Policy Interventions and Groundwater Rejuvenations across India

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Groundwater in making of India

Arjun piercing ground to provide water to Bhisma on arrow-bed
Terracotta sculpted scene from Mahabharata (<900 BCE), Jor Bangla temple, West Bengal

Mohenjo daro
~2500 BCE

Lalitgiri, Odisha
~600 AD

Qutub Minar, Delhi
~1200 AD

Adlaaj, Gujarat
~1498 AD
Groundwater for modern India

The Water Consumer

- Irrigation: 85.3%
- Industry: 1.3%
- Energy: 0.3%
- Other: 6.5%
- Domestic: 6.6%

Source: Central Water Commission
WATER ISSUES in India

- Water Scarcity
- Water Excess
- Drinking Water Security
- Water Quality and Pollution

Climate Change
Gravity Recovery and Climate Experiment (GRACE)

NASA-UT(CSR)-GFZ/DLR

Launch: 17 Mar 2002

Mission Duration: 5 years

Present Status: Still working after 15 years

Nick named: Tom and Jerry

Distance: 220 km (polar orbit)

Elevation: 500 km (approx)

Resolution: 15 revolution/day
Decadal-Scale Groundwater Storage Change
Decadal Time-series of groundwater storage changes (2003-2015)

Bhanja et al., 2017, 
Nature Scientific Report
Groundwater Replenishment?

Groundwater Level

Legends
GWL increasing trend
> 0.2 m/yr
0.1 - 0.2 m/yr
0 - 0.1 m/yr

1996-2015

Bhanja et al., 2017,
Nature Scientific Report
Groundwater Policy Intervention

- Rejuvenating dry river beds
- Infiltration Ponds and tanks
- Check Dams
- Artificial Recharge
- Rainwater harvesting
- Restricted power for agriculture
- Large-scale water management structures
Restricted agricultural electricity usage reduced groundwater pumping

Simulated with information from Shah and Verma, 2008

Replenishment Case Study: *Hypothesis 2*

Andhra Pradesh

Increased creation of Surface water ponds, enhancing recharge

Statistical test with information from A.P.Govt Rep., 2014

Mukherjee and Bhanja, 2018
Conclusion:

Groundwater storage condition in INDIA in last decade

Groundwater Policy Intervention

Mukherjee and Bhanja, 2018
India’s falling groundwater storage replenished: Study

For the first time, researchers from India and abroad have given positive confirmation of replenishment of groundwater storage at the regional scale.

Groundwater replenishment noted in west, south India: Scientists

An international team of researchers, including experts from IIT-Kharagpur and NASA, has reported discernible groundwater storage replenishment in certain Indian regions, in a new study.

Kolkata, Aug 11 (IANS) An international team of researchers, including experts from IIT-Kharagpur and NASA, has reported discernible groundwater storage replenishment in certain Indian regions, in a new study.

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