Washing of utensils**	**10 Litres**
6	**Cleaning of houses**	**10 Litres**
7	**Flushing of latrines**	**30 Litres**
	Total for urban areas	**135 litres/person/day**
8	Extra for large/metro cities for more institutional needs	15 Litres

Total for Metro cities150 litres/person/day

The truth is…



- Little information about actual use
- But, households are beginning to use more
- Lifestyle is changing and becoming more aspirational
- We are inching closer to our counterparts in USA-261 lpcd, Aust- 320 lpcd
- In UK the average HH uses 55% more water than they did in 1980’s



Measure to Manage

Water Use....actual in America
(American Water Works Association)

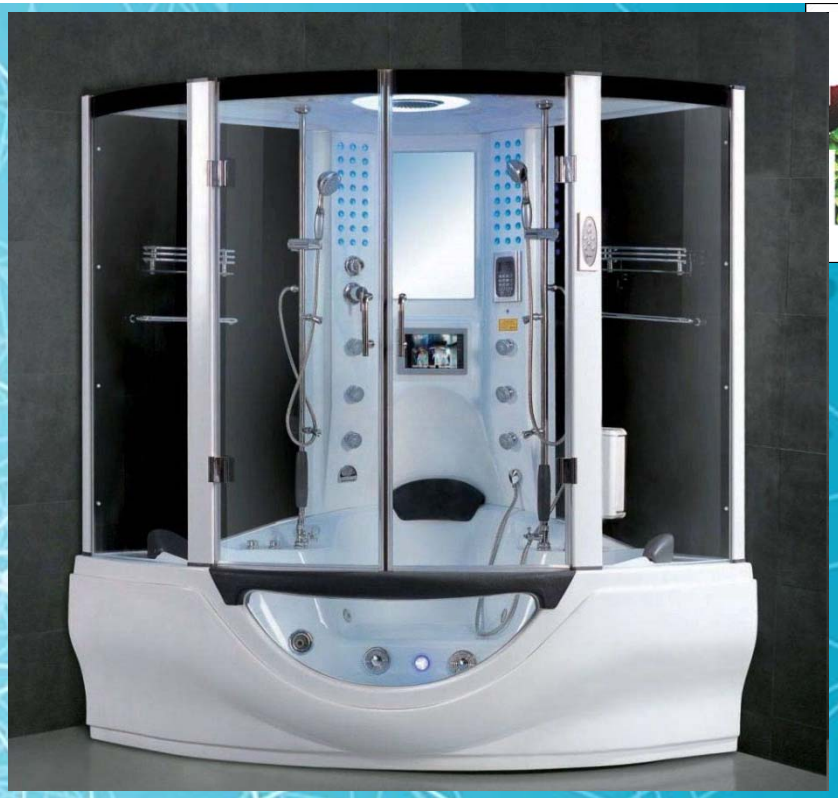
Purpose	LPCD	%age
Showers	43.8	16.8
Clothes Washers	56.7	21.7
	3.8	1.4
Toilets	69.9	26.7
Baths	4.5	1.7
Leaks	35.9	13.7
Faucets	41.2	15.7
Other Domestic Uses	6.0	2.2
Total	261.8	100

Water Use....Emerging Trend in India

Purpose	LPCD	% age
Showers	80	43
Kitchen taps	42.4	23
Laundry	28	15
Toilets	27	15
Leaking fitting	6.48	4
Total	184	100

Greener pastures beckons

Moving away from bucket bath



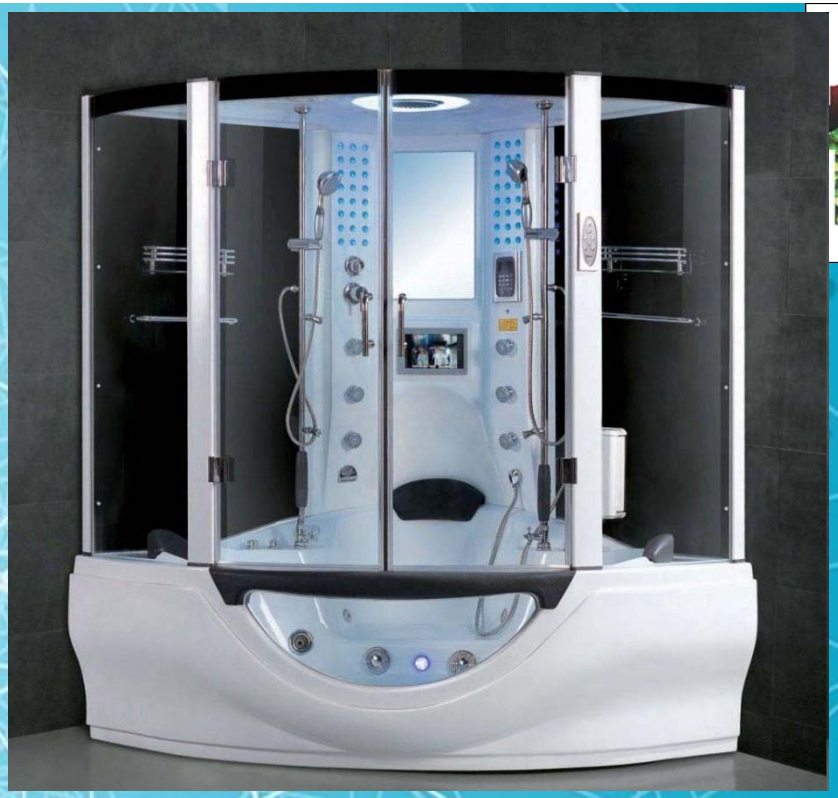

THE BOLD LOOK
OF KOHLER.
Design
Solutions

Water Efficient Fixtures

Fixture	Water use in standard fixtures	Water-efficient fixture	Water saved
Toilets	Single flush toilet uses 10-13 litres/ flush	Dual flush toilet in 3/6 and 2/4 litre models	4-11 litres/ flush
Urinals	4 liters; 10-13 litres if toilet pan is used	Sensor operated adjustable flush	2.2 – 10 litres per flush
Taps	10-18 litres/minute depending on pressure	Sensor taps	5.5- 15.5 litres/ minute
Showers	10-25 litres/minute	Flow restrictors	4-20 litres/minute

Source: Parryware Roca and others

- **Of the 135 lpcd water consumption nearly 30% is for flushing and 40% for bathing & washing**
- **Significant 35 % water savings (AWWA) through water efficient fixtures**




THE BOLD LOOK
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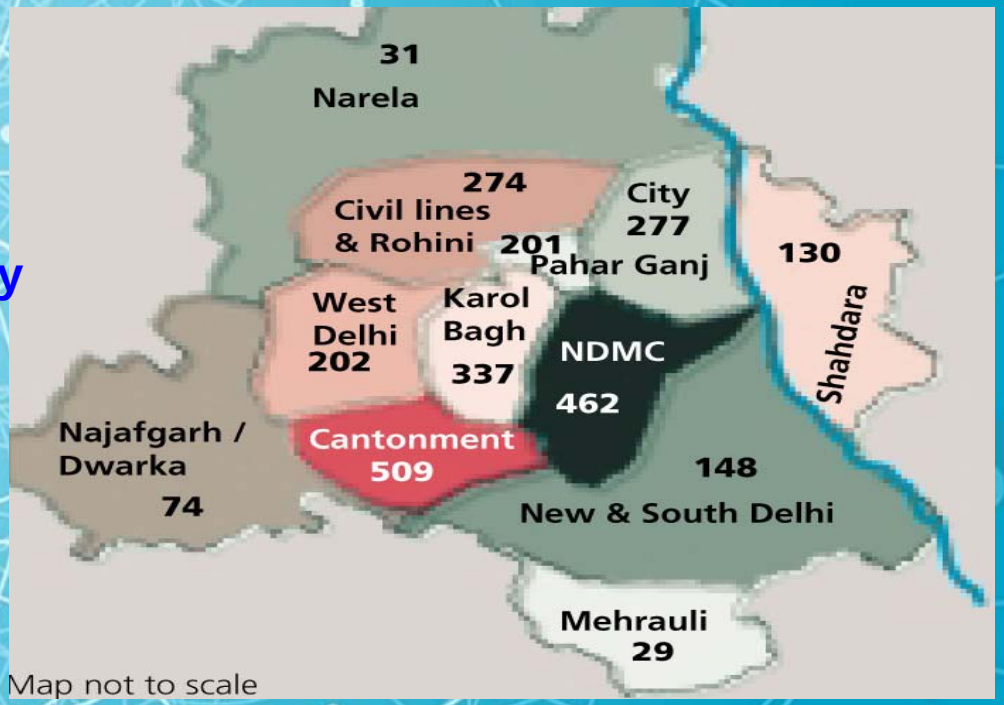
Water Guzzling Mindset on the rise

New Delhi: Per capita availability of water is 209 litres/capita/day.

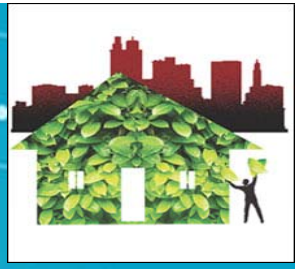
Copenhagen: Per capita water consumption in 1990 was 190 litres/capita/day. But their target was to bring it down to 111 litres/capita/day in 2002.

Delhi will increase per capita availability to 360 litres/capita/day by 2005.
A grand idea. A mindless idea.

Transportation costs are high.
Distribution costs high.
Cannot be recovered.
Subsidy to some. Water inequity ….
We looked at buildings once again……



A Glance at the Status



- No standards on Water Efficiency in BIS
- Voluntary standards on manufacturing process, leakage, material etc.
- National Building Code makes no reference to water efficiency
- Manufacturers claim to have their own tests
- No independent validation of water use and performance efficacy
- No incentives for manufacturers to develop and promote water efficient technologies except for green building rating system
- Almost 45-50% sanitaryware market is informal
- A large segment of the big and small cities and rural areas catered by the informal manufacturers
- Low consumer awareness on water use

Plateful of Technologies

Toilets

- **Dual flush-** 6/3 & 4/2 litres/ flush - An old style toilet uses 10-13 litres per flush. The dual-flush toilets use 6 liters on full and 3 liters on a half-flush', 4/2 litres models also available
- **Interruptible Flush Cistern-** The flushing action can be interrupted at will by pressing the button.
- **Ecosan-** Not very common for commercial buildings- urine-separating toilets separate the waste at the source

Urinals

Low water use urinals- Water is applied automatically through a continual drip-feeding system or by automated flushing at a set frequency.

- Average urinal- 4 litres
- Water-efficient urinals 2.8 litres
- Smart Flush urinal 0.8 litres per flush

Sensor operated - urinals detect the presence of people through movement sensors or door switches

Waterless urinals- there are various technologies available for waterless urinals like oil barrier, collapsible silicon seal and biological blocks

Faucets

- **Aerators**- Taps now available with aerators to save water and reduce splashes. Aerator spreads the water flow into many small droplets, it compensates pressure and provides the same flow regardless of pressure.
- **Flow Fixtures-** controls, deliver a precise volume of water in faucets, showerheads etc. (5.6 – 8.3 liters per minute), irrespective of varying line pressure.
- **Sensor taps-** are automatic shut-off taps, such as push-button or lever operated.
  - Sensor taps shut off automatically after a set time to reduce the potential for taps to be left running too long or not turned off
  - (e.g. a 6-star WELS-rated tap has a running time set between 5 to 10 seconds at a flow rate of 4 litres per minute).

Tap with aerators

Tap with flow fixtures

- **Showers**
  - Water efficient showerheads
  - Flow regulators – 6, 8 to10 litres/ minute
  - showers can also be fitted with digital read-out meters that show the user the amount of water being consumed and the duration of the shower

Showers with regulators

- **Washing Machines**
  - Water efficient- Front load

Front load washing machines

Frost Free Refrigerator

Schedule 1

TFL

Schedule 2

AC

Schedule 3

Direct Cool Refrigerator

Schedule 4

Distribution Transformer

Schedule 5

General Purpose Industrial Motors

Schedule 6

Monoset Pumps

Schedule 7

Openwell Pump Sets

Schedule 7

Submersible Pump Sets

Schedule 7

Ceiling Fans

Schedule 8

Domestic Gas Stoves

Schedule 9

Stationary Storage Type Water Heaters

Schedule 10

Color Televisions

Star Labelled Appliances

International Benchmarks

- Australia's **Water Efficiency Labelling and Standards (WELS)** made *mandatory* by the Water Efficiency Labelling and Standards Act 2005- Australia's Department of the Environment, Water, Heritage and the Arts.

- USA's **WaterSense** (2006), implemented by the Environmental Protection Agency under the Energy Policy Act, 1992.

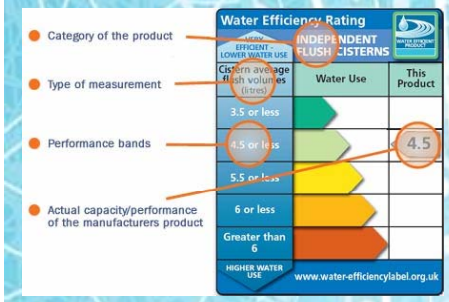
International Benchmarks

- **Water Efficient Product Labelling Scheme** in United Kingdom, operated by The Bathroom Manufacturers Association of UK , recognized by UK government

- **Water Efficiency Labelling Scheme (WELS)**, 2006, implemented by the Public Utilities Board (PUB)


APPROVED

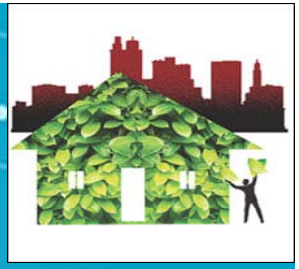
Several countries already have a Rating System….some have it Mandatory



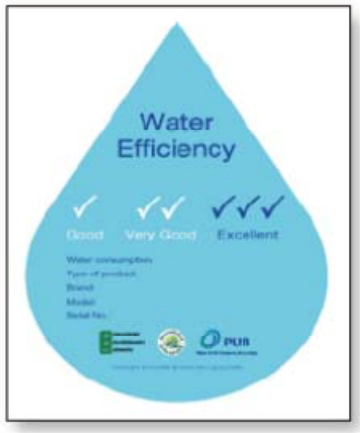
Water Efficient Initiatives - Europe	Type
Water supply (water fittings) Regulations : WC Suite Performance Specifications **(UK); 1999**	Mandatory
BMA Water Efficiency Labeling Scheme **(UK); 2007**	Voluntary
Waterwise Marque **(UK); 2006**	Voluntary
Enhanced Capital Allowance Scheme **(UK); 2003**	Tax rebate
Ordenanza de Gestion y Uso Efficiente del Agua en la Ciudad de Madrid **(Spain); 2006;** Local coverage in Madrid	Mandatory regulations
Decreto 202/1998 **(Spain); 1998;** Local coverage in Catalonia	Mandatory regulations
Distintivo de Grantia de Calidad Ambiental Catalan **(Spain); 1994** ; Local coverage in Catalonia	Voluntary label
Ambientale al Regolamento dell Citta di Avigliana – Allegato Energetico **(Italy); 2007** Local coverage in Avigliana	Voluntary label
Variente all' Art.8 delle Norme Techniche di Attuazione del P.R.G. **(Italy); 1997** Local coverage in Urbino	Regulation
Regolamento Energetico Ambientale **(Italy); 2008** Local coverage in Sassari	Regulation
Regulamento gerls dos sistemas publicos e predias de distibuicao de aguae de drenagem de aguas residuals **(Portugal); 1998**	Regulation
Certificacao de Efficnenncia Hidrica de Produtos **(Portugal); 2008**	Voluntary (E to A++ rating system)
Building Regulations **(Ireland); 2008**	Mandatory regulation
The Blue Angel **(Germany); 1978**	Voluntary label
The Nordic Eco-label **(Nordic countries); 1989**	Voluntary
The European Eco-label **(Europe); 1993**	Voluntary label

Water Efficient Initiatives- Australia & USA	Type
WELS **(Australia); 2005**	Mandatory 5 star rating system
Smart Approved WaterMark **(Australia); 2004**	Voluntary Label
The Car Wash Water Saver Rating Scheme **(Australia); 2004**	Voluntary Label (Rating System)
New Zealand WELS **(New Zealand); 2009**	Mandatory 5 star rating system
WaterSense **(USA); 2006**	Certification Mark
Energy Star **(USA); 1992**	Certification Mark, Voluntary Label

Label for WELS rating (left) and energy rating label (right) used in Australia



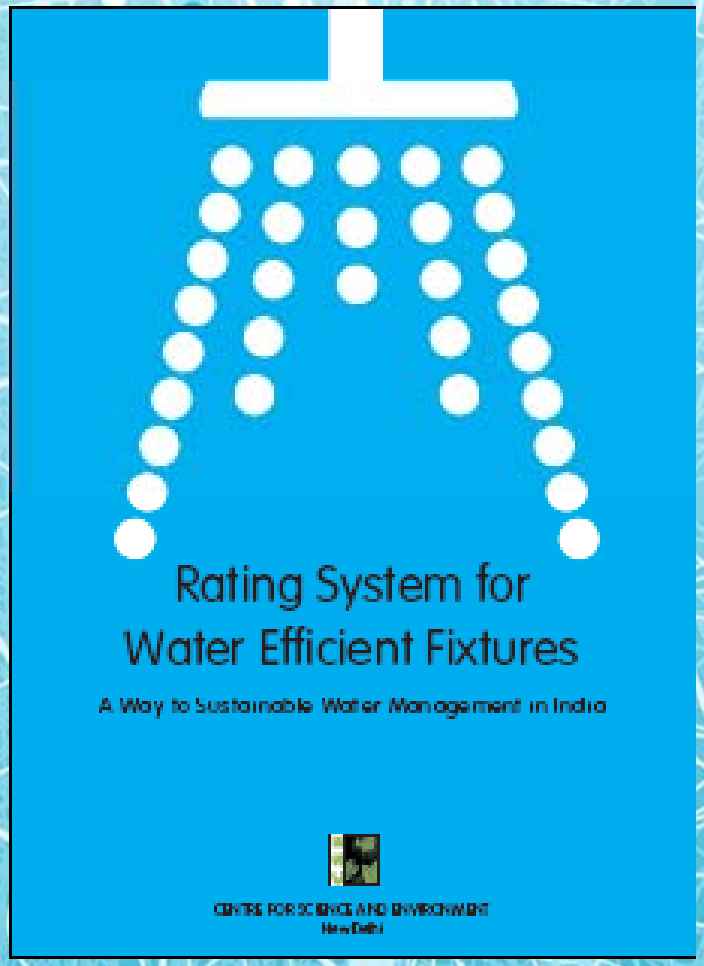
WaterSense Logo

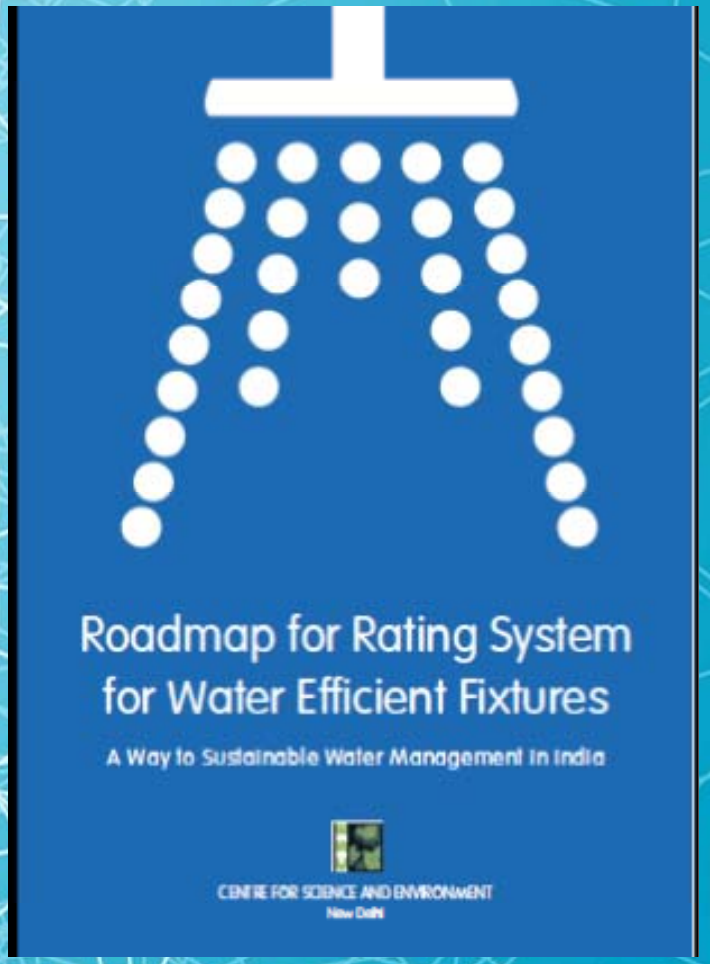


Singapore's Water Efficiency Logo

Water Efficient Initiative- East Asia	Type
WELS **(Singapore); 2006**	Mandatory / Voluntary Label (5-star rating system
Singapore Green Labeling Scheme **(Singapore); 1992**	Voluntary (Accredited Tested products)
WELS **(Hong Kong); 2009**	Voluntary Label
Korea Green Label **(Korea); 1992**	Voluntary Label
Japan Eco Mark **(Japan); 1989**	Voluntary Label
Thailand Green Label **(Thailand); 1994**	Voluntary

CSE's Initiatives





Draft Rating System for Water Efficient Fixtures

Water Closets

- European water closet with cistern or flush valve using not more than 6 litres per flush.☆
- European water closet with dual flush cistern or flush valve using 6 litres for full flush and 3 litres for half flush.☆☆
- High-efficiency European water closet using 5 litres single flush.☆☆
- High-efficiency European water closet using less than 5 litres per flush.☆☆☆
- Combination or Asian / Indian pan using 6 litres per flush; cistern or flush valve.☆
- Combination or Asian / Indian pan using 6 litres per full flush and 3 litres for half flush; cistern or flush valve.☆☆

Urinals

- Urinal with flushing device using 4 litres per flush.☆
- Urinal with flushing device using 3 litres per flush.☆☆
- Urinal with flushing device using 2 litres per flush.☆☆☆

Shower Heads / Hand-held Showers

- Shower head with flow-rates of 9.5 lpm.☆
- Shower head with flow-rates of 7.5 lpm.☆☆
- Shower head with flow-rates less than 7.5 lpm.☆☆☆

Faucets

Faucets (Private use)

- Non-metered faucets or faucets with aerators with flow-rates of 8 lpm.☆
- Non-metered faucets or faucets with aerators with flow-rates of 5.7 lpm.☆☆
- Non-metered faucets or faucets with aerators with flow-rates less than 5.7 lpm.☆☆☆

Faucets (Public use)

- Metered faucets with or without aerators with flow-rates of 1 litre per cycle or non-metered faucets with flow-rate of 2 lpm.☆☆
- Metered faucets with electronic actuator with flow-rates of 1 litre per cycle.☆☆

Kitchen Sink Faucets

- Kitchen sink faucets or faucets with aerators with flow-rates of 8 lpm.☆
- Kitchen sink faucets or faucets with aerators with flow-rates of less than 8 lpm.☆☆

Handheld Bidet Spray (Ablution faucet with hose and trigger)

- Handheld bidet spray with flow-rates of 8 lpm.☆
- Handheld bidet spray with flow-rates of less than 8 lpm.☆☆

Dishwashers

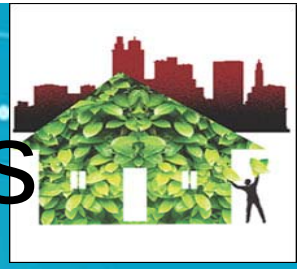
- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) of 22 litres:☆
- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) less than 22 litres:☆☆

Clothes Washer

- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of 5 liters for private use and 8 liters for public use:☆
- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of less than 5 litres for private and less than 8 liters for public use:☆☆

Other Common Sense Interventions

Water efficient landscapes



USA, UK etc. have water restrictions

- Notices to consumers using hosepipes for watering gardens, washing cars, driveways, filling ornamentals ponds, filing swimming pools
- Regulated irrigation schedules based on water needs
- Assigned irrigation days, water wastage fees
- scheduling irrigation during early and late hours
- Region/climate/ soil specific plants
- unpaved areas to increase recharge and reduce runoff

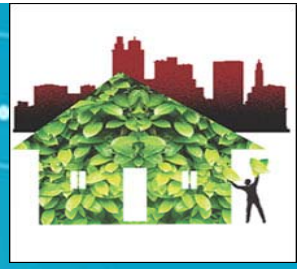
Not to irrigate when it rains

Water Guzzler Grass….avoid

six to eight litres a square metre per day in winter and somewhere between 12 and 16 litres per square metre in summer."

Read more: http://www.thenational.ae/lifestyle/house-home/make-your-lawn-thrive-even-in-the-summer-heat#ixzz2K1kJS3cw

Capacity Building of Water System Managers



- With increase in gated communities and growing role of RWAs in managing them, need to address some concerns
- The RWH and WWTS are often installed by builders but have to be managed by the RWAs
- Some instances where these systems are not been managed properly leading to serious concerns or have gone into disrepair
- Ensuring awareness and capacity building is mandated for RWAs to handle these systems
- It is a great opportunity for decentralizing water systems

Thank you for your attention !