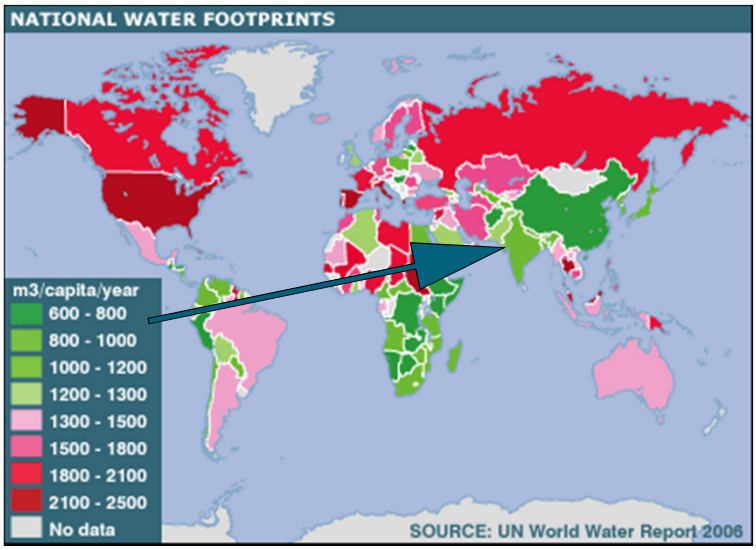
- Water connects (and divides) us
- "Water is critical for sustainable development, including environmental integrity and the alleviation of poverty and hunger, and is indispensable for human health and well-being." United Nations

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



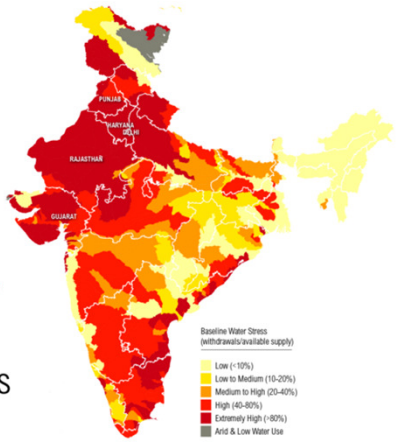
http://timesofindia.indiatimes.com/city/chennai/Chennai-Sunshine-but-Villivakkam-Korattur-remain-flooded/articleshow/49763416.cms

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 quality[2]

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



www.indiawatertool.in

WORLD RESOURCES INSTITUTE

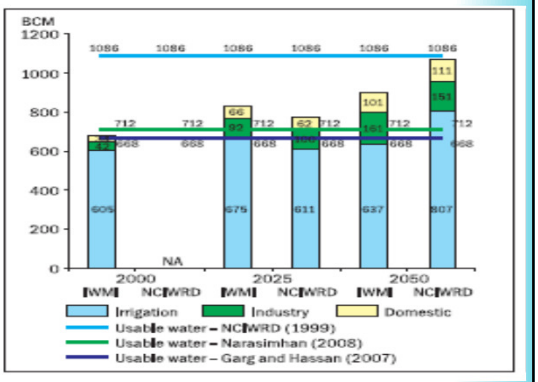
1. pg-9, Charting Our Water Future, 2030 Water Resources Group
2. World Resources Institute

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 m^3** (1951)..to **1654 m^3** (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


http://news.yahoo.com/water-shortages-lead-lanker-mafia-india-


http://environmentcounts.org/article175

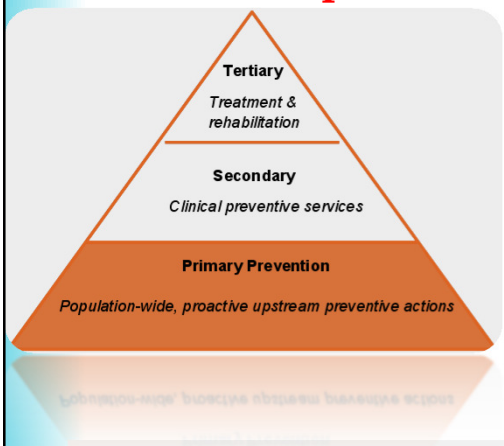
Cost of water does not reflect cost of production and supply not moderated

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,

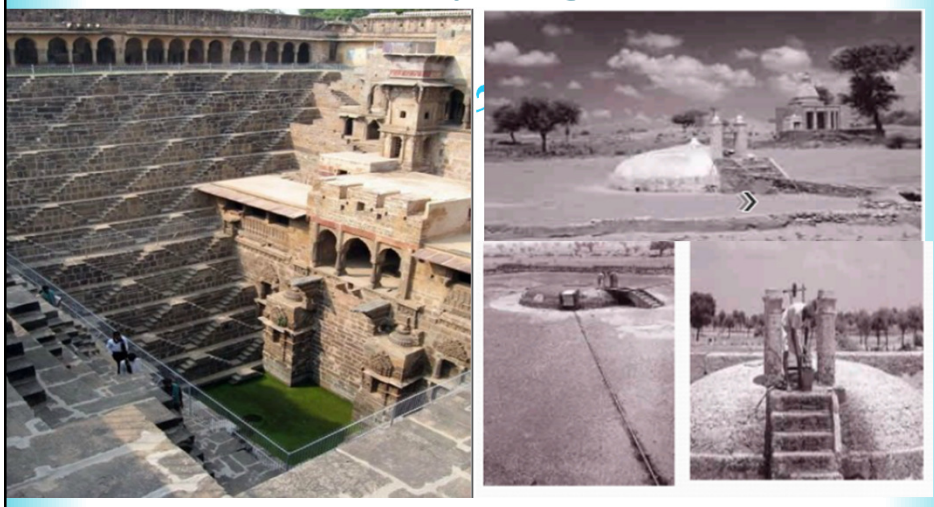
Primary prevention means unhealthy condition never occurs

Did you know?

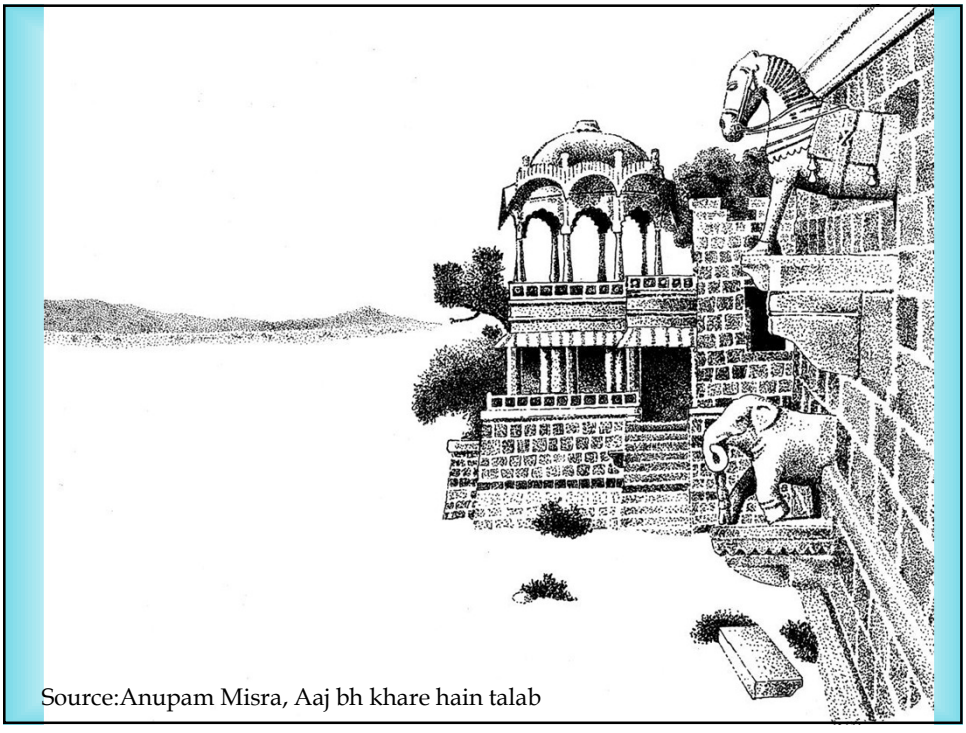
- India has more than **15 lakhs tanks**
- Every **10 fold increase** in catchment area **reduces** average annual **runoff by about 36%**
- One dam with a catchment of 10 ha will collect much less water than 10 dams with 1 ha catchment area each

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

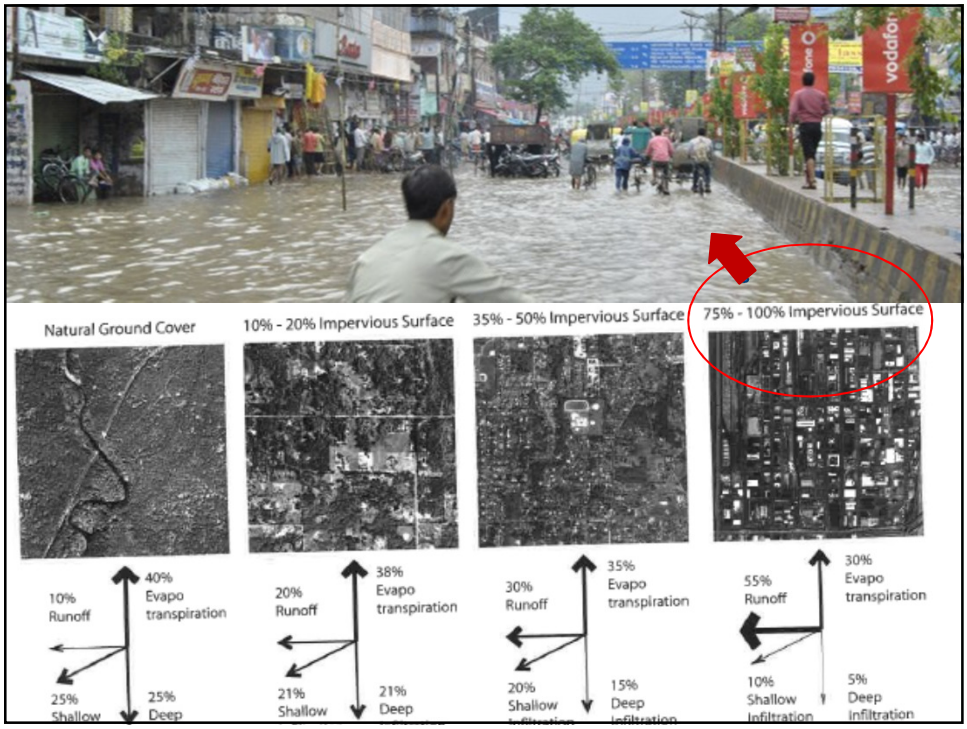
A land of 'Dying wisdom'!



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



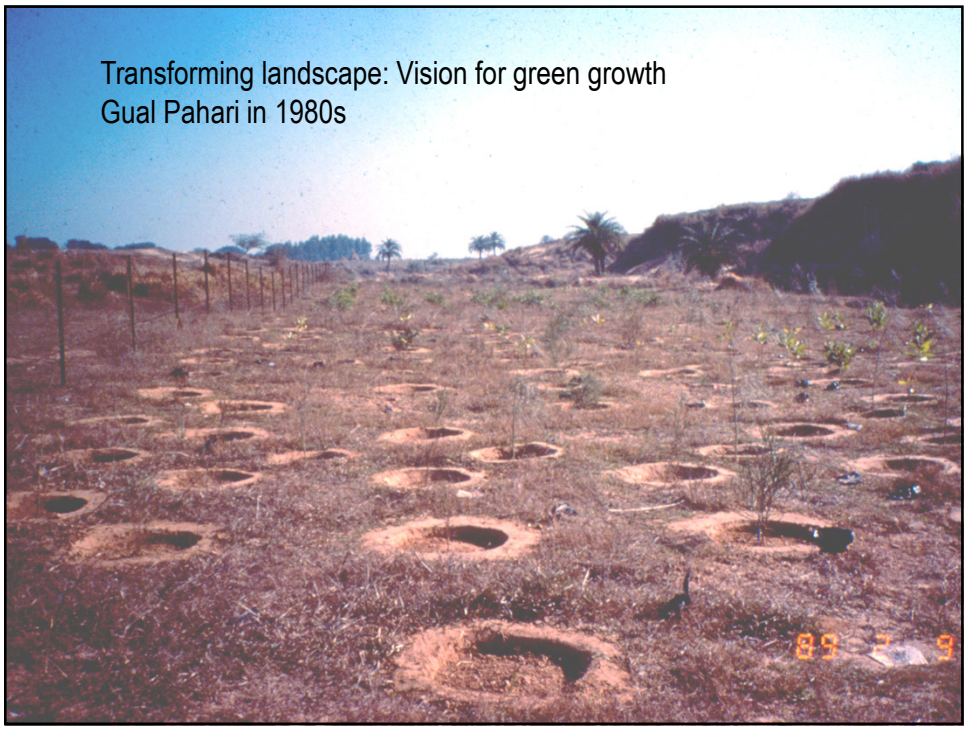
How did the transition happen?

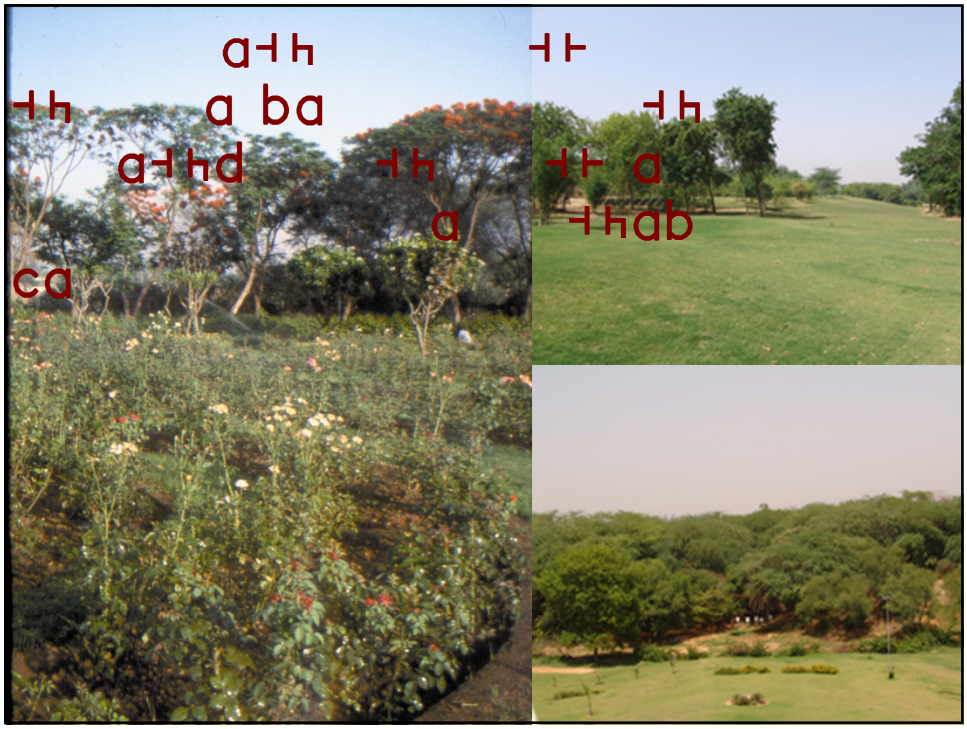
- Traditional water harvesting system lost significance
- Concept of community based water management lost
- Indian bureaucracy took over the self-appointing role of supplying water
- Thirst for 'augmenting' supply rather than 'managing' demand

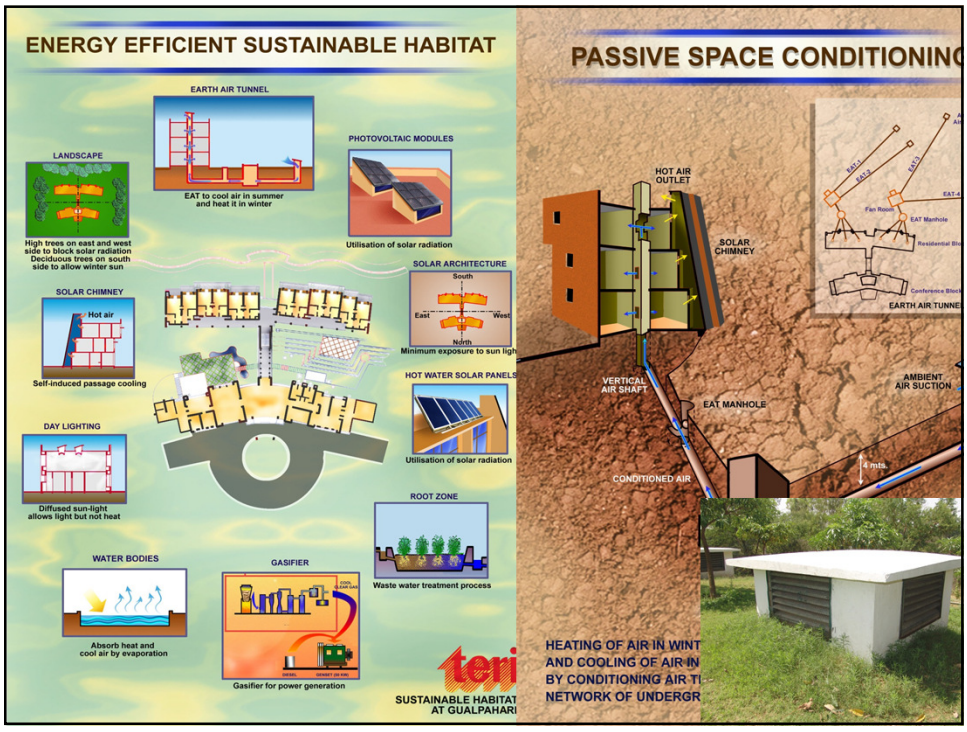
Is there a way for **'Dying wisdom'** to **'reviving wisdom'?**

What can be done?

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



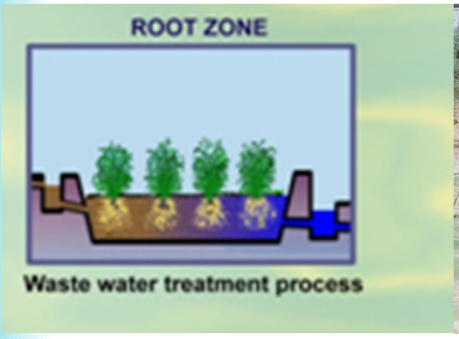


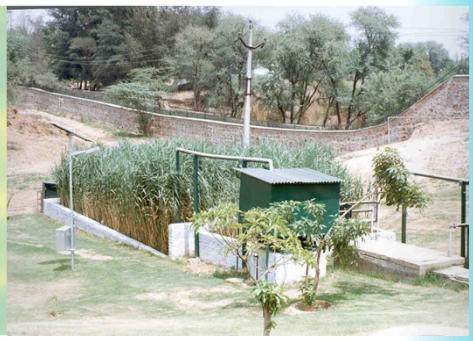

ENERGY EFFICIENT SUSTAINABLE HABITAT
EARTH AIR TUNNEL
EAT to cool air in summer and heat it in winter
PHOTOVOLTAIC MODULES
Utilisation of solar radiation
LANDSCAPE
High trees on east and west side to block solar radiation
Deciduous trees on south side to allow winter sun
SOLAR ARCHITECTURE
South
East
West
North
Minimum exposure to sun light
SOLAR CHIMNEY
Hot air
Self-induced passage cooling
HOT WATER SOLAR PANELS
Utilisation of solar radiation
DAY LIGHTING
Diffused sun-light allows light but not heat
ROOT ZONE
Waste water treatment process
WATER BODIES
Absorb heat and cool air by evaporation
GASIFIER
Gasifier for power generation
teri
SUSTAINABLE HABITAT AT GUALPAHARI
PASSIVE SPACE CONDITIONING
HOT AIR OUTLET
SOLAR CHIMNEY
EARTH AIR TUNNEL
VERTICAL AIR SHAFT
EAT MANHOLE
AMBIENT AIR SUCTION
CONDITIONED AIR
4 mts
HEATING OF AIR IN WINT
AND COOLING OF AIR IN
BY CONDITIONING AIR TI
NETWORK OF UNDERGR

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

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