Understanding periurban water flows

Implications for governance and urban planning

Vishal Narain, MDI, Gurgaon

Overview of presentation

- Conceptualizing periurban
  - What do we mean by periurban
- Research design and context: the growth of Gurgaon city
- The case studies of Budheda and Sadhraana
- Implications for governance and sustainability of cities

Conceptualizing periurban

- No consensus definition
- As a place
  - Villages around cities
  - Most commonly used connotation of the term
- As a process
  - Process of transition from rural to urban
- As a concept
  - An analytic construct to study rural-urban relationships and flows of goods and services

Features of periurban

- Mixed and changing land use
  - Agricultural lands, mining, farmhouses of urban elite, conservation and recreation centers
- Natural resources under stress and contestation: land acquisition for urban expansion, receive urban wastes
- Social heterogeneity and flux
- Erosion of social capital
  - Migration, acquisition of CPRs

Why do periurban areas need attention?

- Urbanization a fact of life in the developing world
- Periurban areas will grow in importance; will shape the nature of urbanization processes
- Receive scant attention because of fragmentation between rural development and urban planning
- Discussions of sustainable cities are incomplete till we understand how their ecological foot-print is borne (the notion of space is important)

Research context: the growth of Gurgaon city

- Growing as a major residential, outsourcing and recreation hub
- Narratives about the millenium city flood the media
- Projected as a “global city” with an impressive skyline
- Visual landscape
  - tall skyscrapers co-existing with village settlement areas and agricultural fields

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 has driven land use change

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 are the implications for water governance, urban expansion and sustainability ?

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
  - (a more structured survey is still underway)

Sadhraana Village

- 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
  - 600 acres sold off to farm-houses
  - 150 acres acquired for Reliance SEZ
- Left with about 40% of the net cultivated area recorded in the 1960s
- Land and water appropriated by the urban elite

Major pressures on groundwater

- Tubewells dug for Sultanpur National Park
  - Now gets its water from the GWS channel
- Farm-houses major appropriator of groundwater
  - extract water using high powered submersible pump-sets not affordable by locals
  - acquire the land over the ‘fresh’ groundwater
  - transport water over 3-4 km to their farm-houses using underground pipes when the farm-houses are located over saline groundwater
    - Results of a legal framework and water rights structure that is inequitable

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

Land use change: bearing the ecological foot-print of urbanization

- 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 with strong reliance on grazing lands
  - 17 acres for each of the two canals to carry water for WTP at Basai
  - Left with just about a fourth of its net cultivated area

The rural-urban water nexus

- 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

Use of urban wastewater

- A wastewater 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
  - Associated with adverse health effects for producers and consumers of the produce
  - Now the only source of irrigation with the removal of tubewells
    - Highlights vulnerability to an uncertain water supply

What these studies tell us…

- Urbanization changes periurban water use and access
- Flows of water between villages and cities are in both directions
- Urbanization creates water insecurity (and not just scarcity)
- These flows need better appreciation in urban infrastructure provision and supply augmentation

Significance of the notion of periurban

- Brings a new dimension to urban planning
- Highlights the notion of space – when we talk of a sustainable city, then what are we talking about ?
- Questions the fragmented nature of conventional planning approaches between rural development and urban planning

Implications for governance

- As urbanization advances, periurban areas (and issues) will rise in significance
- Current processes of urbanization bear well neither for equity nor for sustainability
  - Cities growing beyond the carrying capacity compromise periurban residents' access both to land and water
- Base urban expansion plans on studies of carrying capacity of cities
- Recognise the flows of water between rural and urban areas
  - Move away from seeing "rural water supply" and "urban water supply" as distinct conceptual entities