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# Water, Society and Sustainability

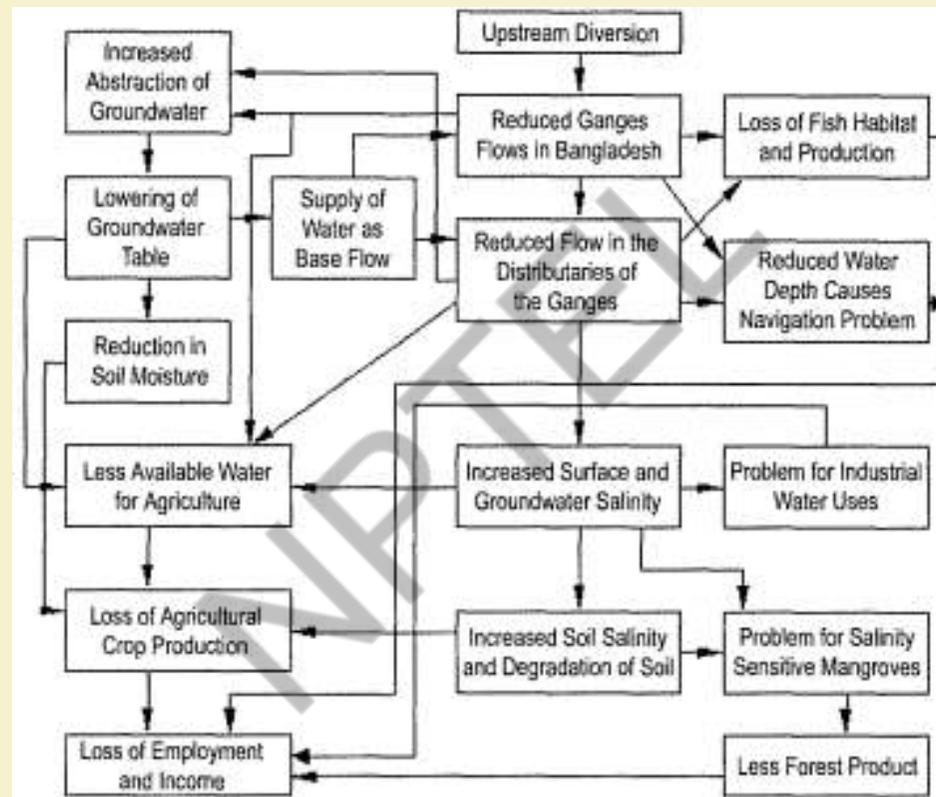
## Lecture No 16: The Farakka Barrage Project: Socio-environmental Implications

Jenia Mukherjee

Department of Humanities and Social Sciences

IIT KHARAGPUR

# Impact of Water Diversion on Bangladesh



Source: Mirza 2004



# River bank erosion in Malda and Murshidabad

Mukherjee, Jenia. 2011 *No voice, no choice: Riverine changes and human vulnerability in the 'chars' of Malda and Murshidabad*, Occasional Paper 28 (Kolkata: Institute of Development Studies Kolkata 2011)

[River bank erosion in Malda and Murshidabad](#)



# Chars

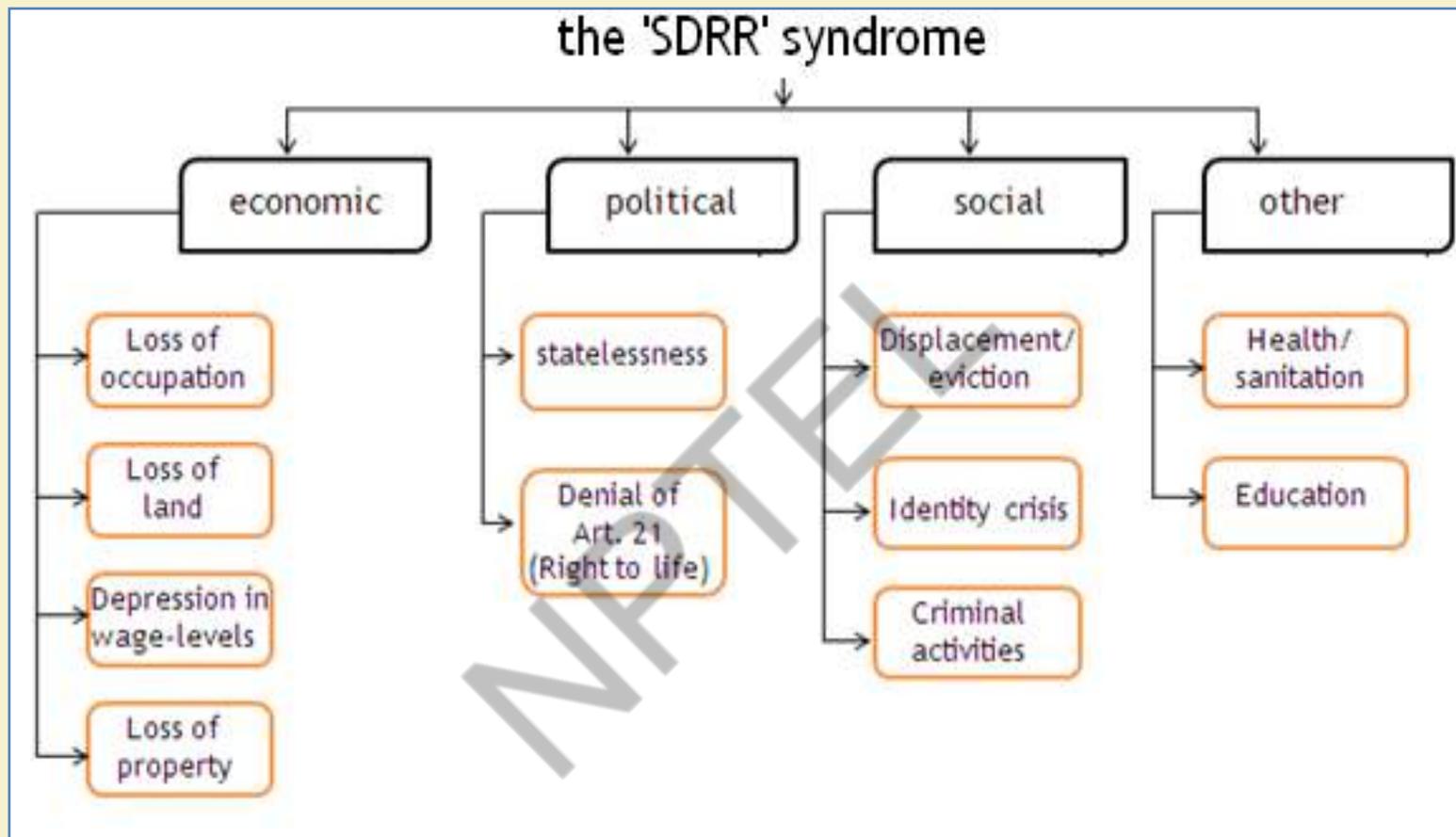


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Source: Mukherjee 2011: 18





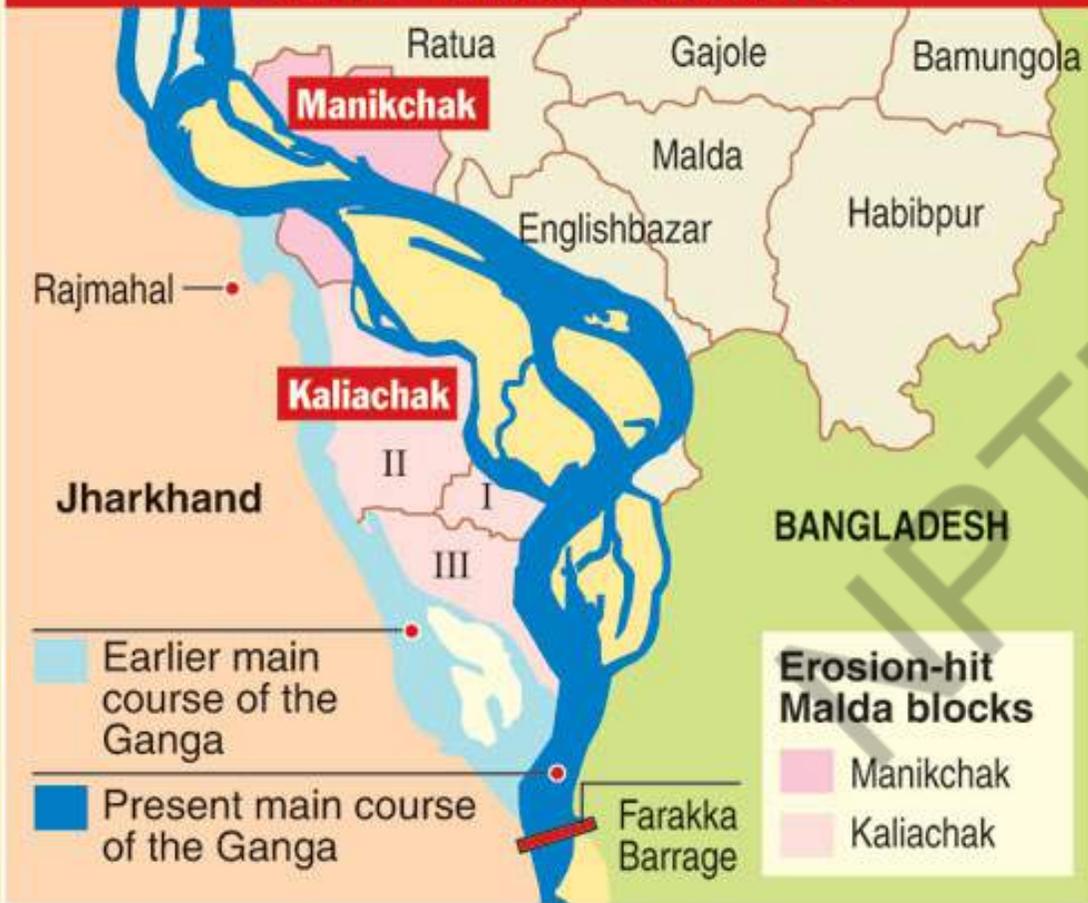
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# SHIFTING SANDS

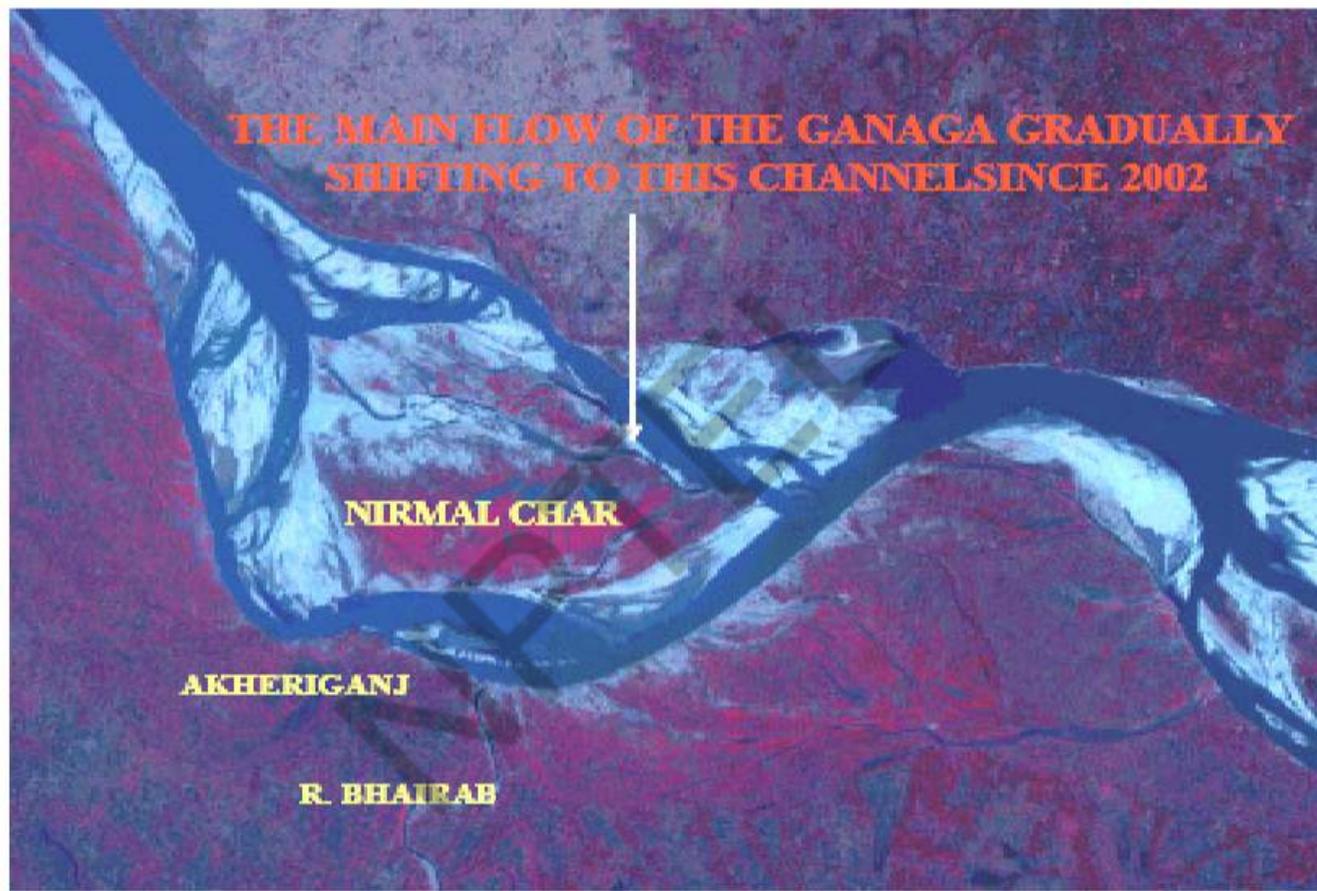


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Source: Rudra 2003: 31



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## Life rolls on...

- Dancing with (the moods) of the river
- Coping up as a compulsory mechanism
- Prevalence of ecosystem services
- *Chorua* culture



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- Parua, P.K. (1999). Erosion Problems of the River Ganga in the districts of Malda and Murshidabad in West Bengal. *Civil Engineering Today, Journal of ASCE*, Vol. 13(2).
- Rudra, Kalyan. (2000). Living On the Edge: The Experience along The Bank of the Ganga in Malda District, West Bengal. *Indian Journal of Geography & Environment*, Vol. 5. 57-67.





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# Water, Society and Sustainability

## Lecture No 17: Urban Waters: Historical and Political Ecological Perspectives

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# Why urban?

- World Urbanization Prospects 2007
- Rate, scale and shifting geography of urbanization
- Urban water challenges
  - Conversion of waterbodies, wetlands
  - Supply of piped drinking water
  - Replenishment of GW table
  - Peri-urbanization: 'urbanization without infrastructures'



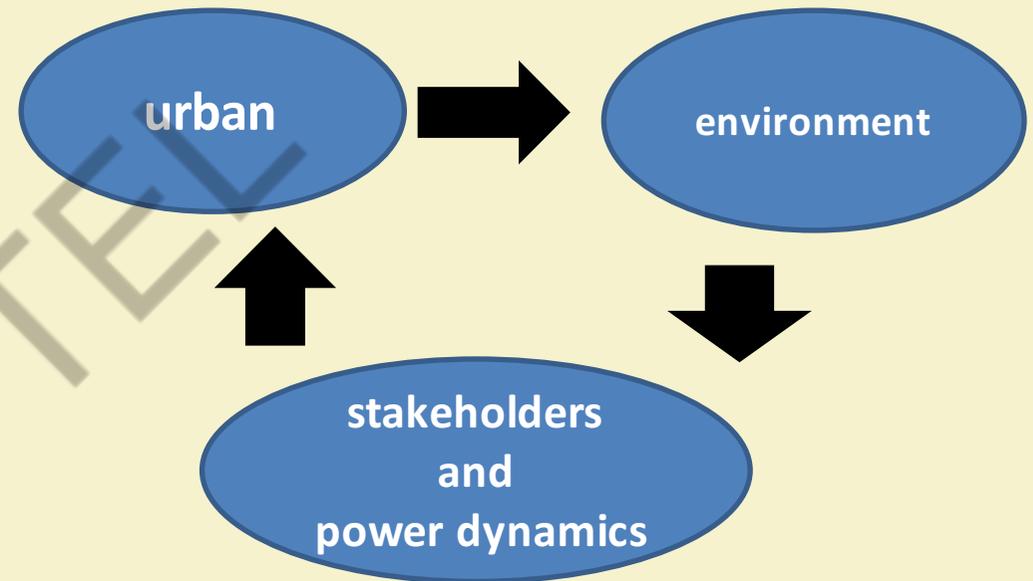
*It is a double whammy: both world population and the percentage living in cities are rising. This double-compounding of growth puts great pressure on urban water systems and the result is rapidly-escalating urban demands for water, growing competition, conflicts, shortages, waste and degradation of water*

– Neil Grigg, <https://erams.com/UWIN/integrated-urban-water-systems-challenges-of-implementation/> (accessed on: April 24, 2018)



# Utilities

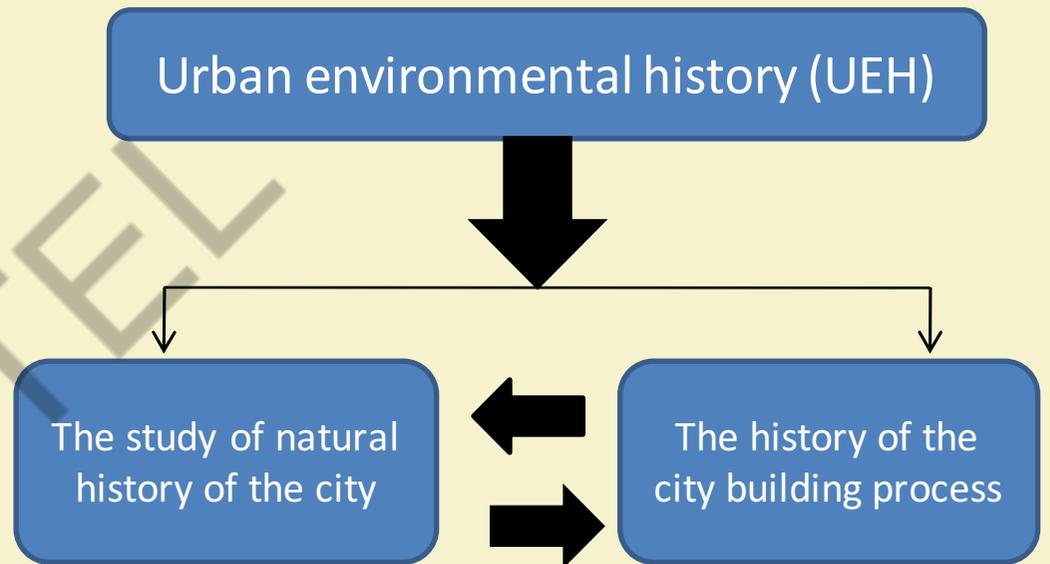
- safe drinking water
- adequate and convenient sanitation
- effective wastewater management
- drainage and flood control systems

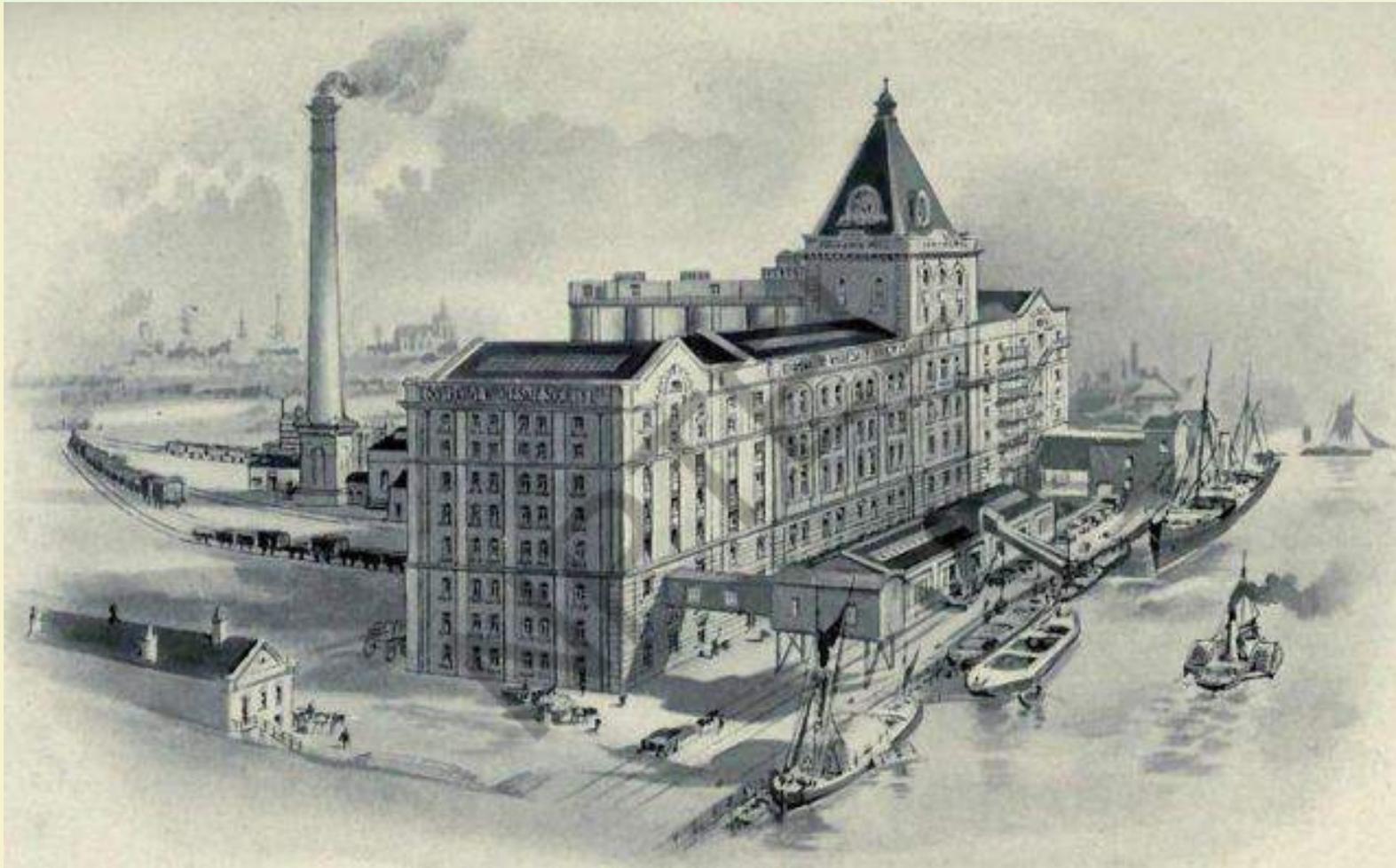


# Urban Environmental History



- Worster – Melosi debate





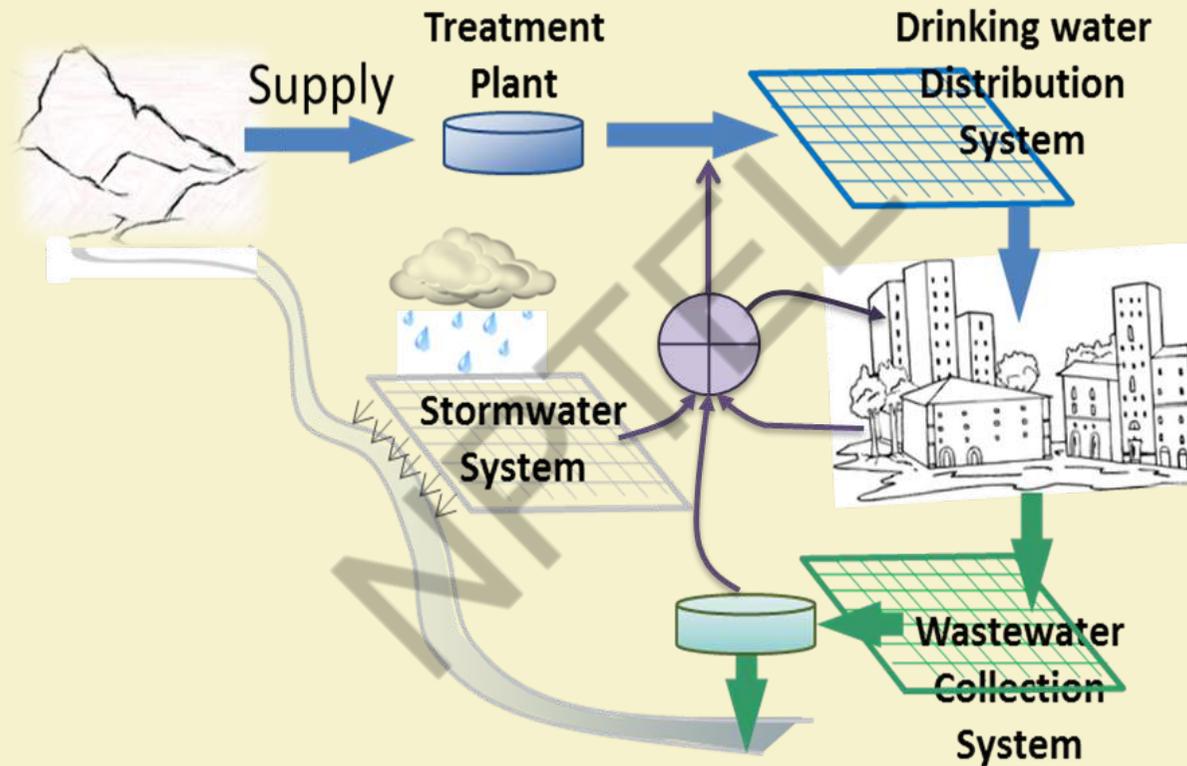
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# Water in, water out



## Modern urban water works

- Modern water works and sewage system – integrated system of water provision and waste- water disposal – urban cleanliness
- Input-output consequences not considered
- Social and cultural dimensions of adaptation – changed behavioural patterns of urban residents
- Piped drinking water – increase in water consumption from 10-20 l./day to 150-200 l./day
- Institutional and legal regulations – relation between suppliers and consumers



### **Sabine Barles – urban metabolism of Paris**

- 19<sup>th</sup> c.: recycling and reuse of waste; awareness on the material value of waste; reconstitution of material cycles
- 20<sup>th</sup> c.: breakdown of material cycles; waste ceased to be a resource

### **Simone Neri Serneri – canal network of Milan**

- Canals: transport, waste disposal, irrigation
- Deterioration of the sanitary situation
- Late 19<sup>th</sup> c.: modern water provision and sewage system
- ‘superimposition’, capacity of water courses to absorb organic pollutant substances not accounted for
- Collapse of the regional hydrological regime



## UEH in South Asia

*The urban environment is neglected by activists; and predictably, by scholars as well. India soon will have the largest urban population in the world, yet we know far less than we ought to about the history of ecological conditions within cities or of their claims on the resources of the hinterland.*

*...we will soon have fine, detailed studies of...the cities of modern India*

Ramachandra Guha, Movement Scholarship (What's Next for Environmental History? *Environmental History* 10/1 (2005)



# UEH in South Asia

## Delhi's Belly: On the Management of Water, Sewage and Excreta in a Changing Urban Environment during the Nineteenth Century

Michael Mann  
FernUniversitaet in Hagen

*The article locates Delhi's urban environmental history firmly within the matrix of colonial urban politics, and analyses the relationship between sanitary discourse in Europe and the 'politics of sanitation' in India. It describes how colonial town planning, particularly in the context of Delhi, segregated sanitary and unsanitary spaces on a racial basis, the former being inhabited largely by the colonizers and the latter by the colonized. It discusses the technological and administrative measures undertaken by the colonial authorities to improve sanitary conditions on the one hand, and provide fresh water on the other. The article argues that New Delhi, and its water and waste disposal systems, was conceived of in a segregated way with respect to the old city, and civic services too benefited the new city at the expense of the old. It establishes a contrast between conceptions of the city in the West (as modern and progressive spaces) and in India (as unsanitary and therefore uncivilized spaces). Old Delhi, the author argues, was made 'old' through neglect and underdevelopment.*

To spoil the pure water of streams and rivers with filth, to cover the limpid depth of anchoring grounds with excrementitious matters, and to transform the basins of our ports into *cloacae*, is always a sort of profanation, an act of barbarism, an attack against health.

(Proceedings of the International Sanitary Conference, Constantinople 1866)<sup>1</sup>

[T]he European talks of progress, because, by an ingenious application of some scientific acquirements, he has established a society which has mistaken comfort for civilisation.

(Benjamin Disraeli, *Tancred or the New Crusade*)<sup>2</sup>

<sup>1</sup> Quoted from Smith (1869: 12). Earlier versions of this article were presented at the Centennial Conference on 'Asian Horizons: Cities, States, and Societies', University of Singapore, 1-3 August 2005 and at the International Seminar on the 'History of Waters in South Asia: Climate, Ecology, De-Forestation, Agriculture, Politics and the Management of Nature', Jahangirnagar University, Kolkata, 3-4 March 2006. I owe Jim Masselos, Narayani Gupta and Brenda Yeoh many thanks for their critical comments.

<sup>2</sup> Disraeli (1926-27), Vol. X, Book III, Chapter VII, p. 233.

*Studies in History*, 23, 1, n.s. (2007)

SAGE PUBLICATIONS Los Angeles/London/New Delhi/Singapore  
DOI: 10.1177/025764300602300101



Journal

International Journal of Urban Sustainable Development >

Volume 7, 2015 - Issue 2

Papers

## Beyond the urban: rethinking urban ecology using Kolkata as a case study

Jenia Mukherjee ✉

Pages 131-146 | Received 14 Jul 2014, Accepted 19 Jan 2015, Published online: 12 Feb 2015

## 2 Sustainable flows between Kolkata and its peri-urban interface

### Challenges and opportunities

Jenia Mukherjee



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# Urban Water Political Ecology of Water

Does only water flow through pipes?

Power also flows!

Who gains? Who loses?



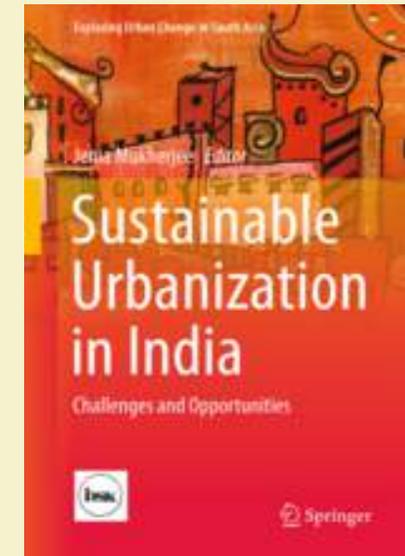
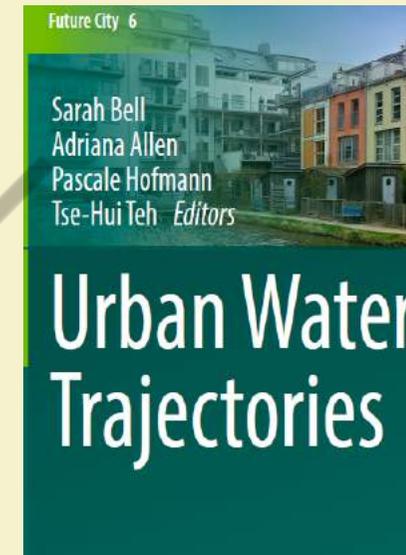
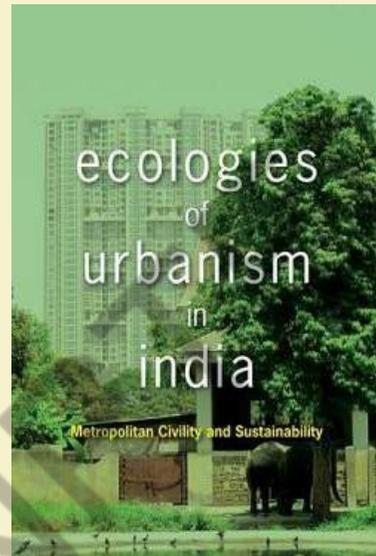
## Uneven, unequal and unjust

- **uneven waterscapes** (Swyngedouw 1997; 2009; Loftus 2009; Acharya, 2015)
  - uneven distribution of infrastructures and water quantity
- **topography of water (quality) inequalities** (Rusca et al. 2017)



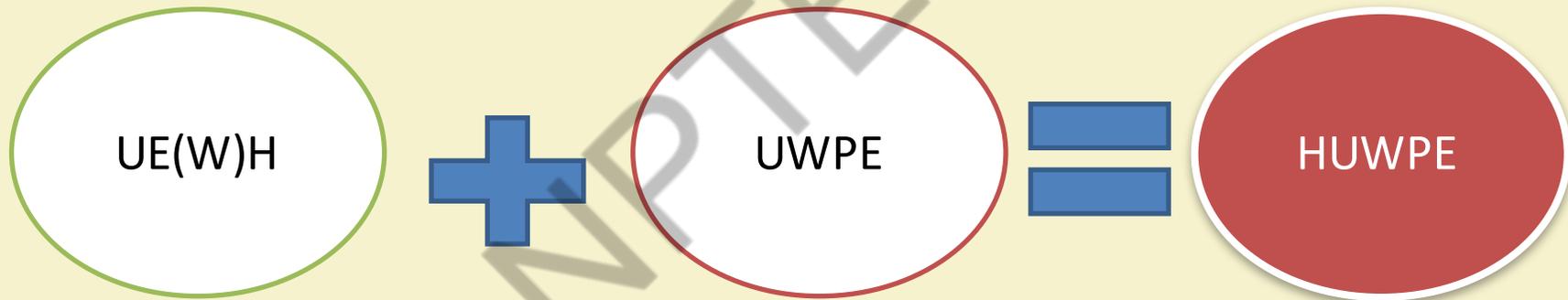
# Third World UWPE: India

- Baviskar 2011
- Coelho & Raman 2013
- Cornea, Zimmer and Veron 2016
- Sundaresan 2017
- Chouhan et al. 2018
- Singh et al. 2018



## Combining (urban) environmental history and political ecology

- UEH and UPE – urban water systems – integrated



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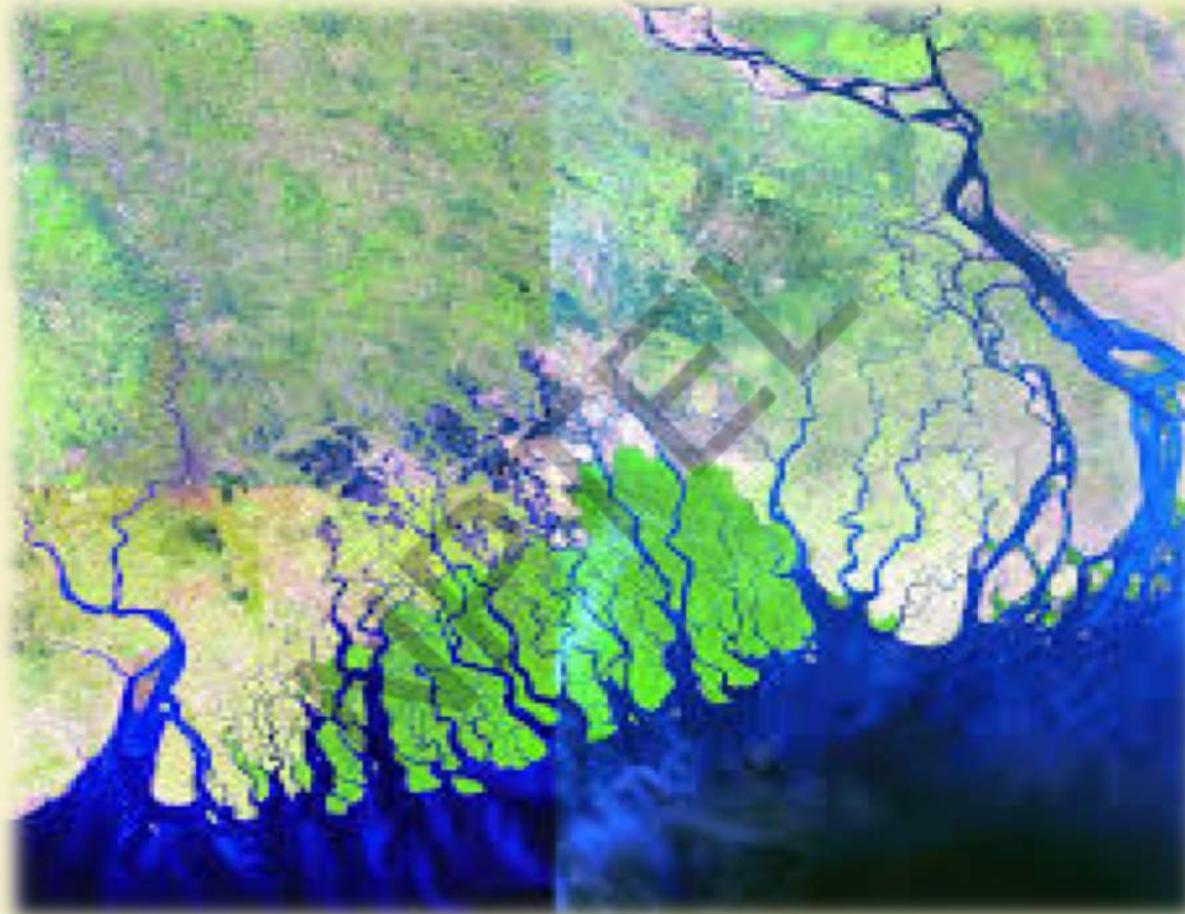
# Water, Society and Sustainability

## Lecture No 18: Transforming Trajectories of Blue Infrastructures of Kolkata

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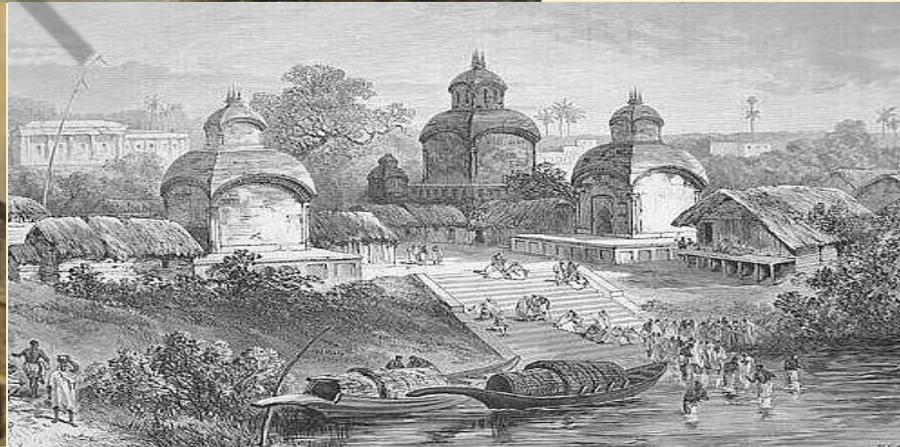
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## Old river choked by rail



Should Metro Railway pay compensation to Calcutta for irreversibly impacting the Adi Ganga channel, damaging its drainage potential and thus putting the city at risk?

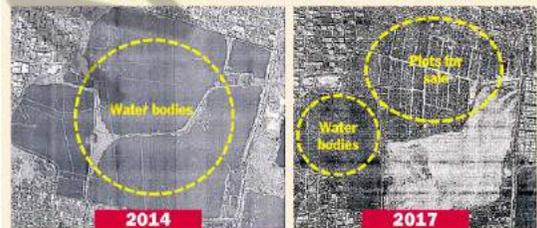
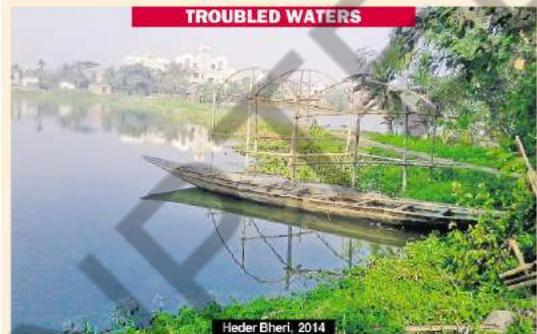
Giant pillars on the Adi Ganga.  
Picture by Bishwarup Dutta



## Stinking River Disappearing River



Plots for sale come up on what used to be 15-acre Heder Bheri in protected wetlands belt



Satellite images show how a part of the East Calcutta Wetlands has been plundered by land sharks

## Water bodies have shrunk 77% in the last 14 years despite protective legislation and the status of a Ramsar site!!

### Land sharks bury water body

JAYANTA BASU



May 7: A water body spanning 15 acres within the East Calcutta Wetlands has been filled to create scores of plots for sale in violation of a Calcutta High Court order that bars any real estate development in that area.

The plots that were once a water body are located behind Rabindranath Tagore International Institute of Cardiac Sciences in Mukundapur, off the Bypass. An adjacent piece of agricultural land measuring about 18 acres has also been illegally converted into plots as part of the project called Prothoma Garden by Biswas Enterprises.

The East Calcutta Wetlands Management Authority, chaired by environment minister Sovan Chatterjee, had filed an FIR at Sonarpur police station on April 24, naming two persons involved in the project. Besides the high court's order, the project violates the stipulation in the wetlands act that a water body can be filled only if one of equivalent size is created.

The water body that has disappeared was about one-third the size of Allpore zoo. Known as Heder Bheri, it used to provide 25 tonnes of fish annually until the late 90s, according to state government records.

Two Google maps of the area, one showing the current landscape and another from an earlier date, reveal the extent of the violation. "There have been many violations in the East Calcutta Wetlands. This must be among the more flagrant ones," said Dhrubojyoti Ghosh, the wetlands crusader. Dhruva Dasgupta, a wetlands researcher, remembers seeing the water body "untouched" and being used for fishing till 2015. "The water was drained out in 2016 and the process of filling the site to create plots started in end-2016."

Metro visited the area recently and found the "project site" encircled by 8ft high brick walls. "The plots are being sold at Rs 7 lakh a cotta," said a member of a local club. "Get in touch with Biswas Enterprises, which is handling the plot sales."

An office of Biswas Enterprises is located about 100 metres from where Heder Bheri used to be. "Biswas Enterprises assured me that all permissions would be organised to build houses on the plots. They also provided me a brochure," said a prospective buyer.

Madhu Mondal, one of the owners of Heder Bheri, said all the stakeholders in the water body had given power of attorney to a person named Motilal Mondal to develop and sell plots. "We had almost lost the water body a few years ago and so we gave Motilal permission to do what was necessary to dispose it of," Madhu said.

Sources said Motilal, along with promoter Biswas Enterprises, had been "developing" the property after draining out water from the *bheri*. "They have been working in collusion with local political leaders. The owners were apparently promised about Rs 80,000 a cotta while a share of the spoils was to be split among political leaders, the police and a section of the administration," said a resident of the area.

If sold, the plots could fetch around Rs 125 crore for a total area of nearly 33 acres.

The filled water body and the agricultural land are part of plot numbers 44 and 80 respectively under the Kheyedaha 2 panchayat area in Mukundapur Mouza. These areas constitute Sonarpur block of South 24-Parganas district. "I do not know about any water body being filled, but I will enquire about it," panchayat pradhan Mita Naskar said.

According to data available with the state land and reforms department, plot number 44 is a "bed (water body)" covering about 15 acres. The adjoining plot number 80, spread over 18 acres, is "sali" or agricultural land. No change in land use is permissible within the wetlands belt and this is applicable to agricultural plots as well.

The wetlands authority received the first complaint about Heder Bheri being filled in December 2016, based on which an inquiry was initiated. But no action has been taken since the FIR in April. Close to 350 FIRs about similar violations in the wetlands belt are pending with various police stations.



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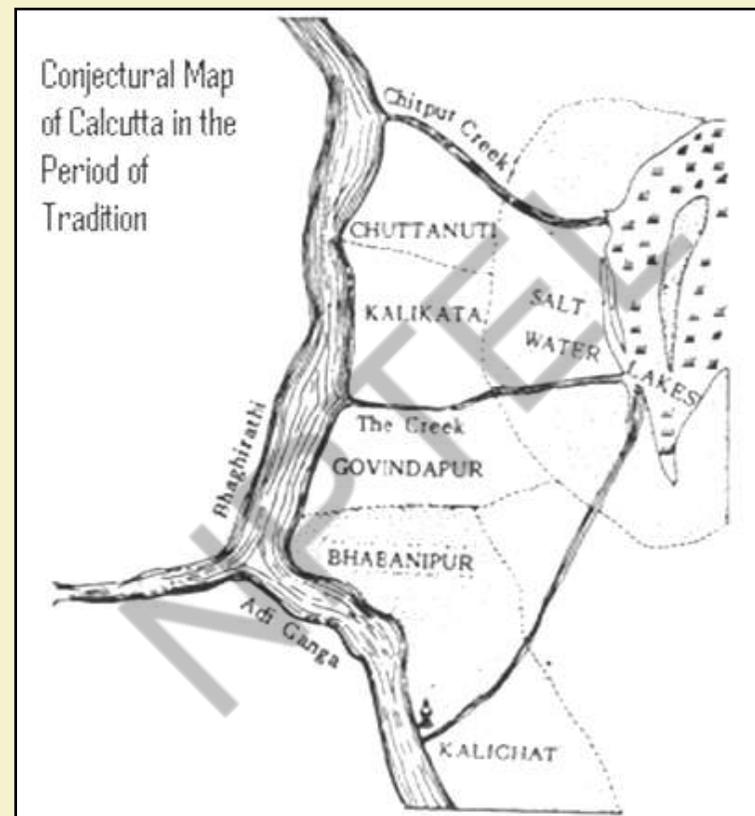
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*Thus the midday halt of Charnock—more's  
the pity!  
Grew a City.  
As the fungus sprouts chaotic from its bed,  
So it spread—  
Chance-directed, chance-erected, laid and  
built  
On the silt—  
Palace, byre, hovel—poverty and pride—  
Side by side;  
And, above the packed and pestilential  
town,  
Death looked down.*



# The victory of site over situation



## excavation of canals

Excavated canal	Year of execution
<u>Belegkata</u> Canal	1810
Circular Canal	1831
New Cut Canal	1859
<u>Bhangar</u> Canal	1897
<u>Krishnapur</u> Canal	1910

Tolly's Canal – 1772-1777

Combined scheme of William Clarke, 1865

The Bidyadhari River – the major outfall channel

Trade and  
transportation

the water-borne traffic to Calcutta was **seven times as great as that carried by the Eastern Bengal State Railway** (*Bengal District Gazetteers*, 1914)

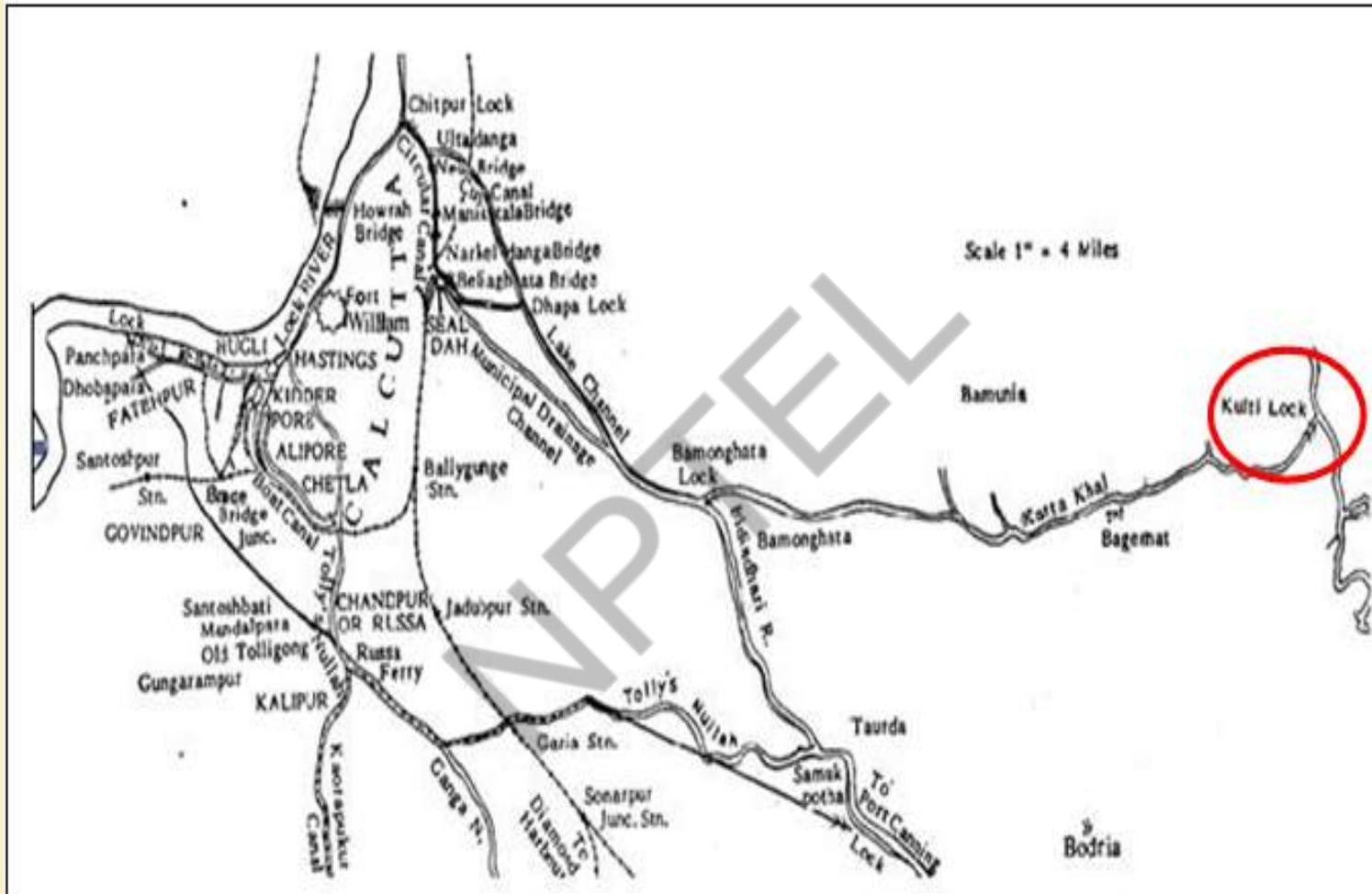
Drainage,  
sewerage and  
sanitation

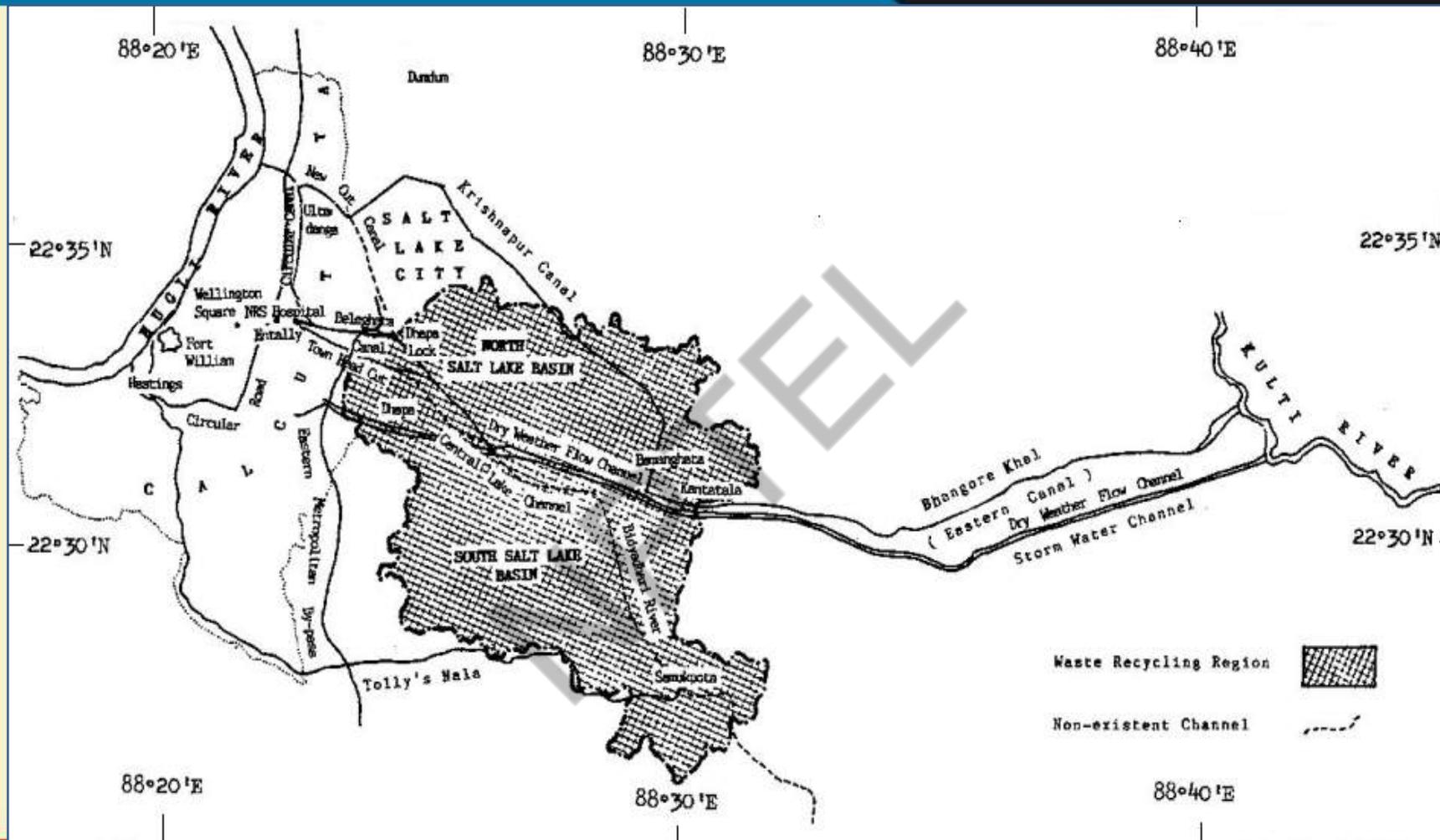


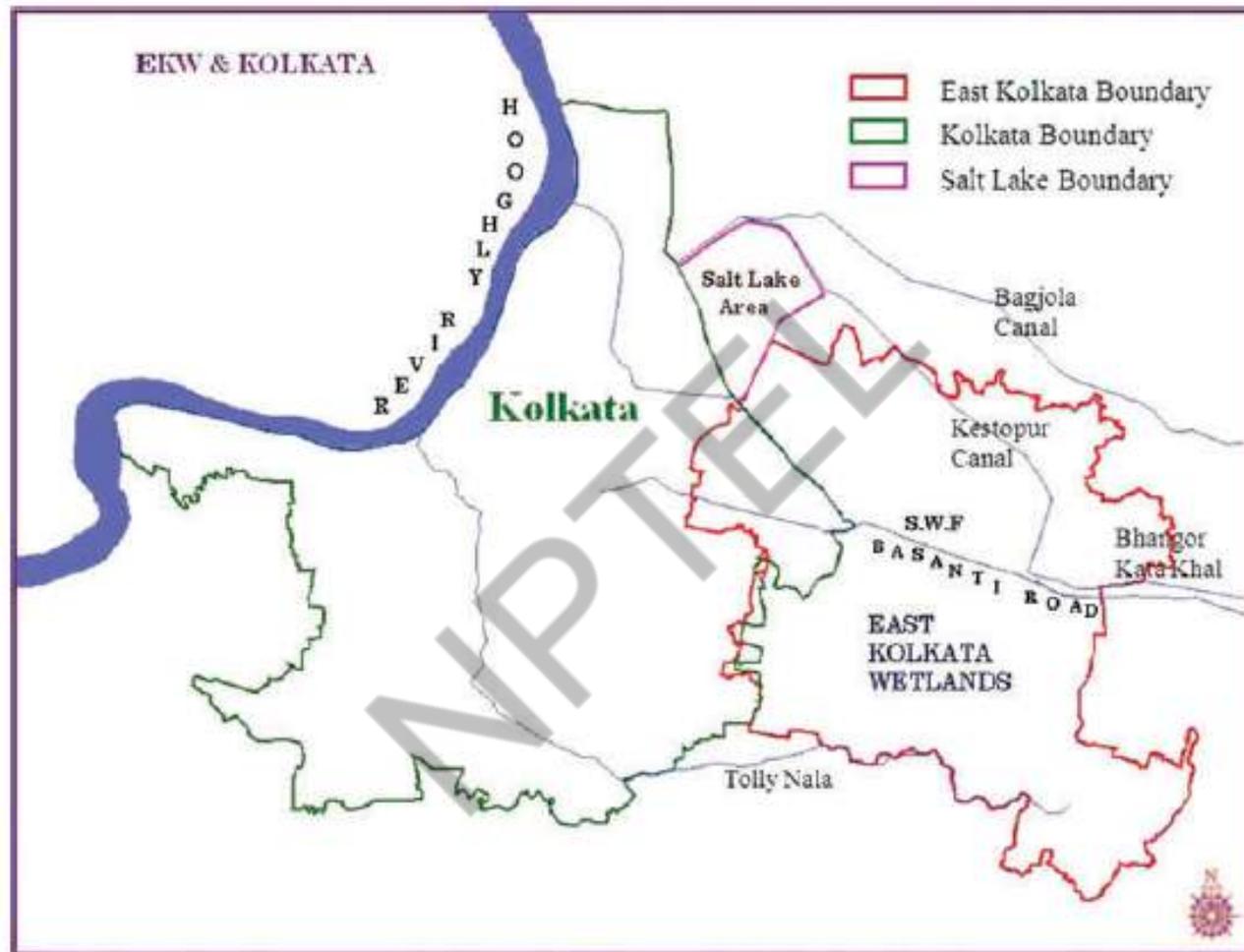


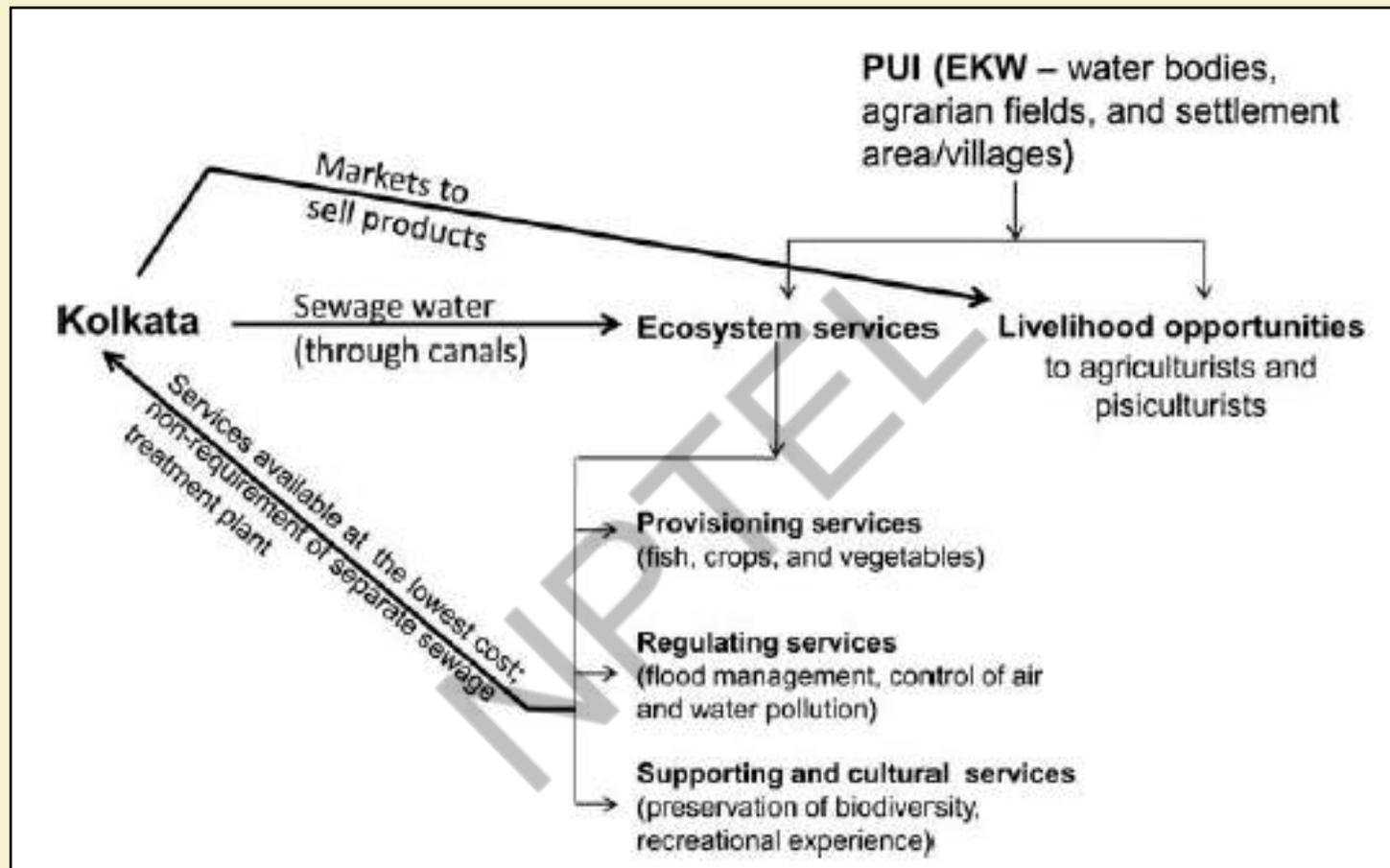
Year	Event	Cross-section of Bidyadhari River at Bamanghata
1829	Excavation of Circular Canal	1920 sft (178.38 m <sup>2</sup> )
1830	Excavation of a link between the Kulti-Gong and the Bidyadhari River	----
1881-1897	Extensive Canalization	
•1883	-----	13, 674 sft (1270.39 m <sup>2</sup> )
•1904	-----	9, 700 sft (901.19 m <sup>2</sup> )
1910	Excavation of Krishnapur Canal	
•1913	-----	6, 490 sft (602.96 m <sup>2</sup> )
•1928	<b>official death of the River</b>	1, 000 sft (92.91 m <sup>2</sup> )











Source: Mukherjee 2015





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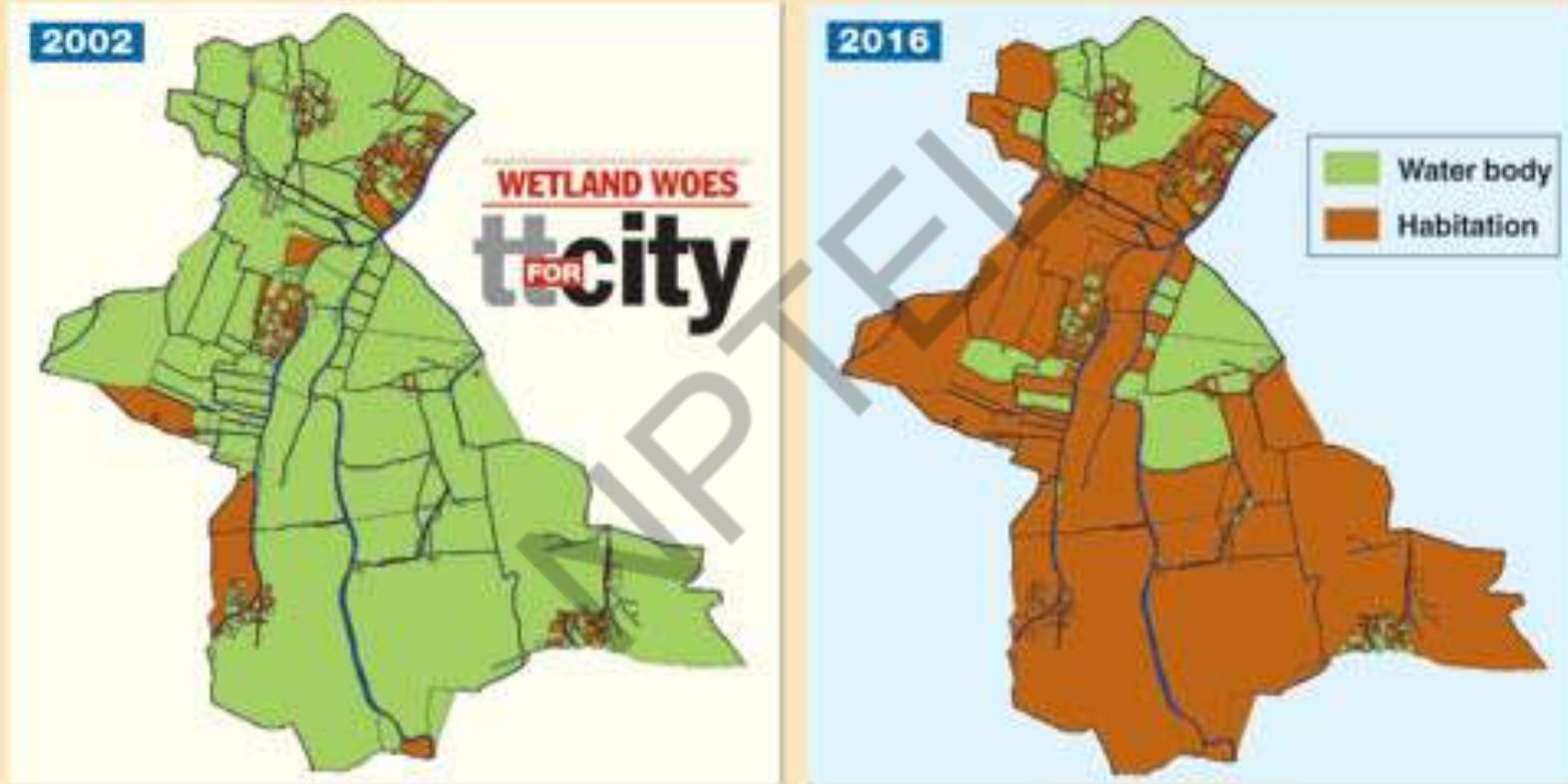
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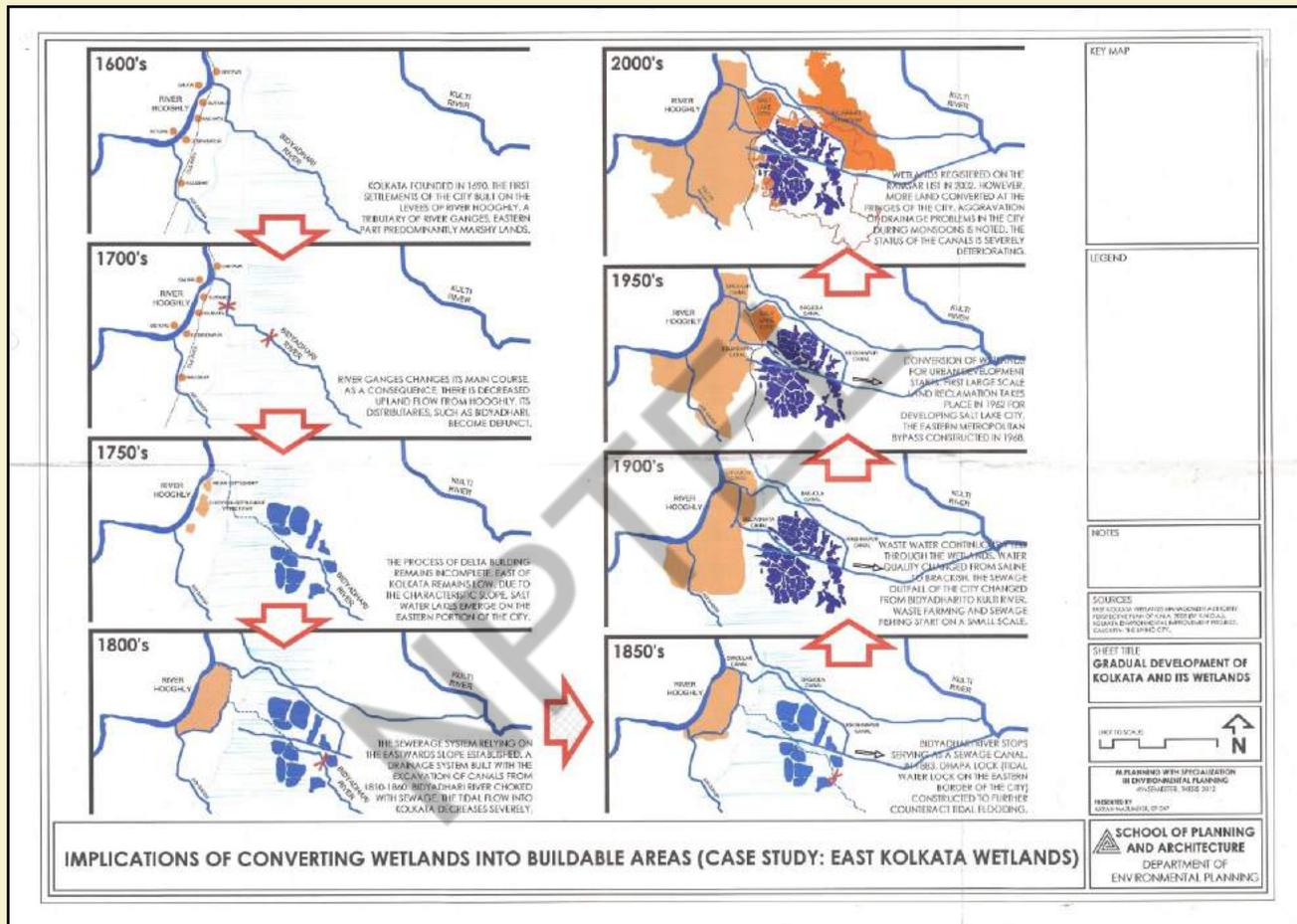
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## CALCUTTA RAMSAR SITE SHRINKS BY 77 PER CENT

Satellite images of Bhagabanpur Mouza in the East Calcutta Wetlands, taken 14 years apart, reveal how the water bodies have been filled by land sharks in violation of judicial orders





Source: Centre for Environment and Development 2007



# Polemics of urban planning

- *Basic Development Plan (BDP)* of 1966
- replaced by *Development Perspective Plan (DPP)* of 1976
  - from bi-nodal strategy along a north–south urban development axis to polycentric model of development along the east–west spatial growth axis (CMPO 1966; KMDA 1976)
- *Plan for Metropolitan Development 1990–2015*
- *Calcutta Environment Management Planning Strategy and Action Plan (CEMSAP)*, 1995-96
- *Kolkata Environment Improvement Project (KEIP)*, 2002
- *Vision Document*, 2015-2020
- 2016 – Draft Wetland Bill





ALL THAT REMAINS: A shanty dweller looks desolately at the remains of her room which was razed in the eviction drive. Photograph by Sanjoy Chattopadhyaya.

## IT WAS DARKNESS AT DAWN FOR SQUATTERS

ASIAN AGE 11.12.02

BY SANJOY BHADRA

While the men were determined to put up resistance, women spent a sleepless night worrying what lay in store for them on the dawn of the World Human Rights Day.

Kolkata, Dec 10: It was probably the darkest night in the lives of the 15,000 odd people residing in the shanties adjacent to the Beliaghata canal. While the male members across the bustee sat outside their shanties, determined to put up a strong resistance, the females spent a sleepless night apprehending what lay in store for them on the dawn of World Human Rights Day. As dawn broke, their jaws

tightened. "We will put up a strong resistance. This place is ours and we have to keep it for our children," 48-year-old Baliram said. Others joined him in vow. "We will fight for our rights," they roared. Dawn broke out in a dismal note. The police vans moved across the streets while CESC men started snapping the overhead connection. Men jostled at corners and prepared for the "battle." Women could only utter: "Ki hobe anader?" The local political leaders

came out with their usual loads of promises. But they hardly held any meaning for the squatters who were about to lose everything they had that morning. "Where you all have been for the last couple of days? We do not need your support?" the locals said, as the leaders made futile attempts to impress them with their fiery speech. Tension mounted as the eviction drive started across the shanties in Narkeldanga and Manikata. The squatters marched forward.

DC/DD (special) Piyush Pandey and DC/ESD, Sanjoy Mukherjee were at their amicable best as they tried to pacify the crowd. The situation, however, took a turn for worse as a section of anti-socials set fire to the shanties. All of a sudden the resistance melted. The locals ran helter skelter to salvage their belongings. But all were in vain as the blazing flames swallowed them all. As the firetenders battled with the blaze, two police leaders continued its demolition drive. Faces that were determined to resist in two hours, wore a desolate look in mid-morning. Last on Tuesday, the workers went back to the squatter-gated locations at the razed structures which they once called their homes. The state government had declared relief packages for all the 95,000 shanties. Accordingly state officials deployed several hundred policemen, but 1,26,000 squatters remain homeless. (Asian Age)



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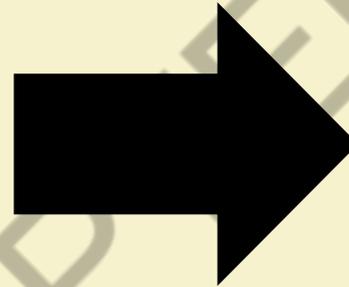
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# Cosmetic initiatives

- KEIP
- River restoration and beautiful projects
- ‘Eco City in an Eco Park’ (Rajarhart – from ‘smart city’ to ‘green city’)
  - massive forestation, rainwater harvesting and recycling and waste water recycling, eco friendly transport system



ecology 'in'  
cities



ecology 'of'  
cities



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# Water, Society and Sustainability

## Lecture No 19: Peri-urban Water Justice in the Global South

**Jenia Mukherjee**

Department of Humanities and Social Sciences

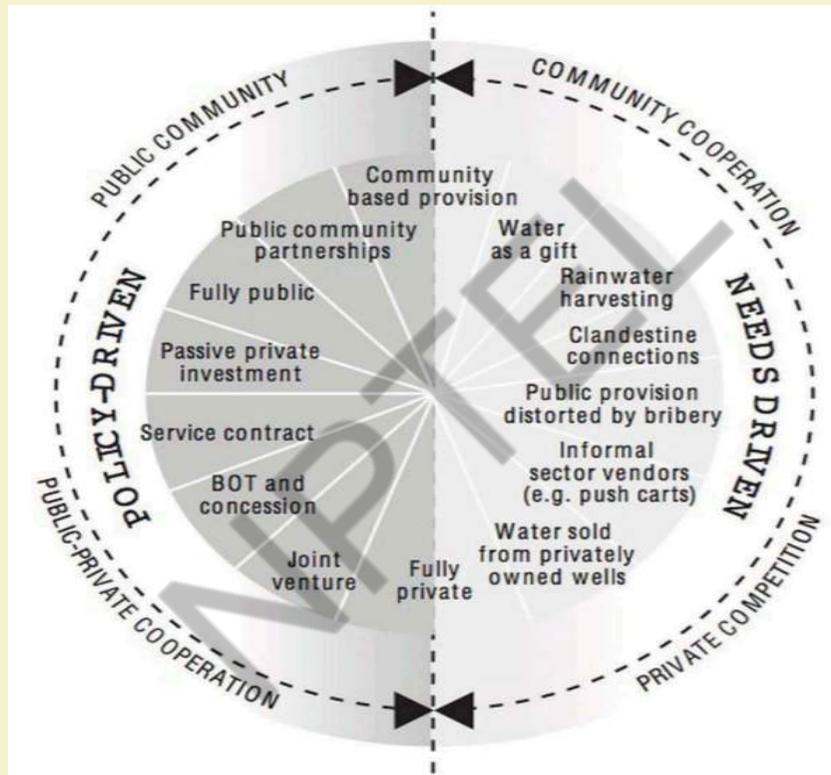
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# Peri-urban, water justice, global south

- ‘urbanization without infrastructures’ (Allen 2014)
- rate, scale and shifting geography of urbanization
- lack of policy-driven WATSAN services
- ‘infrastructural archipelagos’ (Bakker 2003)



# Water Wheel



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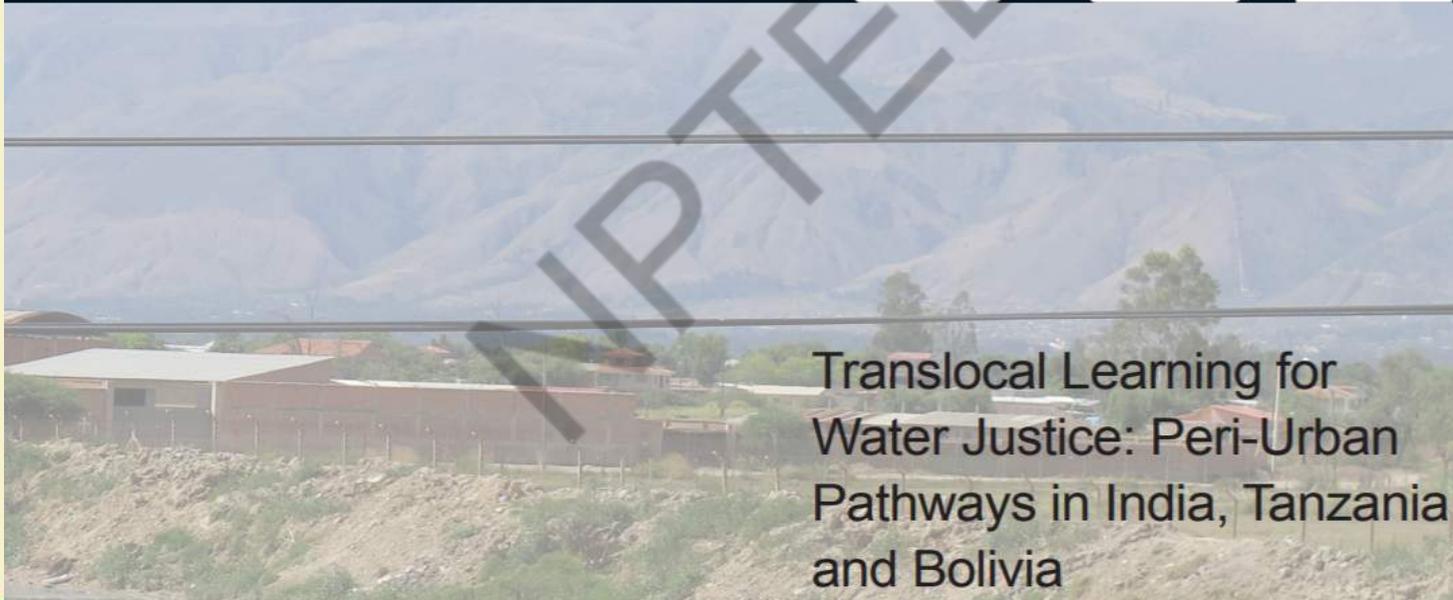
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The Bartlett Development Planning Unit



# UCL



Translocal Learning for  
Water Justice: Peri-Urban  
Pathways in India, Tanzania  
and Bolivia



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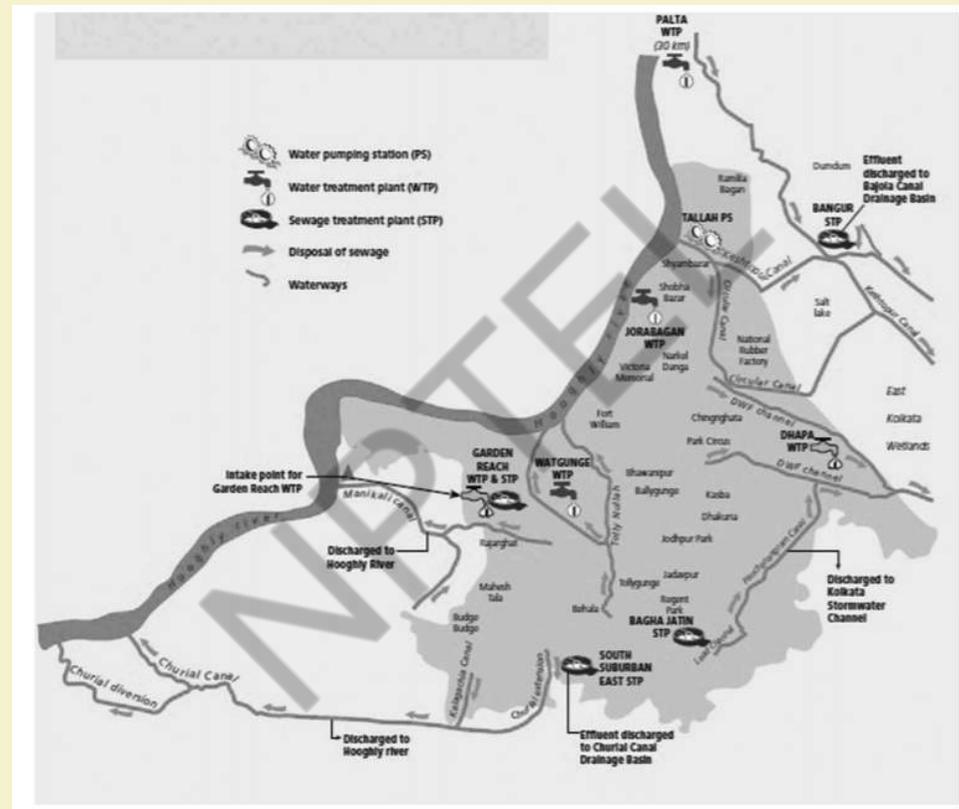


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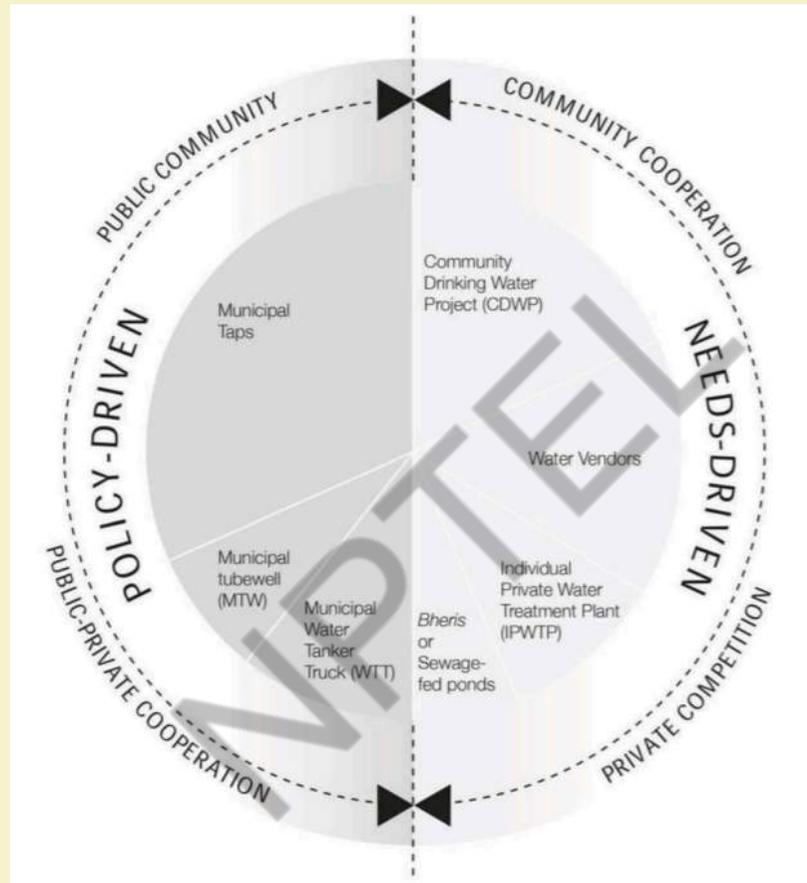
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# Kolkata



Source: cited in Allen et al. 2016: 25



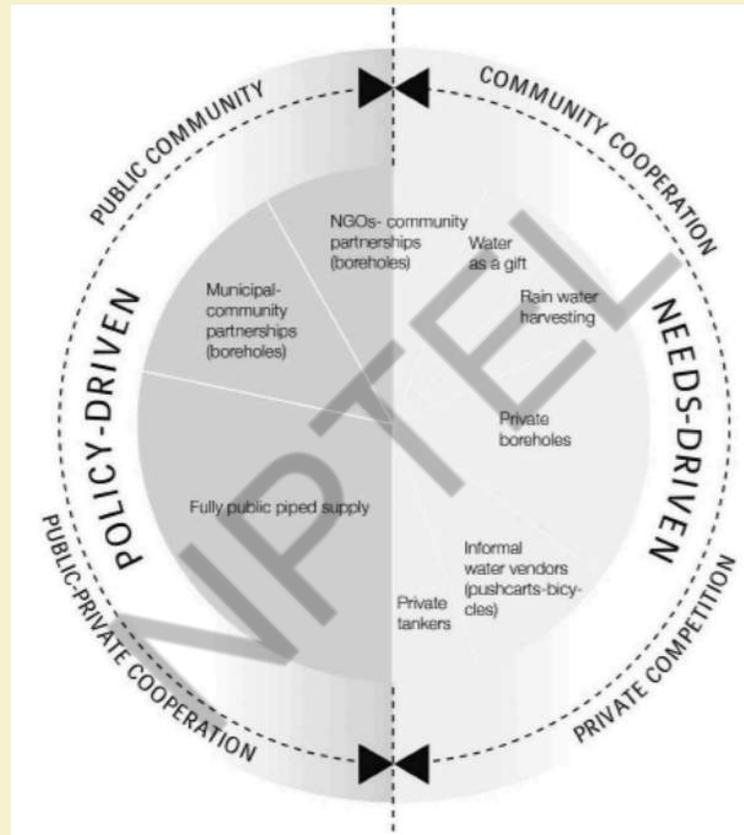


[Water practices in peri-urban EKW](#)

Source: cited in Allen et al. 2016: 27



# Dar es Salaam



Source: cited in Allen et al. 2016: 31



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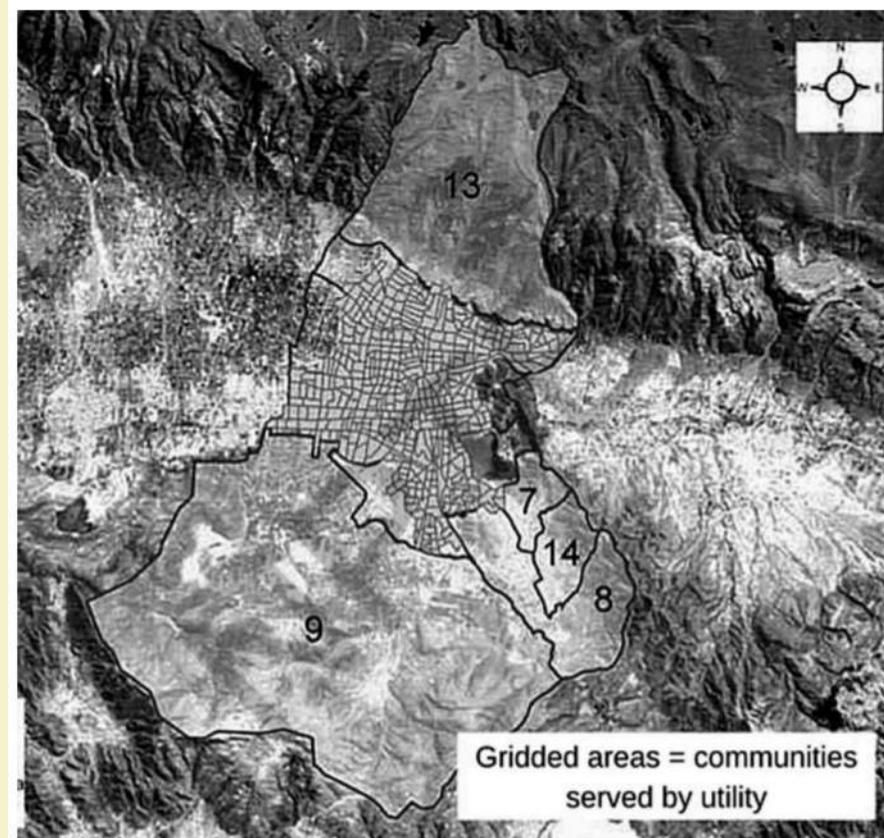


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# Cochabamba



Source: cited in Allen et al. 2016: 34

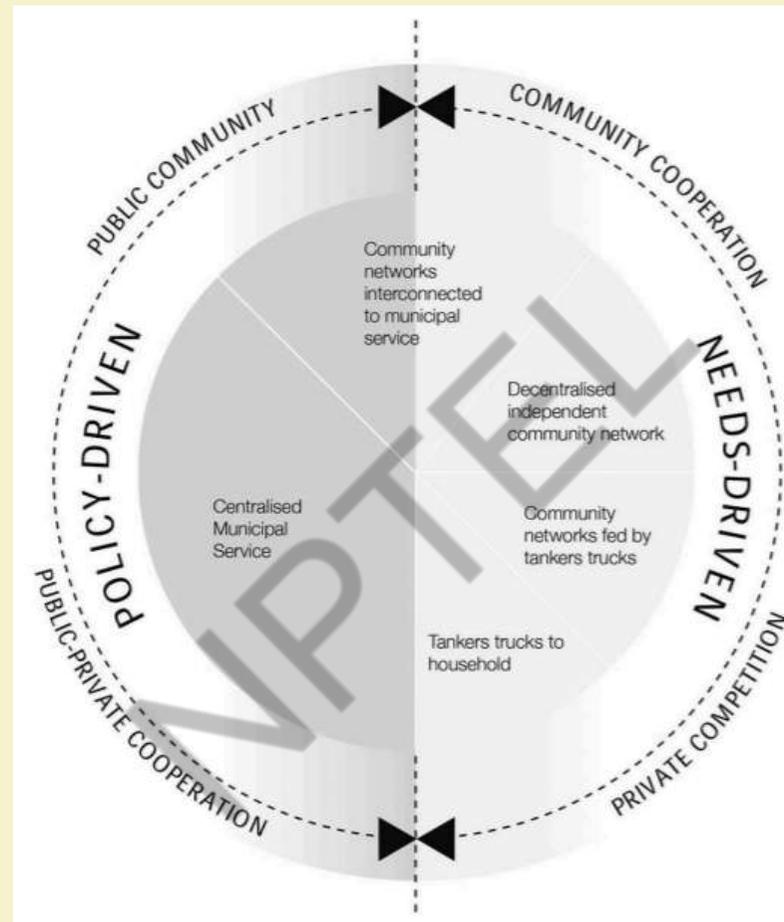


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Source: cited in Allen et al. 2016: 36



## Translocal learning for water justice: Peri-urban pathways in India, Tanzania and Bolivia

<https://youtu.be/AF4f6Qc8n54>



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# Water, Society and Sustainability

## Lecture No 20: Discussion and Conclusion

Jenia Mukherjee

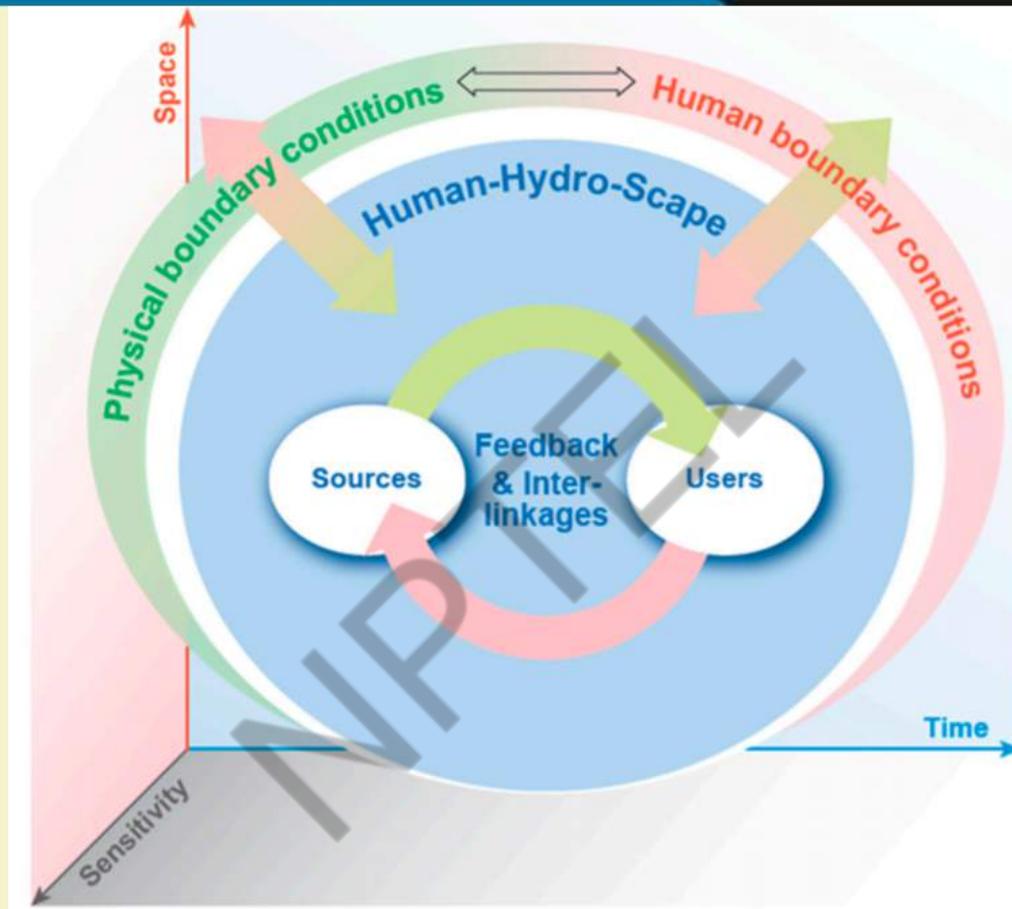
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## Pluralistic Water Research

- True integration in water-society research
- PWR: “is not only a pluralistic but also an integrative and interdisciplinary approach which aims to coherently and comprehensively integrate human-water dimensions” (Evers et al. 2017).
- Why pluralistic approach is required?
- IWRM, SH, HS, PE – different epistemologies, ontologies, methodologies, and axiologies





Source: Evers et al. 2017: 6



## All big interventions – big follies?

- Different possible development paths and potentially desirable futures exist (Evers et al. 2017: 7)
- There is no single best answer – no universal set of principles and prescriptions
- Need for locally tailored, politically sensitive, context-specific pathways and solutions
- Revolution in conceptualizing, exploring and pursuing water research



# Involving people, involving communities...

AICTE-QIP Short Term Course on

**COMBINING HYDROLOGY AND HYDROSOCIAL:  
TOWARDS COMPREHENSIVE UNDERSTANDING OF  
RIVERINE SYSTEMS**

**October 23 - 29, 2017**



organized by

The Department of Humanities and Social Sciences  
Indian Institute of Technology Kharagpur

- What is the river (or water body) you know the best?
- When did you interact with it for the first time? What do you recall from that experience?
- What are your interactions now with this river (or water body). Describe your actions, gestures and practices.



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## Radical initiatives

- Human rights to rivers
  - The Whanganui River, New Zealand (*I am the river and the river is me*)
  - The Vilcabamba River, Ecuador
  - The Ganges and the Yamuna Rivers, India

Kuttemperoor River reborn

<https://indianexpress.com/article/india/how-a-kerala-village-revived-a-dying-river-4639365/>



## Radicalizing river (water) research

- Reconfigure
- Re-conceptualize
- Redefine
- Reconcile



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# Thank You!!



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