Recent Action-Research in Water Sector.

CTARA, IIT-Bombay
People in Water Sector

- **Subodh Wagle**: Water regulation, policy, irrigation and sector studies.
  - Jal-Swarajya, and recently the Nira-Deoghar project
- **N. C. Narayan**: Policy, Watershed management.
  - Udaipur case study, Integrated watershed management, interdisciplinary training.
- **Bakul Rao**: Water and Environment, consultancy.
  - Design of rural water quality programs for Karnataka state.
- Numerous other student projects in Karjat, Manchar and other areas.
- **Milind Sohoni**: Rural drinking water—Today’s focus
2005-The Gudwanwadi Project

- A teaching and research initiative
- **Objective**: to investigate the interface between technology and development.
- **Methodology**: concrete problem and direct participation.

- 380 Thakar people.
- 200 animals.
- 40 households.

And an acute shortage of water for 5 months.

**Technology Choice**

Build a check-dam.
Multi-agency

Faculty, students of IIT, ADS (a local NGO), Gangotree—an implementer.
People

Intensive village level work.
Our Director
On July 1st, 2006

Full!
Success...mixed

- Running water (for washing etc.) till about Feb 20th.
- Drinking water in borewells till about March 15.
- Acuteness of problem reduced by 2-3 months

Ongoing research

- Hydrogeological surveys and testing
- Protocols for construction-2008-grouting
- Simulation
- cost-effectiveness
Wider Goals

Rural Water Solutions-Jal Swarajya

- 2000 villages in Maharashtra alone
- No technical solutions seem available other than
  - lifting from existing reservoirs and
  - ground-water

2007-Thane district survey.

- Poor performance of ground-water based solutions.
- Poor quality groundwater data.
- Capacity building is essential.
The Karjat Project

- **Disha Kendra**: A popular NGO in Karjat-Khalapur area, led by Nancy Gaikwad.
- **January 2010**: approached CTARA with problem of widespread drinking water collapse in North Karjat taluka.
- Ashok Jangle (DK): various RTIs and collation of some information.
- Preliminary interviews with taluka officials.

**Our plan:**

- **Question 1**: Is there adequate groundwater at all?
  - GSDA, our own tests. *(Sanjiv, Vishal)*
- **Question 2**: Are there administrative problems?
  - lack of information, improper yield tests, etc.
- **Question 3**: What is to be done?
  - Groundwater recharge structures?
  - **Surface water supply?** *(Abhishek, Vikram and Janhvi)*
The Karjat Pipeline feasibility study

Study Objective

Is it possible to have a wide-area rural pipeline scheme for the area?-a basic techno-economic feasibility study.

- primary and secondary, i.e., source to standpost. no tertiary.
- use MJP norms exactly as far a possible.
- See if capital costs and energy costs fit within norms.
- ownership, tariffs, cost recovery, metering etc., later.

- Abhishek Sinha, Vikram Vijay: two dual-degree Civil. Engg. students, Janhvi Doshi, 4th year B.S., summer intern from Rice University.
- 3 months of field work: May-July 2010. Report-writing 1-2 months.
- Rs. 1 lakh budget.
Hamlets and clusters
Overall map
### Key Findings

<table>
<thead>
<tr>
<th></th>
<th>200 LPCD</th>
<th>40 LPCD</th>
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<tbody>
<tr>
<td><strong>Daily Demand</strong></td>
<td>19.47 MLD</td>
<td>3.90 MLD</td>
</tr>
<tr>
<td><strong>Net Investment</strong></td>
<td>Rs. 57.21 crores</td>
<td>Rs. 17.19 crores</td>
</tr>
<tr>
<td><strong>Cost per person</strong></td>
<td>Rs. 7051</td>
<td>Rs. 2119</td>
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</tbody>
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- Energy costs of Rs. 4.51 per cubic meter, at Rs. 5 per unit and 75% pump efficiency.
  - This may reduce further from better choice of lift-up point, agreement between MJP, Irrigation and Tata Power.
- O&M costs and establishment costs to be added.

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**Pipeline water supply for North Karjat (pop. 51,000 in 70 hamlets) is techno-economically feasible.**

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1. www.cse.iitb.ac.in/~sohoni/karjatfinal.doc
Post-report

- Report submitted to Disha Kendra for dissemination.
  - Key knowledge input to serve as rallying point.
- Report submitted to Karjat MLA, Shri. Suresh Lad.
- And to MJP office and Minor Irrigation office in Karjat.

Towards adoption:

- Key resolution by GPs of expression of demand (scarcity). done earlier
- Submission to ZP and MJP.

New Research

- Single vs. Multi village schemes and institutional issues
- IIT as consultant to rural bodies
Groundwater

Basic question: Groundwater sufficiency and distribution.
- conflicting narratives of taluka administration and inhabitants
  - Karjat again...
- very poor quality and sparse groundwater data.
  - 9 observation wells for the whole taluka

![Water level in Khandas](chart.png)
The GP Water Document

To maintain reliable data and assess need.

To prepare a framework for policy implementation.

Some key ideas:

- **Yields**—a new test?
- **Maintability**—Capacity building at GP level to maintain plan.

Data:

- The demand: household and commercial. Seasonality.
- Ponds and tanks: storage and seasonal levels.
- Sources: open wells, handpumps and energized borewells.
Seasonality and well yields

- **Need:** to assess supply and to predict
- **Example:** column = 7m, WT = -4 implies recharge 7 cu.m./day.
- Generated in initial years

**Reliable and Accurate**
A more refined understanding of supply and demand.

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**Well Recharge Curves**

- -2m monsoon
- -4m winter
- -6m spring
- -8m summer
Simulator Project- since 2008

- Role in watershed development.
- Planning of small structures for drinking water.
Thanks