

Regional Drinking Water Security

Action research, policy and analysis

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www.ctara.iitb.ac.in

CTARA—Introduction

- CTARA Centre for Technology Alternatives for Rural Areas
- set up in 1985, PG programs in 2007, UG projects 2010
- core features:
 - ▶ serve bottom 80%, core sectors—development
 - ▶ design, analysis and research—*with stake-holders*
 - ▶ inter-disciplinary faculty— senior IAS officer, consultants, planning commission WG members

CTARA—Introduction

Academic program

- two-year graduate course, one year Masters project
- 10-week rural stay, policy and practice integral to courses

Our students –*Development Professionals*

- program coordinators –NREGA, AGY
- PMRDF, research
- Companies in development sector, think-tanks and NGOs

Current Research

- Drinking water, grid electricity, household energy use, small-town planning, post-harvest agriculture, water policy analysis

Our agenda

- To brief GoM about work at CTARA (+GISE), IIT Bombay
 - ▶ Upcoming research project-Sangli, Thane, Raigad
- To seek research agenda of common interest-rural
 - ▶ evaluation, analysis and design
 - ▶ district level planning-mitigation, security
 - ▶ GIS as a planning tool
 - ▶ source strengths-measurements and sustainability
 - ▶ regional groundwater models
 - ▶ water supply schemes
- Stronger collaborations between CTARA/GISE/IIT Bombay and WSSD to bring synergy
 - ▶ through WSSO, NRDWP, other channels

Current research themes

- Regional drinking water scheme analysis:
 - ▶ GP wide SVS scheme analysis,
 - ▶ Thane district tanker-fed villages and assets
 - ▶ Development of SVS and MVS scheme analysis protocol through Sugave scheme and Tadwadi-Morewadi analysis.
- MVS Scheme design:
 - ▶ North Karjat, Mokhada
- Watershed work:
 - ▶ Gudvanwadi check dam, Modeling for Ikrichapada
- GW modeling with GSDA to predict GW
- Sangli drought planning

Stakeholders

Government agencies

- Zilla Parishad and District Collectorate—Raigad, Thane and Sangli, various Gram Panchayats
- GSDA, Minor Irrigation and Rural Water Supply, MJP,
- DST, RGSTC, MIT

Educational institutes

- Karjat Govt. College of Engineering (KGCOE), RIT Sangli, IIT Mandi, Gandhinagar

Elected representatives

- MLAs, Shri Jayant Patil, MoRD, Thane DPDC and so on

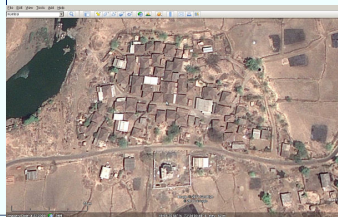
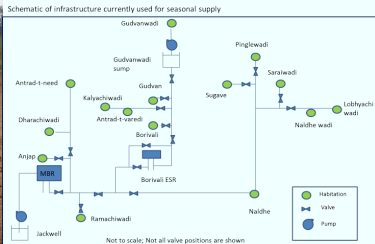
NGOs

- Aroehan (Mokhada); Disha Kendra, ADS (Karjat).

Where could we go from here?

- **Commissioned Studies**
 - ▶ to ascertain on a wider scale various lacunae
 - ▶ regional update for DPDC consumption
 - ▶ policy studies in DWS, GW and other sectors
- **Collaborations and a State role**
 - ▶ empanelment through WSSO, STA and so on
 - ▶ on design processes, IMIS, GIS and so on
 - ▶ training roles (but limited bandwidth)
 - ▶ **broader engineering curriculum**
- **Studies funded by GoI/GoM agencies–MIT/DST/RGSTC**
 - ▶ focus on Thane/Raigad/Sangli
 - ▶ on sectors associated to DW, including quality (in Sangli)

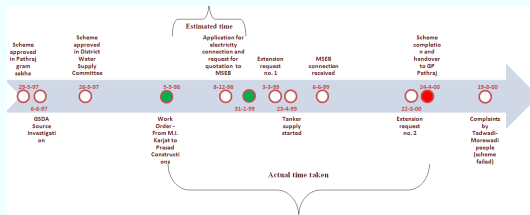
Anjap-Sugave Multi-village scheme analysis, 2011



The Problem: Rs. 210 lakh MVS, as yet partially complete.

Conclusions : Many issues of design, ownership. **Recoverable.**

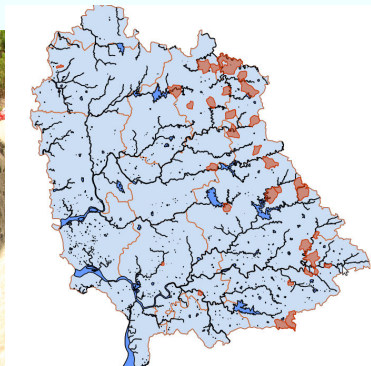
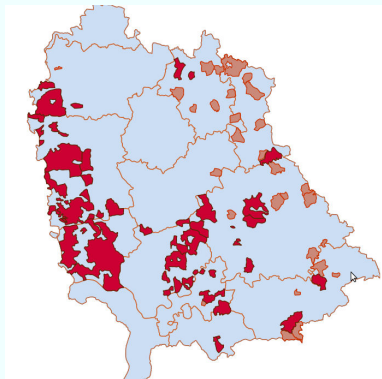
Failure analysis of the Tadwadi-Morewadi Single-Village Scheme, 2011



The Problem: Failed SVS. Severely stressed village.

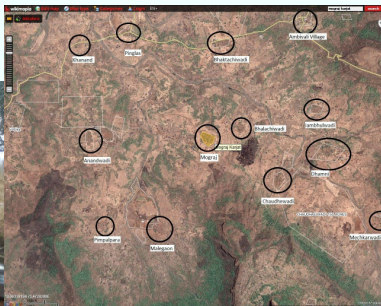
Conclusions : Terrible design errors. Groundwater conflict.

Thane District regional analysis of drinking water, 2012



The Research Question: Tools for regional understanding of DW.

Mograj/Tembhre GP level study and data analysis



The Question : Why do stressed villages not get onto tanker lists?

Approach : Why and how do habitations not match their IMIS status?

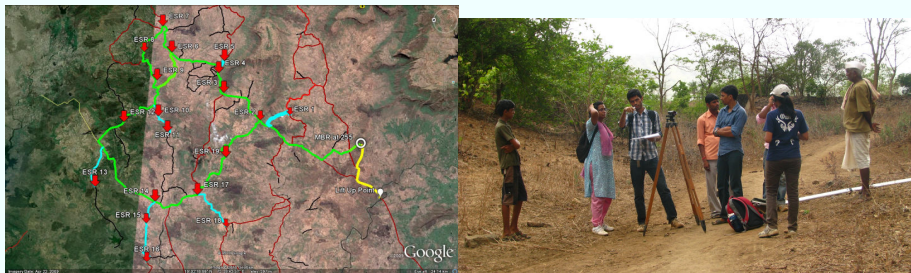
Mograj GP level study and data analysis

S.No.	Scheme Name	Beneficiary Habitations	Implementing Agency	Sanction Year	Year of completion	Scheme covered under	Capital Cost Estimate	Current status (2012)
Mograj GP								
1	Ambivali PWSS	Ambivali	Zilla Parishad	2008-09	2010	Bharat Nirman	25	Functional
2	Mechkarwadi PWSS	Mechkarwadi	Zilla Parishad	2002-03	2005	Sector reform pilot project, ARWSP calamities	13.32	Failed in 2005 and revived in 2010 for one part of habitation
3	Khandan PWSS	Khandan	Zilla Parishad	2008-09	2010	ARWSP	12.61	Unknown - scheme not found on the ground. Status to be investigated further.
4	Malegon Pimpalpada PWSS	Malegon, Pimpalpada	Zilla Parishad	1997-98	2000	ARWSP	8.5	Failed for both habitations within a year. Scheme repaired in 2007 but failed
5	Mograj Anandwadi PWSS	Mograj, Anandwadi	Zilla Parishad	1997-98	2000	ARWSP	12.35	Failed in 2000 for Mograj and failed for Anandwadi in 4-5 years
6	Bhaktachiwad PWSS	Bhaktachiwadi	Zilla Parishad	2002-03	2006	sector reform pilot project - ST dominated habs	8.26	Failed in 2006
7	Pinglas WSS	Pinglas, Bhaktachiwadi, Ambivali, Tembhre (Tembhre GP), Shingdol (Tembhre GP)	Maharashtra Jeevan Pradhikaran	1998-99	2010	MNP state funds, ARWSP	43	Failed same year
8	Choudharwadi PWSS	Choudharwadi	Zilla Parishad	2004-05	2005	not known	4.48	Failed
9	Bhaktachiwadi Ashramshala PWSS	Bhaktachiwadi Ashramshala	Zilla Parishad	2005-06	2007	state funds	11.09	Functional except summer (school holidays)
10	Dhamni PWSS	Jambhulwadi, Choudharwadi	Zilla Parishad	1986-87	1988	not known	0.94	Failed in 1989

Tembhre GP level study and data analysis

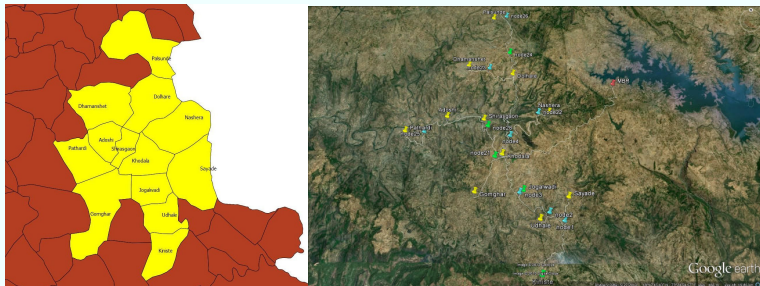
S.No.	Scheme Name	Beneficiary Habitations	Implementing Agency	Sandion Year	Year of completion	Scheme covered under	Capital Cost Estimate (lakhs)	Current status (2012)
1	Tembhre Shingdol PWSS	Tembhre, Shingdol, Katkarwadi	Zilla Parishad	2010-11	2011	Bharat Nirman	25.09	Functional but faces potential disconnection due to high electricity bill arrears
2	Rajpe PWSS	Rajpe, Katkarwadi, Dhangarwadi, Pachkhadkawadi	Maharashtra Jeevan Pradhikaran	1998-99	2000	MNP, state program	22.91	Never operated for Dhangarwadi and Pachkhadkawadi, recently failed for Rajpe and Katkarwadi due to poor maintenance
3	Dukkarpada PWSS	Dukkarpada, Hirewadi	Zilla Parishad	2002-03	2006	Sector reform pilot project	8.49	Functional for Dukkarpada. Scheme never existed for Hirewadi
4	Saraiwadi PWSS	saraiwadi, jambrung	Zilla Parishad	2002-03	2006	Sector reform pilot project	5.67	Failed for Saraiwadi. Never existed in jambrung
5	Jambrung PWSS	jambrung	Zilla Parishad	2012-13	2013	NRDWP-Coverage	25	Villagers unaware of this scheme. Local politician claims he has paid the public contribution
6	Solanpada PWSS	Solanpada, Kamatpada	Zilla Parishad	2008-09	2013	ARWSP	20.58	Scheme under construction but pipeline already broken
7	Thombarwadi PWSS	Thombarwadi, Hirewadi	Zilla Parishad	2012-13	2013	NRDWP-Coverage	25	Villagers unaware of this scheme. Local politician claims he has paid the public contribution

North Karjat rural regional scheme: Feasibility Study, 2010



The Problem: Widespread drinking water stress, depleted GW.
Conclusions : 6 MLD, 17 ESR large rural scheme. At 40lpcd per capita investment at Rs. 2300. **feasible.**

North Mokhada rural regional scheme: Feasibility Study, 2012

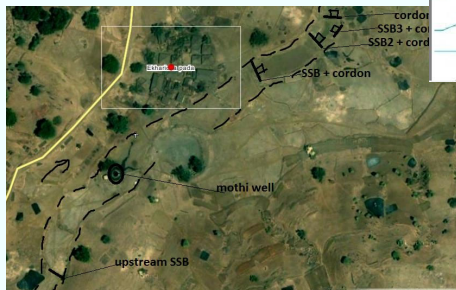
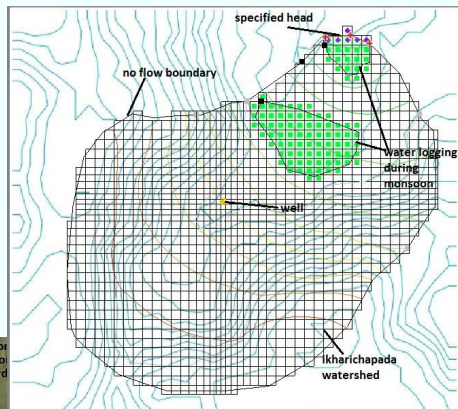


The Problem: Widespread drinking water stress, depleted GW.

Approach : Similar approach, uses upper Vaitarna. Examining tariff options.

Source strengthening

- *Ikhari cha pada*, Mokhada, Thane.
- Micro-watershed simulations using MODFLOW



The Question : How can groundwater be recharged?
What are the outcomes?

The Gudwanwadi Checkdam Project, 2005

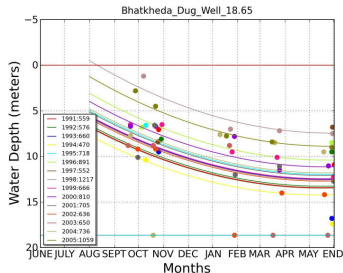
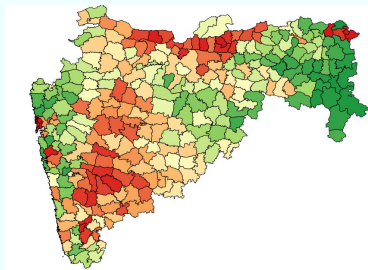


The Problem: Acute drinking water shortage

Partial solution: Check dam (85m, Rs. 25 lakhs), groundwater modelling, social issues.

- **Jal-Swarajya Review, 2007.**

Regional Groundwater Modelling based on GSDA datasets, 2012



The Research Question: Usage of GSDA data to build GW models for (i) *short term*-drought prediction, and (ii) *long term*: groundwater security and policy.

Sangli-tanker scheduling problem

ग्रामिण पाणी पुरवठा उपविभाग पंचायत समिती जत

टँकरद्वारे पाणी पुरवठ्याच्या दैनिक अहवाल

दि.१२.०९.२०१२

अ. क्र.	टँकर नं	गावाचे नाव	गावछाप I संख्या	वाडीवस्ती संख्या	लोक संख्या	टँकर सुरू तारीख	मंजूर खेपा	प्रत्यक्ष खेपा	टँकरची क्षमता लिटर्स	पाणी भरण्याचे ठिकाण	एकेरी अंतर किमी	पाणी पुरसे आहे का	टँकर सुरू आहे का	शेरा
१	MH-१०Z१७२	डफळापूर	१	-	७२६९	०५.०२.२०१२	३.५	३.५	२४०००	सुनिल दरीवा गडदे (खलाटी)	८	होय	होय	
	MH१२DT६३१३	डफळापूर	-	१०	-	१८.०१.२०१२	४	४	१२०००	अरविंद गंगाराम शेजुळ	८	होय	होय	
	MH १०Z१२०७	डफळापूर	-	१४	८१५०	३०.१०.२०१२	१.२५	१.२५	२४०००	शहाजी राठ देवकते (खलाटी)	१५	होय	होय	
२	MH९Q ७४७६	आक्कळवाडी	१	४	१२०००	१६.११.२०११	२	२	८०००	अंकलगी तलावाखाली विहोर	५	होय	होय	
३	Mh ०१ ९६७७	आरंगी जत	१	३	३०००	०५.०१.२०१२	४	४	१२०००	सुशिला शंकर कनशेट्टी	१५	होय	होय	
४	MH ४३ ६९००	जा. बोबलाद	८	३२००	३.१२.२०११	४	४	१२०००	बडोंग मुलागी	२०	होय	होय		
	MH०४ ८६०६	जा. बोबलाद	१	०	५२१०	२०.११.२०११	२.५	२.५	१२०००	भारत बंडा साबळे	२२	होय	होय	दि. २४.०४.२०१२
	MH०Z२५१६	जा. बोबलाद	०	०	३२६०	११.१२.२०१२	४	४	१२०००	भारत बंडा साबळे	१५	होय	होय	
	MH १२-६२५९	जा. बोबलाद	८	०	१४.०२.२०१२	२.५	२.५	१२०००	बाळासो शामराव रूपनूर	२५	होय	होय		
५	MH१०T१६११	उमदी	-	४	७६२५	१९.०१.२०१२	२	२	१२०००	अंकलगी तलाव	२५	होय	होय	
	CTJ-१०१८	उमदी	-	३	८२००	३०.०३.२०१२	२	२	१२०००	अंकलगी तलाव	होय	होय		
		उमदी	-	३	८२००	२४.०१.२०१२	०	०	१२०००	वसंत धर्मणा सुतार	७	होय	नाही	टँकर बंद
६	MH१०A११५२	निगडी खुर्द	१	११	८२००	१४.०९.२०११	३	३	१२०००	अंकुश शिंदे (निगडी खुर्द)	१०	होय	होय	
	MH१०A११६६	निगडी खुर्द	१	११	८२००	१४.०९.२०११	३	३	१२०००	अंकुश शिंदे (निगडी खुर्द)	७	होय	होय	
७	MH०A११४६	सनगडी	१	८	३५४०	१२.०३.२०१२	२	२	१२०००	भारत राम साबळे	१२	होय	होय	
८	MH ०४P५१११	मायथळ	१	०	१४.१२.२०११	३.२५	३	१२०००	मिमाणा पांडू मोटे	१०	होय	होय		
९	MH १२G११००	सोऱ्याळ	-	१३	२७००	१३.१२.२०११	३	३	१३५००	अंकलगी तलाव	५	होय	होय	
	MM११F५१२४	सोऱ्याळ	१	-	१३२६	५/४/२०१२	१.२५	१	१२०००	अंकलगी तलाव	५	होय	होय	
	Mh १०W६८२१	सोऱ्याळ	१	०	१३२६	२८.१२.२०११	०	०	१२०००	अंकलगी तलाव	१२	होय	नाही	टँकर बंद ५/११/१२
१०		उटगी गावछाप	१	-	४९३५	१७.१२.२०११	०	०	१२०००	सरस्वती परसापा सन्नोळी	२०	होय	नाही	टँकर बंद
	MH१०Z८०६	उटगी	-	८	२५००	२८.०२.२०१२	४	४	१२०००	भारत निर्माणविहीरलमाणतांडा	१५	होय	होय	
	MH१०Z८०६	लमाणतांडा (उ)	---	४	४००		५.०	५.०	१२०००	अंकलगी तलाव				

What do we need-minimum

- Liaison across departments and staff (e.g., in WB studies)
 - ▶ **data**: information on schemes, yield tests, GSDA, failure analyses, budgets, AAPs, and so on.
 - ▶ **interviews and liaison**: with engineers, field officers and staff
- Access to monitoring and evaluation processes -**inputs for us to design better M&E**
- Access to existing design processes-**collaborations to improve processes**
 - ▶ both SVS, MVS and other technical design
 - ▶ WSSO and other SO, TSP and other policy designs
- Access to planning processes-**bring new tools**
 - ▶ DPDC, drought planning , large assets, policies

Research and public good

All outputs will be shared with you *first*. Co-authors and partnership.

Thank you

