

Strengthening Engineering Training and Research for Maharashtra

Concept Note
CTARA, IIT Bombay
www.ctara.iitb.ac.in

Background.

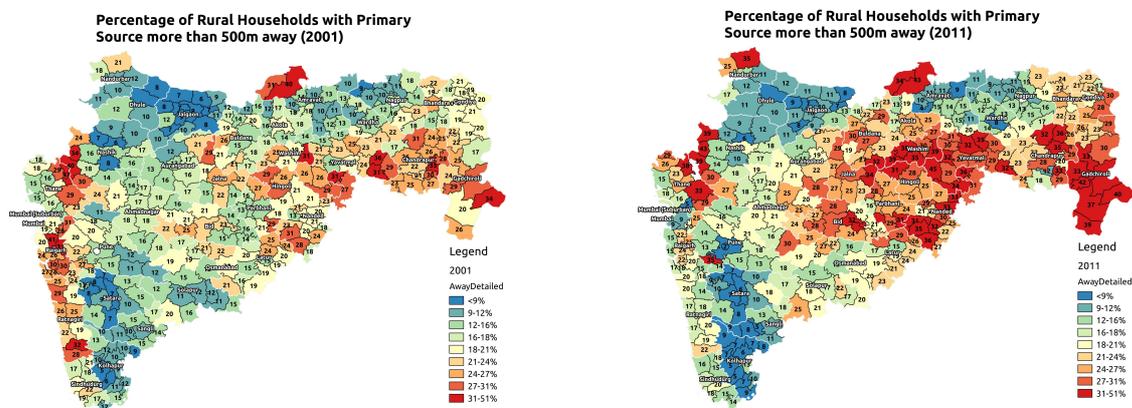
CTARA (Centre for Technology Alternatives for Rural Areas) is an academic center of IIT Bombay, which is devoted to technology in development. We have worked for the last 30 years, with both central and state governments, elected representatives, small and medium enterprises, NGOs, engineering colleges and citizen groups. Our primary focus are issues of the bottom 80% such as agriculture, water, energy, livelihoods, needs of the informal sector and environmental and social services. I

Diminishing Standards.

People of Maharashtra (and of India) are now facing increasingly difficult times. This in in many areas such as agriculture, cooking energy, public transport and even drinking water. We will use drinking water as an example. The access to drinking water in India is actually *decreasing* with rural Maharashtra performing significantly worse than other states.

Year-round access to drinking water (various rounds of NSSO in 2008 and 2012)		
	Rural	Urban
India (2008)	862	911
India (2012)	858	896
Maharashtra (2012)	745	931*

The urban performance is also very poor, outside Mumbai and Pune. As regards the distance travelled to fetch water, the Census data shows that this too has increased. The two maps below show, by taluka, the fraction of households whose primary source of drinking water is atleast 500m away, in the years 2001 and 2011. We see that inequality in access to drinking water has increased substantially. Tis affects not only employment opportunities, education and health but also social cohesion. Even in the well-off western Maharashtra, groundwater and surface water quality is now a rising problem.



The fact is that Drinking water and sanitation is a basic *engineering* service in which Maharashtra was traditionally very strong.

We have several technical agencies such as Maharashtra Jeevan Pradhikaran, Groundwater Survey and

Development Agency and the recently constituted policy agency WSSO. Moreover, via Jalswarajya I and II, MWSIP and other programs, the World Bank has continuously engaged with the state for atleast three decades now and at *considerable expense*. So it is important to understand the cause.

Causes of failure: Inadequate applied research and few avenues for professionals.

Causes of failure: Inability of the public sector to document failures and analyse them, evolve best practices and new technology and administrative processes and policies. Poor participation of civil society or private sector.

1. **Under-staffing**, e.g., a typical taluka with over 100 wadis/habitations has roughly 2 rural water supply engineers and less than one field geologist. This makes the correct implementation of a program very difficult since monitoring outcomes or carrying out intensive and participatory processes are time consuming.
2. **Outdated procedures**, e.g., design of multi-village schemes, watershed treatment etc., have not kept up with modern technologies and social processes. As a result, many important options such as bulk-water grids, or regional water plans have remained on paper. Of the roughly 900 rural regional schemes, roughly 600 are non-functional. However, a thorough socio-economic and technical analysis of this has not happened and WSSD is reluctant to use this option even when this is the only technically viable option.
3. Disinterest of the private sector to analyse causes of failure and to take corrective action or offer innovative solutions. Very little collaboration with institutions of learning and very little relevant research. **Few avenues for professionals to work in the water sector.**

An important example, is the important area of watershed. Repeated programs such as *Hariyali* and *IWMP* have yielded very few positive outcomes. Many of the IWMP project plans are of poor quality and have very little technical content. As a result of this failure, groundwater is now increasingly unreliable. The causes again are the same: poor avenues for professionals, poor outcome frameworks and poor research. Given this, the CM's *Jalyukta Shivar* program is likely to have similar outcomes, since the basic processes have not changed.

New roles and New collaborations.

Much of the above causes apply to all sectors. It seems that in the current job description, incentives and the performance of the public sector, the state is reluctant to put additional manpower to the problem. Given that, what is now required are new job descriptions and new models of engagement between the state, civil society and the private sector. Moreover, the research needs of various departments must be met so that practices change and outcomes improve. Both the above factors, i.e., new job description and new research, calls for a broader interaction between regional engineering institutions and departmental and regional agencies.

Such a need has been recognized by most state departments and in many cases, the appropriate GRs have been issued. For example, the national drinking water program (NRDWP) has recommended in a correspondence, that IIT Bombay and VNIT, Nagpur be identified as State Technical Agencies to support the sector. A GR has been issued in 2013 which requires all new and failed rural water supply schemes to be analysed by technical institutions. IIT Bombay has written to WSSD on both accounts and has also offered to collaborate in the World Bank project Jalswarajya II. All these matters are pending.

We propose a broader engagement between engineering colleges and regional administrations so that

1. Research needs of regional agencies are met and a more *public understanding* of the problems emerges.
2. Colleges learn to interact with society and agencies and develop a more practical and field-work based perspective on research and training.
3. Such training leads to a new body of professionals in new roles of engagement for our future.

A network of such engineering institutions will be an asset for the state and may assist it in meeting periodic

challenges such as droughts or large research projects such as basin-level plans. In fact, the World Bank program TEQIP also recommends such a research and training collaboration between engineering colleges and state agencies and programs.

A first step in this direction was taken by CTARA, IIT Bombay which held a meeting at IIT Bombay on **September 12, 2014** of all TEQIP colleges. The objective of the workshop was to:

- A. Develop a common research framework in the drinking water sector.
- B. Understand the inter-disciplinary and professional issues involved.

Representatives of 17 colleges, Unicef, District Collector of Osmanabad, and members of WSSD, WSSO, Meetra participated in this meeting. A copy of the report is enclosed. Members of CTARA have visited govt. colleges in Sangli, Aurangabad, and Nanded, and VNIT Nagpur and RIT, Islampur and interacted with students and faculty members. A meeting with the Director, College of Engg., Pune on this agenda was also accomplished. Thus a large network of colleges with a common research platform is now available.

What is needed.

1. Clear guidelines to district authorities to enable the interaction between colleges and regional agencies. Ear-marking funds from either district-level sources or from water sector sources for the conduct of research. Mechanism for presenting output of research in district bodies.
2. Implementation of the State Technical Agency guidelines and the GR concerning review of schemes by technical institutions.
3. Sourcing funds from DST for applied research and project proposals in water supply, sanitation and drought management.
4. Establishment of an empowered committee of engineering colleges to look into further collaboration with state agencies, and to upgrade curricula and research to meet Maharashtra's needs.

Experience at CTARA and its role.

CTARA has extensive experience in working in the development sectors with a special focus on drinking water and its connections with surface and groundwater. We have routinely partnered with GSDA and we are on the Board of Governors of MEETRA, the center of excellence in training and research of WSSD, Govt. Of Maharashtra. We have worked on many programs and projects in the water sector, including Jalswarajya, Maharashtra Sujal Nirmal Abhiyan, NRDWP and so on. A compendium of our work is available at: <http://www.ctara.iitb.ac.in/water/>

A unique venture is the Technology and Development Solutions Cell (www.ctara.iitb.ac.in/tdsc) which offers consultancy to urban and rural bodies in design and analysis in basic sectors of water, sanitation, public transport etc. CTARA has an MoU with many entities e.g., Parbhani town, MoRD and others. CTARA would be very happy to coordinate with other engineering colleges in any role that is suitable. This will include joint research, new courses and case studies, introducing them to interdisciplinary and stake-holder driven research, shared data-sets and so on.