

The emerging role of the developmentalist

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www.ctara.iitb.ac.in

Agenda

- Introduction to CTARA
- Core CTARA operational values and the T&D program
- Projects and Thane district
- The engineer-consultant and the way forward

Centre for Technology Alternatives for Rural Areas

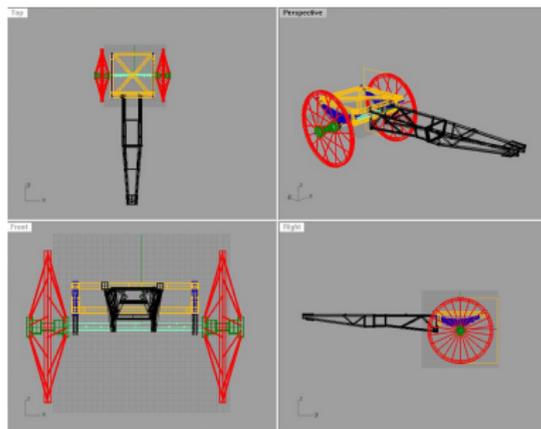
- An academic center of IIT-Bombay, started in 1985
- To study and to develop solutions for problems from rural India

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**

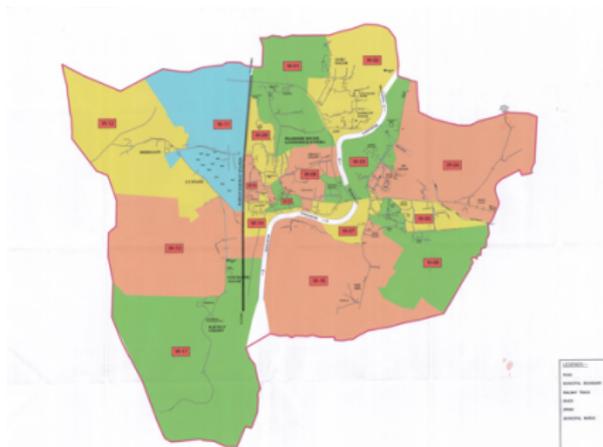
Objectives of the M.Tech./Ph.D. program

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?

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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**

Course	TD390	TD490	TD491
Credits	6	6	12
Title	Study	Analysis	Design
Reporting	IIT	+stakeholders	+ stakeholder

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

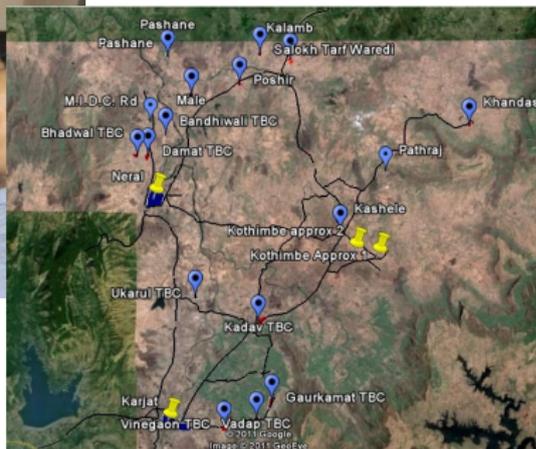
Sampler

- 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 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

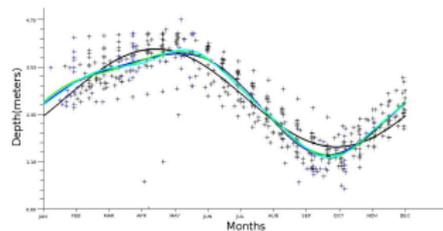
- Grow as number of projects grow- **1-2 people needed soon**
- Yearly reports on expenditure and value generated-**first economic and eventually financial viability**

In the water sector

- **Drinking water** -Urban and rural, access, design, feasibility study, failures
- **Groundwater**-regional data analysis, simulations
- **Surface water**-watershed interventions, masterplans
- **Policy**-Membership in the planning commission working groups

Engagement

Largely in Karjat taluka and Thane district.



Area	9000 sq km.
Pop. (Rural)	81 (23) lakhs
Taluka (Tribal)	15 (5)
Habitations (GPs)	8000 (900)
Cities (Mun. Coun.)	37 (12)

Thane

- Roughly one rural drinking water engineer and one surface/groundwater engineer for every 20,000 people, 40 habitations and 50 sq.km.
- Huge development agenda-groundwater security, drinking water systems, institution building



The Big Question

So how are these **1 hydraulic engineer** and **1 surface/groundwater engineer** and **4-5 gram-sewaks** to serve 20,000 people over 40 habitations ranging over 50 sq.km.?

The challenges

- design for technical, financial and institutional sustainability
- requiring composite and inter-disciplinary skills
- capacity of society to monitor and shape the system

A possible approach

- close cooperation between field-level administrations and educational and research institutions **including local engineering colleges**
- movement of funds to local R&D and avenues for innovation
- training of a **new engineer-social scientist-consultant**

The issues-why ITRA should be careful!

- Roughly 5,00,000 students join engineering every year-so the numbers are there.
 - The ITIs wont do-needs a more systemic and technological training.
 - Needs a more hands-on, societally oriented, inclusive engineering paradigm-*but not old Rourkee*
 - Our current systems-abstract engineering in subjects of doubtful relevance and a faculty unable to teach it
-
- Firmly entrenched pecking order-IITs, NIITs, a few others and then losers
 - Firmly entrenched jobs order-Finance, Banks, consultancy, commoditized research, IT, foreign engineering consultancy/work, losers

The special relationship route

- **Temptation**-sidestep the education issue and collaborate with the govt. agencies directly.
- **The Project/SPV mode** -popular with many donor/banks such as WB, Unicef etc., also popular with bureaucracy and political establishment.
- Project builds parallel system with its own accountability
-**Jal-Swarajya, JNNURM**
- While delivery and financial accountability is better, political accountability is poor-**off balance-sheet, off-discussion**
- Jal-Swarajya-so called demand-driven. **Poor cross-subsidy structure, stress on financial sustainability, tends to increase differences.**
- **Pet companies, increasing influence of the big consultancies**-poor access to educational institutes and smaller local companies.

The Vision

Have a **Department of Technology and Development** in every engg. college, starting with the IITs. These would bring together researchers, practioners and administrators in a novel curriculum focussing on engineering, policy and sustainability.

- **Excellence through delivery and engagement** with government and implementation agencies, NGOs and CSOs.
- **A pedagogy of engineering**-colleges as local solution and knowledge providers
 - ▶ to develop the *engineer-social scientist-consultant*
- **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 – see www.cse.iitb.ac.in/~sohoni/RD.pdf

Thanks

