

Global cities: Local Water Sources.

Where the urban shadow falls
Vishal Narain, Stockholm, August
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The ecological foot-print of urbanization on the periphery

- How as cities grow, the ecological foot-print is borne by periurban locations
 - The flows of water from rural to urban areas
 - The acquisition of lands to build infrastructure to quench urban thirst
 - The flow of urban wastewater into villages
 - The appropriation of rural land and water by urban elite

Overview of presentation

- The Growth of Gurgaon city
- The research questions and design
- Findings from current work
- Implications for public policy and Governance

The growth of Gurgaon city

- Projected as a millenium city of Northwest India
- Drawn a large number of MNCs and corporates that have located their headquarters/manufacturing plants in the city
- Visual landscape
 - tall skyscrapers co-existing with village settlement areas and agricultural fields
- Frontiers of the city still expanding

The growth of Gurgaon city

- Three major reasons behind its growth
 - proximity to the national capital and international airport
 - initiatives of state government
 - policies for SEZs (special economic zones)
 - real estate boom since the 1980s

Changing water use and flows

- Falling water tables:
 - 70% of Gurgaon's water needs are met through groundwater
- Rural-urban water conflicts
 - farmers breaching the Gurgaon channel that brings water to the Basai Water Treatment Plant
- Rural-urban water flows
 - water tankers a common sight
 - groundwater used for irrigation now transported for nurseries to cater to urban residents
- Urban-rural water flows
 - sewerage irrigation common in periurban parts of Gurgaon
- Pre-emption of water by farm-houses using expensive technologies, depriving locals of access
- Drying of lakes and water bodies

The research questions

- How does urbanization affect water use and access of periurban residents ?
- How do they adapt to the changes in water availability as a result of the above processes ?
 - what mix of technologies and institutions shapes this adaptation ?

Research location and design

- Two villages
 - Budheda and Sadhraana
 - Periurban Gurgaon
- Qualitative research design /ethnographic approach
 - case study method
 - semi-structured interviews with residents
 - key informant interviews
 - focus group meetings
 - direct observation
 - secondary sources of data

Sadhraana Village

- Located 15 kms away from the city
- Population of 3500 people
 - 425 households
- Major crops grown
 - wheat, mustard, sorghum, pearl-millet, vegetables and lentils
- No irrigation canal or sewage based irrigation
 - only groundwater

Land use change over the last two decades

- Gradual Process of land use change
 - 80 acres acquired for the Sultanpur National Park
 - In the late 1960s
 - 600 acres sold off to farm-houses
 - Recreation and social getaways for the urban elite
 - Used for orchards and plantations
 - 150 acres acquired for Reliance SEZ
- Left with about 40% of the net cultivated area recorded in the 1960s

Major pressures on groundwater

- Tubewells dug for Sultanpur National Park
- Farm-houses major appropriator of groundwater
 - extract water using submersible pump-sets not affordable by locals
 - acquire the land over the ‘fresh’ groundwater
 - transport water over 3-4 km to their farm-houses
 - Result of a legal framework tying land and groundwater access

Impacts of growing pressures

- Fall in water table over last decade
 - 60 ft to 100 ft
 - 20 ft to 60 ft
- Farmers accessing saline groundwater
 - unfit for agriculture and livestock
- Small and marginal farmers unable to afford the high costs of extraction
 - a submersible pump-set: Rs 100000 to Rs 125000

Adaptation to water scarcity

- Technological adaptation
 - From *lao chedas*, *rainth* to tubewells and submersibles
 - small and marginal farmers left out
 - Use of sprinklers
 - water scarcity
 - sandy soil and undulating terrain
 - less labor-intensive irrigation technologies
- Leave land fallow
- Take only one crop per year
- Switch to rain fed crops
- Buy water based on social relations
 - Social capital eroded in periurban areas

Budheda

- 725 households and 5500 people
- Crops grown
 - wheat, mustard, sorghum, pearl-millet, vegetables
- Many sources of irrigation depending on location of fields
 - tubewells/submersibles/ urban sewage

Where the urban shadow falls...

- Major source of land to supply water to the city:
 - 129 acres of land for a WTP for Gurgaon city
 - 30 acres in a second round of acquisition
 - 12 acres of grazing land for the same plant
 - Livestock dependent village
 - 17 acres for each of the two canals to carry water for WTP at Basai that is the major supplier of water for Gurgaon
 - Left with just about a fourth of its net cultivated area

The rural-urban water flows

- The Gurgaon Water Supply Channel passes through the village to carry water to Basai WTP for Gurgaon city
 - source of opportunity and conflict
 - raised local water table
 - pipe outlet installed for village pond
 - tube wells installed to benefit from water table rise
 - Had to be removed when the NCR channel was dug
 - Highlights vulnerability of farmers to uncertain water supply

The urban-rural water flows

- The Gurgaon Jhajjar canal passes through the village, carrying the city's waste
 - Untreated sewage
 - Rich in nutrients, removes the need for costly application of fertilizers and water pumping
 - Farmers irrigate paddy and wheat
 - Pay irrigation department for its use
 - Results in conflicts on account of over irrigation
 - Produced for the market and not for self-consumption
 - Now the only source of irrigation with the removal of tubewells
 - Highlights vulnerability to an uncertain water supply

Conclusions and implications

- Urbanization processes shape and alter the flows of water between rural and urban areas
- Need to break away from the dichotomy between rural and urban water supply
- Plan for water resources at a regional level
- Need to mobilize both civil society as well as service providers for local level interventions