Vision, Action and the Future
Centre for Technology Alternatives for Rural Areas
IIT-Bombay

Milind Sohoni

www.ctara.iitb.ac.in
Agenda

- Introduction to CTARA
- Core CTARA operational values and the T&D program
- Development situations
- Vision and the future
Centre for Technology Alternatives for Rural Areas

- An academic center of IIT-Bombay, started in 1985
- To study and to develop solutions for problems from rural India

Initial work:
- Agricultural machines and implements
- Energy and drudgery saving devices
- KVIC nodal center
  - Herbal oils extraction process
- Bio-diesel from waste oil
Later work

- **2005**: Check-dam at Gudwanwadi, 85m, 20,000 cu.m. for Rs. 25 lakhs
- **2009**: Vertical Shaft Brick Kiln at Pen *taluka*

Department ⇒ End-Use ⇒ Stakeholders
Civil, CSE ⇐ Drinking Water ⇐ Gudwanwadi

Academic Initiatives

- **2007**: M.Tech. program in Technology and Development
- **2010**: TDSL-interaction with other departments and UGs
Core Faculty

- **A. W. Date** - Appropriate Technology, Rural systems
- **U. N. Gaitonde** - Mechanical Engineering, Energy and Thermal system
- **Anand Rao** - Energy and Environment, Climate Change
- **N. C. Narayanan** - Water and Governance, Development Theory
- **N. Shah** - Food, Agriculture and Agro-Industry
- **Milind Sohoni** - Water, Rural systems

Adjunct Faculty:

- **S. Wagle** - Policy and Governance
- **Bakul Rao** - Environment Analysis and Assessment
- **P. Modak** - Environment and Natural Resource Mgt.
- **S. Agnihotri** - Governance and Govt. Programs
The T&D core operational values

- Concrete beneficiary/stake-holder—the bottom 80%, households, hamlets, gram-panchayats, villages, towns and cities
- Basic areas—soil, water, energy, livelihoods, public health
  - end-user defined or demand-driven
- Concrete deliverable—as close to implementation as possible
  - solutions and knowledge—technology, policy, study, capacity
- Act locally and then think globally

Objectives of the M.Tech./Ph.D. program

To produce the developmentalist/development practioner

- Analyse ”development” situations and design solutions
- Build on grassroot understanding to work on national/global issues
Karjat City—a small taluka town in Maharashtra

- Request from Municipal Council to analyse City Development Plan
- **Ongoing work**—water, sewerage, solid waste, municipal budget
- **Skills**: GIS, simulations, social and governance analysis

**water system**

- 3 zones OK but higher capital costs, 1 zone poorly designed
- Pump efficiencies lower (51%, 60%) than standard (70%)
- Financial stress— unmetered system, commercial and residential
- Competition with private bore-wells
Drinking water system for Boriwali GP (Karjat tal.)

As requested by Borivali Sarpanch.

Development problems demand:

- field-work and inter-disciplinarity
- creativity, innovation, honesty and hardwork
The corollaries

- Foremost learn the real **Engineering loop**: analyse, design, deploy, satisfy
- **Accept Inter-disciplinarity**-necessary and in the multi-stakeholder form
- **Engage**-with the unorganized sector, directly or through the State or the Market, if present. Through NGOs, CSOs
- **Do Field work**-sensitization, proofing, participative and beyond

### Perspective
3-4 common courses

### Skills
2-3 common courses

### Knowledge
Domain coursework and electives

### Practice
Fieldwork and delivery specifics
The current M.Tech./Ph.D. in T&D

Coursework

- **Perspective** - philosophical nuts and bolts
  Development Theory, Appropriate Technology, Policy and Governance

- **Sectors** - the knowledge base
  Water, Soil and Agriculture, Energy, Environment

- **Skills** - to bring rigour to field work
  Social Sci. Res. Meth, System Dynamics, Project Mgt. and Analysis

- **Field work** - 10 week structured rural stay, field visits

- **Two-Stage Project** - Ideally
  - Ist Stage - Situation and alternatives - Appreciation
  - IInd Stage - Technology or Policy - Generation
Our students (and our faculty) in the field
Our locations- *Naldhe*
At our 10-week field stay
Selected M.Tech. Projects

- Study and design of cages for aqua-culture
- Development of nutritional supplement for malnourished children
- Design enhancement and dissemination of improved cooking chulha in a village
- A process model for regulation in infrastructure development
- Analysis of groundwater regulation in various states of India
- Simulation of hybrid energy systems for village applications using HOMER
- Convergence of NREGS and Watershed improvement programs in Kerala
- Assessment of Herbal Initiatives in a Rural System
What after M.Tech?

What do we train them for-

- An initial stint with an NGO/CSO in a particular sector
- Or a company in the development sector
- An independent consultancy, business
- A Ph.D. in development subjects and teaching
- Advisor-ship, expert consultant to collectors, ministers, banks and agencies
- Leadership role in flagship NGOs, government, regulatory bodies, or independent Centers
- Corporate roles-new companies and new areas

OK-but what about starting with big companies?

Veolia, a French water company with turnover of $50 billion, started as a company to serve Lyon.
What after M.Tech?

What do we train them for-

- An initial stint with an NGO/CSO in a particular sector
- Or a company in the development sector
- An independent consultancy, business
- A Ph.D. in development subjects and teaching
- Advisor-ship, expert consultant to collectors, ministers, banks and agencies
- Leadership role in flagship NGOs, government, regulatory bodies, or independent Centers
- Corporate roles-new companies and new areas

OK—but what about starting with big companies?

- Is there a big company delivering water to the bottom 80%?
- Veolia, a french water company with turn-over of $ 50 billion, started as a company to serve Lyon
Supervised Learning in Tech. and Dev. (TDSL)

- Unique opportunity for faculty members to float live development projects and for students to take them
- Guidance and Liaison from CTARA
- **Objectives** : extension, field study, entrepreneurship in the public space. Also **pre-research**

<table>
<thead>
<tr>
<th>Course</th>
<th>TD390</th>
<th>TD490</th>
<th>TD491</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credits</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Title</td>
<td>Study</td>
<td>Analysis</td>
<td>Design</td>
</tr>
<tr>
<td>Reporting</td>
<td>IIT</td>
<td>+stakeholders</td>
<td>+ stakeholder</td>
</tr>
</tbody>
</table>

- Since January 2011, 3rd offering—**extremely popular**—13 students this semester, 30+ students overall
Sampler

- North Karjat Tal. Drinking water scheme -Design
- Rural Bio-gas Alternatives-Two case studies -Study
- The Anjap-Sugave multi-village scheme-a failure analysis-Analysis
- Transport provisioning in Karjat taluka -Study
- Incentives from Medical companies to retailers -Study
- Karjat City Development plan-Design

This semester-Thane district, Bio-gas, Slum Rehabilitation schemes

- Budding consultants, entrepreneurs, researchers-Opportunities in the development agenda
Some pictures
The Vision in Development Action

• IIT should be known for its excellence through delivery and engagement
  ▶ known not for who gets in but what comes out
  ▶ innovative and creative projects which deliver

• A pedagogy of engineering — colleges as local solution and knowledge providers
  ▶ to develop courses, modules and projects

• An engagement and presence with government and implementation agencies, local bodies and civil society

• To intellectualize the role of the university/institute and to mediate on behalf of society

Foremost

To make engineering inclusive and social so as to deliver development
The TDCC-Consultancy Cell

- to respond to consultancy and knowledge needs of civil society
- to liaison between student output, stake-holders and delivery
- to position CTARA with implementation, govt, agencies and to develop thematic output
- to administer TDSL and to organize CTARA research output

Currently led by Pooja Prasad (B.Tech Chem., 2000) and an M.S. from Stanford. 8 years experience in logistics in Silicon Valley

- Grow as number of projects grow- **1-2 people needed soon**
- Yearly reports on expenditure and value generated- **first economic** and eventually financial viability
What do we need?

- **Field instruments**—GPS, surveying, hand-held devices, meters
- **Extension of environmental testing facilities**
  - space and instruments for soil, water, air
- **Space**—office, laboratory, project staff and faculty
- **TDCC**—salaries? Housing—guaranteed for 3-4 people?
- **Workshops and Meetings**
  - dissemination and consultation
  - on NREG, design and analysis of piped water supply schemes
- **Faculty** : already two chairs—one in social and one in engg.
- **Student Internships** : Rice and now possibly Berkeley. Discussions with Brown and Columbia. Both back and forth
What do we need?

- **Field instruments**-GPS, surveying, hand-held devices, meters
- **Extension of environmental testing facilities**
  - space and instruments for soil, water, air
- **Space**–office, laboratory, project staff and faculty
- **TDCC**–salaries? Housing–guaranteed for 3-4 people?
- **Workshops and Meetings**
  - dissemination and consultation
  - on NREG, design and analysis of piped water supply schemes
- **Faculty** : already two chairs -one in social and one in engg.
- **Student Internships** : Rice and now possibly Berkeley.
- Discussions with Brown and Columbia. Both back and forth

Perhaps.. Broadbasing extension within IIT

Shift in alumni focus from IIT’s infrastructure to *deeper waters* – IIT’s role and vision and direct participation in the national agenda
Thanks