TD 608
Project Management and Analysis

Part I
Project Conception and Execution

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A Water Story

A Water Story

An Ongoing Research

- What is the typical urban water supply cycle
- What are rural domestic water provisions
- What are the engineering challenges
- What are the policies involving rural and urban water
- How can engineering and policy make a difference

- Output: A report, or an argument with factual data, surveys and so on.

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The Main Players

- Urban water (say, e.g., Mumbai's)
- Projects which hold water
- Rural drinking water
- Rural farming water
- Budgets
- Geology and Civil Engineering practices

Mumbai-the system

- Greater Mumbai-a population of about 150 lakhs
- Average water consumption-3500 MLD
  - (i.e., mega-liters-per-day)
- Big projects-*Bhatsa, Vaitarna*, in Shahpur taluka.
- Several small projects-*Tulsi, Vihar, Powai*
- Huge Infrastructure of pipelines, filtration plants and pumping stations.
- Largely by gravity
- Marginal Investment Cost per MLD: Rs. 4 crores.
  - (Mr. Srivastava, Dep. Commissioner)
- System recharges every monsoon (rainfall 3000 mm/year)
- Cost comes out to be $(4 \times 10^7)/(365 \times 10^6)$ or:

Investment

Rs. 100 per cubic meter of year-long availability

Mumbai-MCGM and the consumer

- MCGM (Muncipal Corporation of Greater Mumbai)
  - Salient features of the budget
  - Different services
- Property Tax: a percentage of asset value
  - `pay-as-you-earn`, *progressive*
- Octroi, Sales Tax
  - `pay-as-you-consume`, *regressive*
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- Of 3500 MLD, about 20% non-revenue-water
  - this includes losses, theft
  - roughly along international norms
- Older wards un-metered, newer metered but many unfunctional
- Unmetered water charge bundled with property tax
- Average tarrif Rs. 6 per cubic meter for domestic and Rs. 15-20 for commerical.
- Rough Parity between tariff and O&M costs
- Average consumption 200 LPD
  - (i.e., 70 cubic meters per year)

That is ...

an investment of Rs. 7000 per person

Jal-Swarajya

A *template-scheme* to create village-level drinking/domestic water supply systems.

Main points

- Aimed to create *piped household* water supply
- Initial Capital Costs borne by state
- O&M costs borne by beneficiaries
- Once deployed, no investment in village for 15 years
- Connected with WB

- Norm: 40 LPD i.e., only for drinking and rudimentary domestic use.
- social structures: Village community, capacity building, service-provider
- technical: source identification and strengthening, laying of pipes, storage tanks
- Allocation: Rs. 1600 pp: works out to: $(1600)/(40 \times 365)$ i.e., about

an investment...

of about Rs. 100 cu. m. for storage and distribution!

Jal-Swarajya-Implementation

- Hundreds of villages in Maharashtra, over the last 2-3 years, and an older similar program.
- Problem: cross-community vested interests
- Problem: Billing by village committee, and insufficient executive power.
- Problem: Inadequate follow-up

Criticism

- Source stabilization : an important sub-goal, bundled with distribution
- 40 LPD not adequate for cattle
- Inadequate funding: sources
  - Open wells, bore wells, i.e., Ground Water
  - Existing reservoirs
- No surface storage structures-no budget

Early Results: Discouraging

- Ground-water based schemes in trouble
- about 30% of the schemes

The rural norm

Question : Why is the rural norm so low? Why is it not in line with the urban "norm" of 200 LPD?

MWRRA :

- calls water a *scarce economic and social commodity*
- begin with water entitlement, which will be tradable
- lead to a *water market* and more efficient use
- however, ties irrigation water entitlement to land holding!
- no clear reference to norms for non-land-holding families

"What ever can the land-less do with water? "

Lots . Assume a family of 5 and thus an entitlement of 1 cu. m. per day.

- Horticulture: Look at various *wadi* programs. A 5-*guntha* vegetable plot will yield about 200 kg of vegetables (every 3 months), for consumption or sale.
- Keep Buffalos: About 5 buffalos throughout the year!
- Make Bricks, Repair houses: 15,000 bricks per month.

Livelihood Resource

Thus 200 LPD would be an important livelihood resource!

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Lets look at an hamlet of 400

- $200 \times 365 \times 400 = 28,000$ cu. m.
- With a norm of Rs. 100 /cu m., Rs. 28 lakhs
- Thus, there is an allocation of Rs. 28 lakhs for the village water system.

A small surface storage structure is possible!

Small Check-dams,

- if succesful, are in the cost bracket!
- Effective solutions to the water provisioning problem
- Help in Ground-water recharge
- Important for the food and livelihood security of the community

Conclusion:

- If you apply equal norms to urban and rural people
- Technical solutions for rural communities do exist

The Question

So, do we have the know-how to build small check-dams at the price-point Rs. 100 per cu.m.

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NO

Irrigation Department

- Know-how and practice in 300,000 cu. m. plus.
- About 4000 such dams in Maharashtra and claims 99% succes-rate.
- Price-point about the same as above.

ZP and others

- Soil conservation, *gram vikas* and so on.
- Most designed *not to hold water!*
- Largely hand-book method. No site-specific analysis and design.
- Most fail, i.e., do not hold water beyond January.
- About 1500 littered all over W. Maharashtra alone!

The Challenge

Protocols for the design, test, analysis and construction of small structures at the price-point Rs. 100 per cu. m.

- There may be many options:
  - Check-dams, village ponds, KT-bandharas, stone tanks
  - But all seem to be surface storage
- There are very few attempts by the state machinery, e.g., *Karjat Tribal Block*
- Clear disregard of the domestic water needs of villages

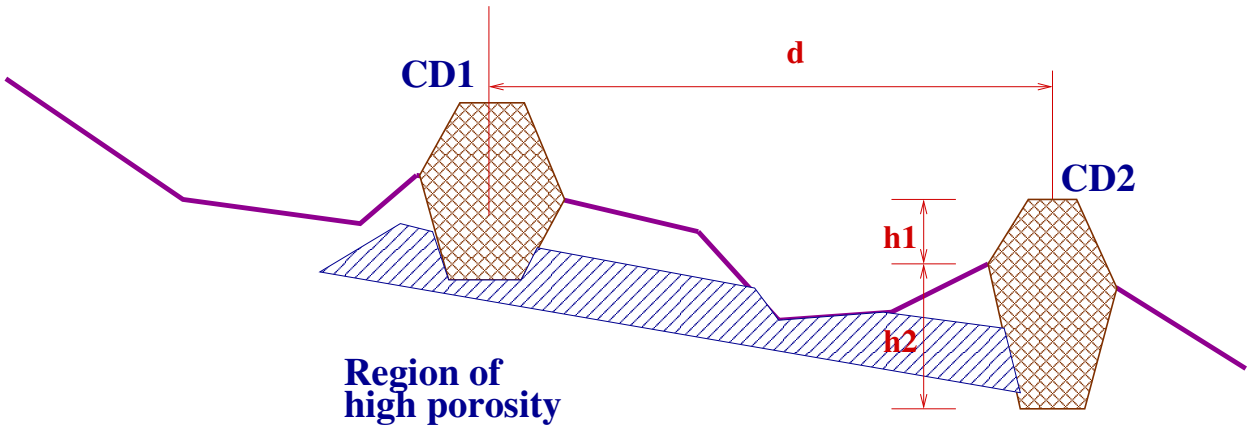
What is needed

- Effective site-specific protocols for geological testing
- Methodologies for specific corrective procedures
- Analysis of existing structures
- Simulation studies of typical approaches such as sequential structures
- Study of ground-water and surface-water interaction.

Typical Vexing Problem in Konkan Region ...

Loss of storage water by January

- What are the causes?
- Is there a channel? Or is the dam faulty?
- How much does is the recharge? Will it help the wells below?
- Where should I take the well?
- How is the channel to be profiled?
- Sounding, resistivity or tracers?
- Can grouting be done?
- Will a subsequent structure help?



Payback

Can the village pay back the investment?

- For a family of 5, the investment is Rs. 35,000.
- Assuming a 10% return, we get Rs. 3500, while for 5%, it is Rs. 1750.

So, is the 200 LPD norm financially or economically viable?

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Developmental Answers

- Small projects are generally cheaper and also yield other societal benefits, such as capacity, skills and entrepreneurship building.
- There are many construction options (e.g., labour participation) which results in project costs actually reaching community, through *wages, rents and royalties*.

But, should we not ask this for the Irrigation Projects? Do these projects pay for themselves, in terms of capital costs?

How to pay back

This depend on what the family does with 1 cu. m. per day.

- Rear buffaloes - should be easy
- Make bricks - easy again, bricks sell at Rs 1/brick.
- Horticulture on 5 *gunthas* - This is the toughest.

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- Each *guntha* will give the family about 40 kgs of vegetables.
- Assuming 3 seasons per year, we have about 120 kilos per *guntha*

- What is the market price for vegetables?-Rs. 10
- i.e., depending on the rate, 2-3 guntha produce will go in servicing debt.
- Thus, its financially unviable to base pay-back on horticulture.

Hard Questions

- Why is the price not Rs. 20?
- Who are the farmers producing vegetables at Rs. 10?
- Is water free for these farmers?

Irrigation and the City

Ray, Isha (2005). *Get the prices right: water prices and irrigation efficiency.* Economic and Political Weekly, August 13 2005: 3659 3668.

- Irrigation usually through open canals with a rotation of about 14 days
- Substantial difference between tail and head of canal
- Irrigation water charges are largely *non-volumetric*, but on
  - area of farm, crop, location of farm on the canal and rotation
- The price, though supposedly around 5-10 % of profits earned, are usually too little to be counted
- Volumetric charging is *too expensive to implement*
- Produce thus substantially cheaper and usually for urban consumption
- Thus the subsidy is enjoyed equally by the irrigated-land farmer and the urban consumer *alike* .

Thus, this market distortion is again in favour of the urban consumer, and is here to stay!

Smaller Cities?

JNNURM: Jawaharlal Nehru National Urban Renewal Mission

`www.jnnurm.nic.in`

Objectives: Urban Development

- Reforms to enable investment, sustainable development
- Develop asset development and asset management
- Meet common minimum program and Millenium Development Goals
- Mentions Public-Private partnership
- typically follows WB nomenclature and spirit
- Mandatory and Optional city and state level reforms!

Mandatory Reforms include:

- City development plan (CDP)
- TAP, accounting, e-governance
- internal provisions for the urban poor
- repeal land-ceiling and rent-control acts
- reduction of stamp-duty to 5%
- Reform of property tax
- O&M ring-fence around utilities, e.g., WATER

More JNNURM and in Maharashtra

- Education and Health expressly forbidden in JNNURM
- Mass-Transit (metro etc.) infrastructure allowed.
- No mention of public transport.
- No mention of public spaces, playgrounds or gardens
- seems to curtail funding for public services!
- seems to try and make property market more efficient

5 cities in Maharashtra

Water and Sewerage projects

City	crores
Mumbai	1800
Thane	220
Nagpur	691
Nanded	306
Nashik	198
Pune	300*

Question: Who is paying for all of this?

- 70%-50% as a grant from state/center.
- 30%-50% to be raised by muncipal corporation through soft-loans or bonds.

City and Budgets

Question: Who is paying for the 30%-50%?

- This, in turn, *supposedly* must be paid by the taxes collected by the city.
- Three obvious sources:
  - *progressive*:Property taxes
  - *regressive*:Water Charges
  - *regressive*:Octroi

Here is a table of municipal budget data from the CDPs

City	Water	Property	Octroi
Nagpur	?	18%	42%
Nanded	10%	9%	65%
Nashik	6%	5%	62%
Pune	?	?	42%

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JNNURM mandatory provisions

- "Reform of Property Tax so that it becomes a major source of revenue for the ULB"
- "Cities should graduate to full cost O&M recovery in utilities"

So, should this expenditure be regarded as O&M and the Water Dept. is to pay, or is it Capital Expenditure and the City pays?

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Hopefully, its labelled as Capital Costs!

However ...

Observations

- In Pune, planned Property Tax revenue increase is capped *lower* than that from water! Same trend elsewhere.
- In fact, no mention of a target property rate!
- Huge bussiness community pressure to reduce Octroi.

This is in stark contrast to most healthy international cities of similar size.

International Property Tax rates hover between 0.5%-1%!

Property Tax Rate Reform is mandated by JNNURM and will require:

- GIS and records of all properties
- Setting a target rate-missed by JNNURM
- Regular appraisal of asset value
- Coverage

Thus, there are many *fat* reasons why this will go at a slow pace

Water-Right or Commodity

A standard dictionary

definition		funding source
right	$\Leftrightarrow$	progressive taxes
commodity	$\Leftrightarrow$	regressive taxes
Mixed	$\Leftrightarrow$	Capital costs: progressive
		O&M costs: regressive

Thus, in this terminology, we may say that JNNURM treats water as mixed goods

Even the *Mixed* option is difficult to implement because:

Cause	Effect
Wide inequality in income and property values	Even telescopic rates will squeeze the poor
Rapid Growth	Large O& M budgets
non-regularised homes	No legal rights

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The Question

So, what are the urban poor to do?

Water for Livelihood: Summary

- There is a great mismatch, *both institutional and per-capita* between provisions for urban vs. rural water
- JNNURM enables cities to embark on source development projects in the rural hinterland.
- Without clear budget and policy directives, this is unlikely to help the urban poor.
- There is no agency which effectively addresses the rural water needs
- Jal Swarajya as a scheme is insufficent in its very design to address this need
- The technology for the rural water problem needs research

- Irrigation appears as a subsidy to the landed rural and the urban consumer.
- Besides this, it distorts the market to make rural water projects unviable.
- Both these together will lead to further irregular movements from the un-serviced rural hinterlands to the poorly serviced urban slums

- Livelihood water is likely to remain a central problem to the urban as well as rural poor

Research Agenda

- Jal Swarajya:analysis of the scheme, and survey of existing projects.
- Karjat TB: documentation of drinking water schemes, successes and failures.
- Governance: Execution of rural schemes, identification of problem areas, tanker schemes and so on.
- Technical: Large body of work needed.

- Irrigation-detailed data of a typical valley system
- MWRRA-and irrigation and the rural landless
- JNNURM-monitoring and study of CDPs vis a vis water and sewerage
- JNNURM-study of provisioning for the poor
- Comparative Study-across cities in the world