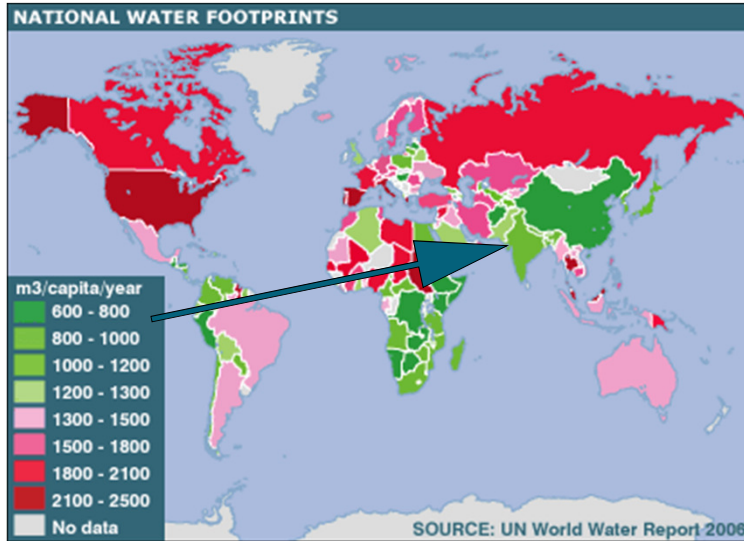




∞ Water connects (and divides) us

∞ “Water is critical for sustainable development, including environmental integrity and the alleviation of poverty and hunger, and is indispensable for human health and well-being.” United Nations

WATER (we are water starved: what are we doing?)



HEALTH WOES

The contamination shows presence of coliform bacteria or E.coli in Delhi's water. This bacteria is responsible for gastrointestinal infections that can result in typhoid, cholera, gastroenteritis or jaundice.

Posh areas of south Delhi and Karol Bagh are the worst affected.

About 60 per cent of Delhi residents consume water supplied by the Delhi Jal Board. The rest get water from pumps or tankers.

Drinking water sources in Delhi are contaminated by sewage overflow, septic tanks, leaking sewer lines, sludge and untreated waste water.

Pipes supplying water to many areas of Delhi are old and have cracks.

THE WAY OUT

HOME REMEDIES

- Boil water to kill disease-causing bacteria and other germs.
- Sterilise water chemically. Household chlorine bleach can be used.
- Store water in a clean container and make sure it is a metal container, it has not corroded.

CHLORINATION

The use of chlorine in water eliminates almost all germs that cause waterborne diseases. If your water comes from a private well, overhead tank or water tanker, chlorination is an effective way to purify it.

Chlorine can be added to water by way of bleaching powder, chlorine tablets and liquids. A four gram tablet purifies 2,000 litres of water.

People move in first; roads, water follow: Credai-Pune

Following Delhi's impact on the water affected areas in Pune, this...

Statement: BUILDERS' BOOM

About Credai, formerly RP&I...

WATER WOES

- More than 150 complaints to Delhi government's public grievance cell daily on water shortage.
- Between 20-30 written complaints received daily by Delhi Secretariat against the DJB.
- According to the National Sample Survey Organisation (NSSO) survey, 15.6% of Delhi's urban households and 29.7% of its rural areas don't get sufficient water throughout the year.
- The current average demand for potable water in Delhi is around 1,100 MGD (million gallons per day) while the DJB supplies around 830 MGD.
- The demand is projected to touch around 1400 MGD by the end of the 12th Five-Year Plan in 2017.

DJB Action Plan

- 980 tubewells set up at new locations and 64 dried up tubewells have been revived.
- 250 km of pipeline have been replaced with new ones to minimise complaints of leakages.
- 330 major water leakages have been identified and repaired.
- Three new UGRs (underground reservoirs) at Sultanpur, Dabas, Qutub Garh and Ramla Meidan shall improve the water supply during summer in the colonies of north-west Delhi.
- In 2014, 23 additional filling point hydrants have been constructed and 165 tanker filling hydrants are functional around Delhi.
- To combat the local water mafia, the DJB has introduced the Delhi Integrated Multi-Modal Transit System (DIMTS) which will be monitoring the movement of DJB tankers.

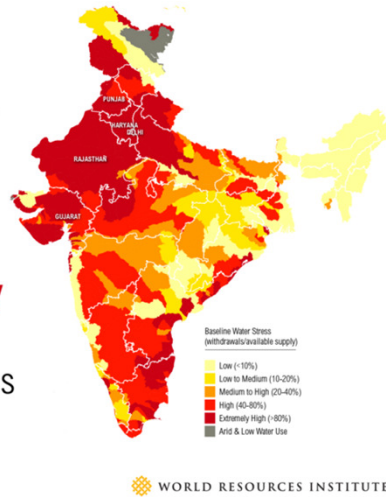
<http://timesofindia.indiatimes.com/city/chennai/Chennai-Sunshine-but-Villivakkam-Korattur-remain-flooded/articleshow/49763416.cms>

<http://www.dailymail.co.uk/indiahome/indianews/article-2609784/Delhi-dries-summer-It-April-Capital-reeling-water-shortages.html>

INCREASING WATER STRESS

- There will be a 50% gap between supply and projected demand by 2030 ¹
- More than 100 million people in India living in areas with poor water quality²

54%
of India
Faces
**High to
Extremely
High
Water Stress**



www.indiawatertool.in

WORLD RESOURCES INSTITUTE

1. pg-9, Charting Our Water Future, 2030 Water Resources Group
2. World Resources Institute

We cry when it rains, we cry when it does n't!!!



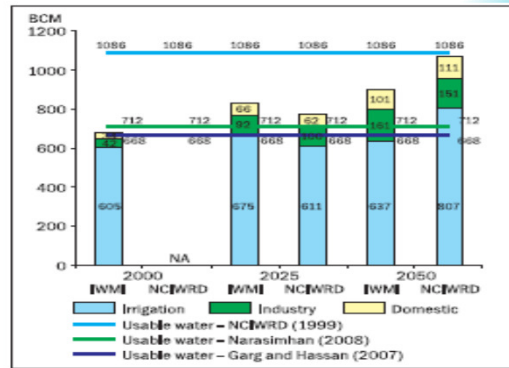
Developmental stress on water resources

(Indian)

- In India industrial water requirement doubled during last decade & expected to increase 7 folds by 2050 (from 15.3 BCM in 1997 to 102 BCM in 2050)
- Fierce competition among sectors: industries, irrigation, drinking water etc.

Demand Supply gap

- Water demand in India will reach a whopping 1,500 bcm (by 2030) while current supply is only about 744 bcm. (Source: The 2030 Water Resources Group)



State of Water Resources

Declining water availability

Falling per capita water availability:

- 5177 m³ (1951)..to 1654 m³ (2008)
- "Water Stressed"
- Nine out of our 20 river basins with 200 million populations are already facing "water-scarce" condition

Overexploitation of groundwater

- More than 50% of our water demand met from GW
- Many over-exploited States already : e.g. Delhi, Punjab, Rajasthan

Depleting Groundwater

- Due to several factors like increasing no. of bore wells, ineffective regulation, cropping pattern, cross subsidies, increasing demand)
- May further worsen under climate change scenarios

Deterioration in surface and groundwater quality

- High BOD and bacteriological contamination in many stretches of rivers & observed pollution of lakes and wetlands
- Groundwater contamination: F, As, Fe, Nitrate, Inland and Coastal Salinity, Heavy metals & pesticides.

Issues: Access / pricing/Inefficiencies

Inequitable access

- **Inequitable access with high disparity** in per capita water supply (Eg. Delhi 29 to 509 lpcd)
- **High unaccounted for water (UFW) in Urban cities**
- **Irrational tariff**
- **Unsustainable & inefficient water-use**

Discharge of untreated sewage into water bodies causing pollution



Cost of water does not reflect cost of production and supply not moderated

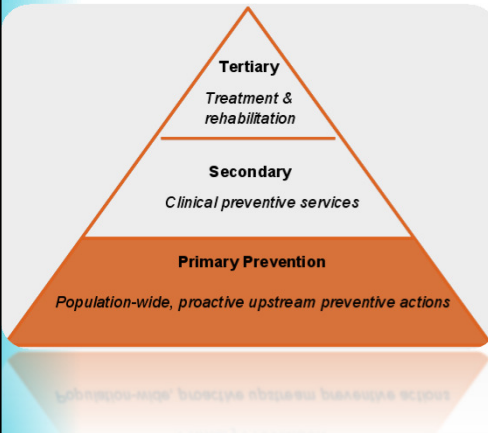
City	Production cost Rs/kl	Water charges Rs/kl
Delhi	8.95	2.00
Mumbai	5.74	2.25
Jodhpur	20.00	1.21
Indore	9.50	2.00
Bangalore	13.00	5.60

Why should we save?

City	Own Water Supply Norms of Cities (lpcd)
Ahmedabad	170
Bangalore	140
Kolkata	227
Chennai	110
Delhi	225
Greater Mumbai	240
Lucknow	250
Pune	140

Impacts of water shortage/quality issues:

Impacts Health



- ☞ Around 37.7 million Indians are affected by waterborne diseases annually,
- ☞ 1.5 million children are estimated to die of diarrhoea alone
- ☞ 73 million working days are lost due to waterborne disease each year. T
- ☞ The resulting economic burden is estimated at \$600 million a year.

Source: WaterAid,

**Primary prevention means
unhealthy condition never
occurs**

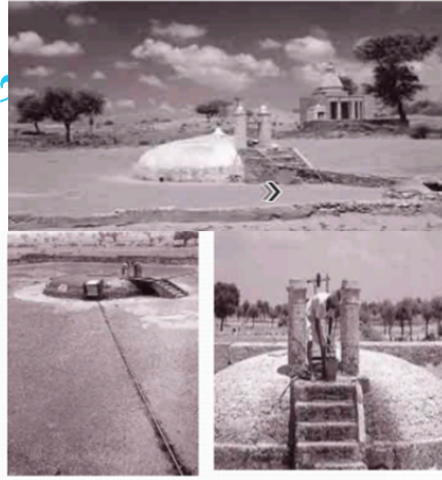
Did you know?



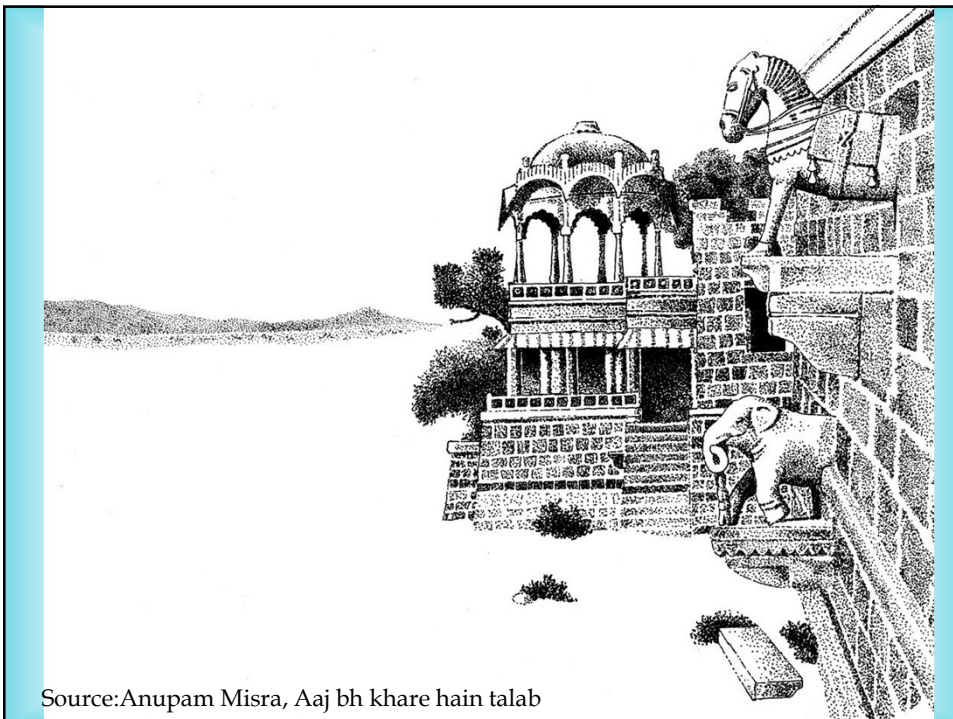
- ☞ India has more than **15 lakhs tanks**
- ☞ Every **10 fold increase** in catchment area **reduces** average annual **runoff by about 36%**
- ☞ One dam with a catchment of 10 ha will collect much less water than 10 dams with 1 ha catchment area each

**We still feel that our future is secure in building
large dams**

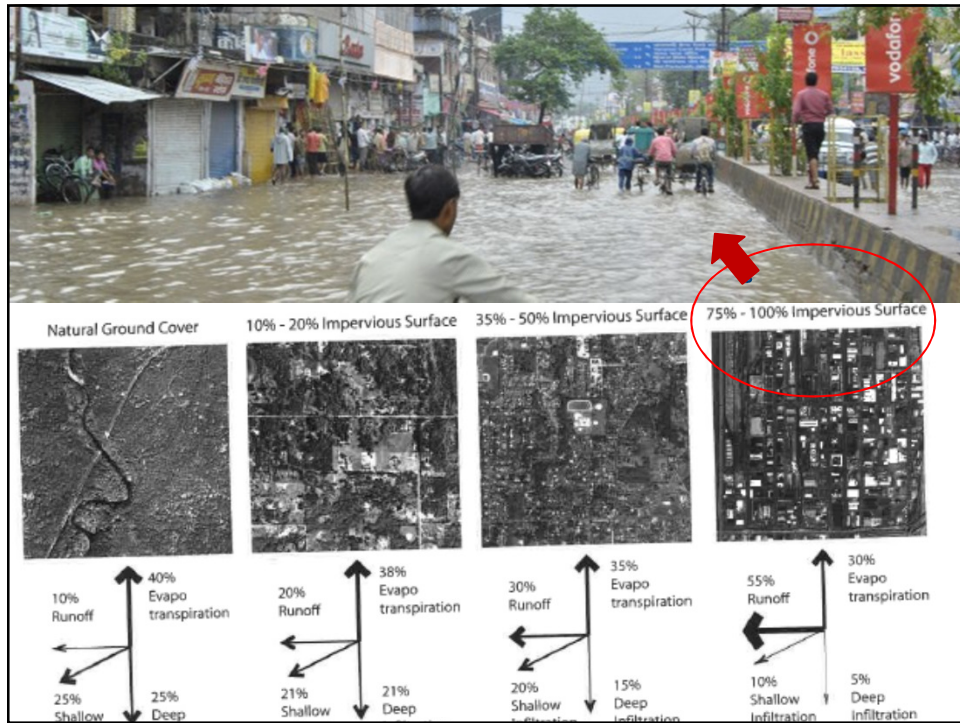
A land of 'Dying wisdom'!



We could catch the precious 100 hrs of rain of the 8760 hours in a year effectively



Source: Anupam Misra, Aaj bh khare hain talab



How did the transition happen?

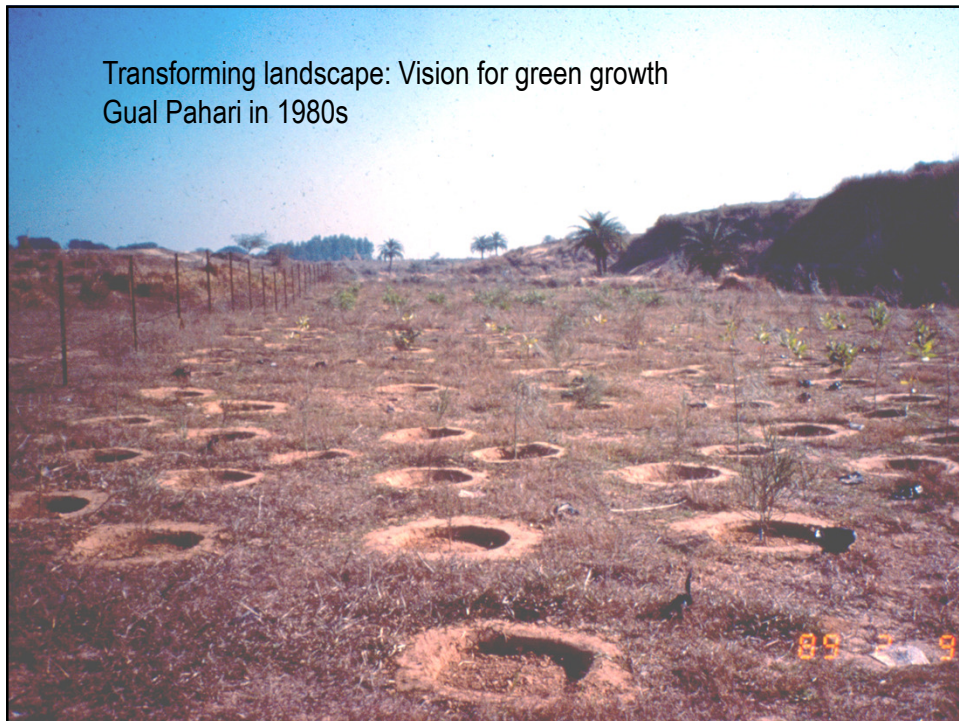
- ❧ Traditional water harvesting system lost significance
- ❧ Concept of community based water management lost
- ❧ Indian bureaucracy took over the self-appointing role of supplying water
- ❧ Thirst for 'augmenting' supply rather than 'managing' demand

Is there a way for 'Dying wisdom' to 'reviving wisdom'?

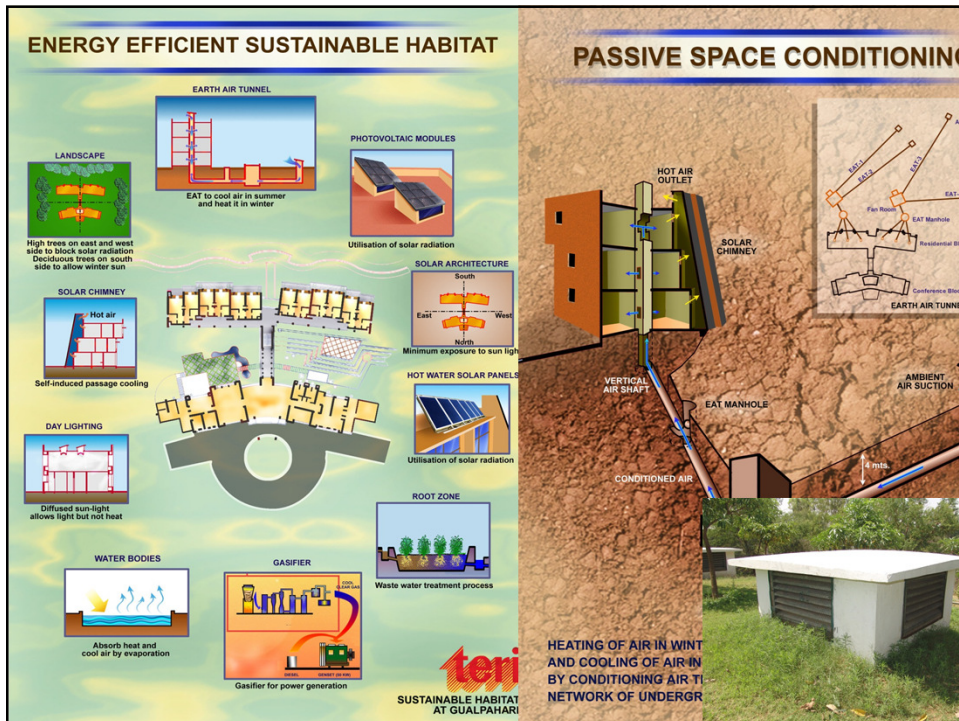
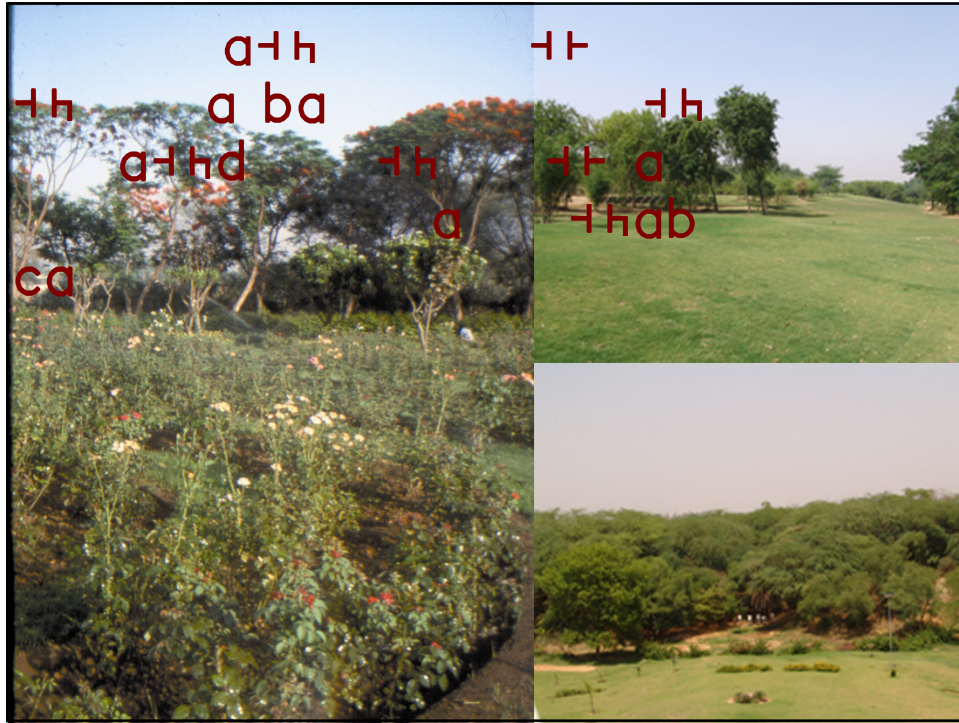
What can be done?



☞ In the pursuit of finding solutions, TERI started its own journey with experimenting on it's campus at Gurgaon



Transforming landscape: Vision for green growth
Gual Pahari in 1980s



TERI-RETREAT, Gurgaon



Water management plan for TERI-Gram campus - construction of artificial recharge injection wells; Rejuvenation of streams; Rainwater harvesting

TERI-RETREAT, Gurgaon

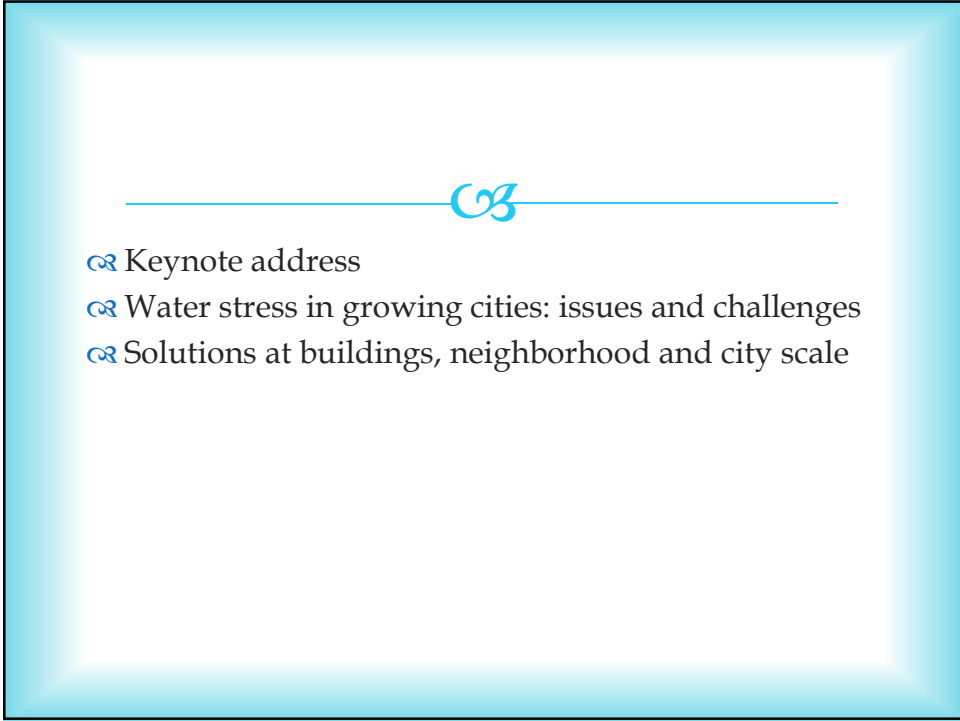





⌘ GRIHA journey-integration of water demand and supply side management at building and neighbourhood scale

What next?





—  —

- ☞ Keynote address
- ☞ Water stress in growing cities: issues and challenges
- ☞ Solutions at buildings, neighborhood and city scale



WELCOME
&
THANK YOU

—  —

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Associate Director,
Centre for Research on Sustainable Building Sciences &
GRIHA Council,
The Energy & Resources Institute