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NEXUS Gains

Gayathri Angou

MSc. thesis

Opportunities & barriers for recharge ponds in an urbanizing district of the Ramganga basin, as explored through transdisciplinary rural-urban linkages

Agenda

1. What
2. Where
3. Why
4. Key findings
5. What's next



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What is the research?

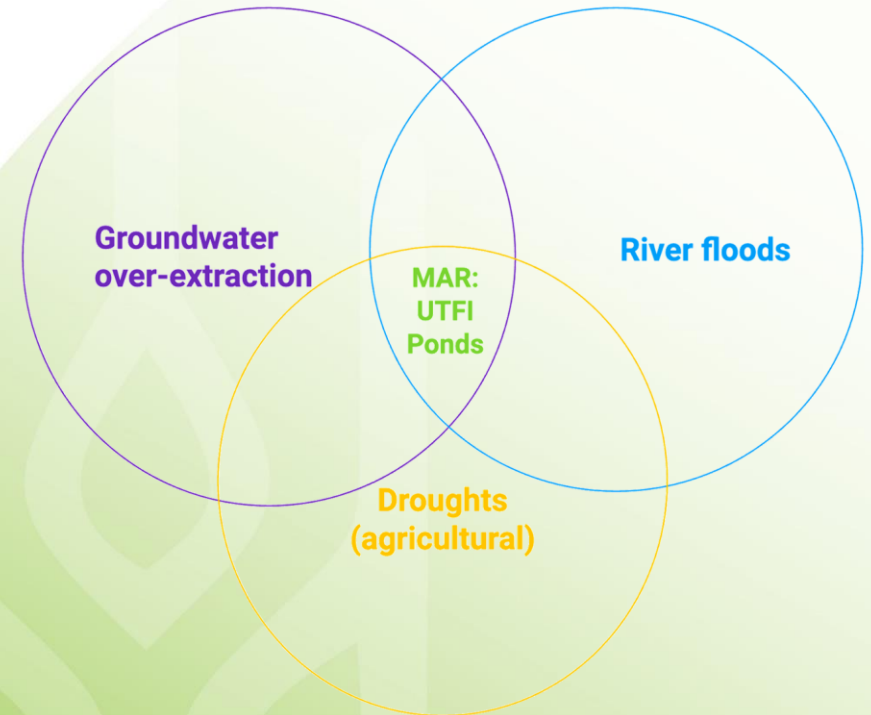
My background:

- MSc. In NL
- Sustainable urban development
- AMS Institute, Amsterdam

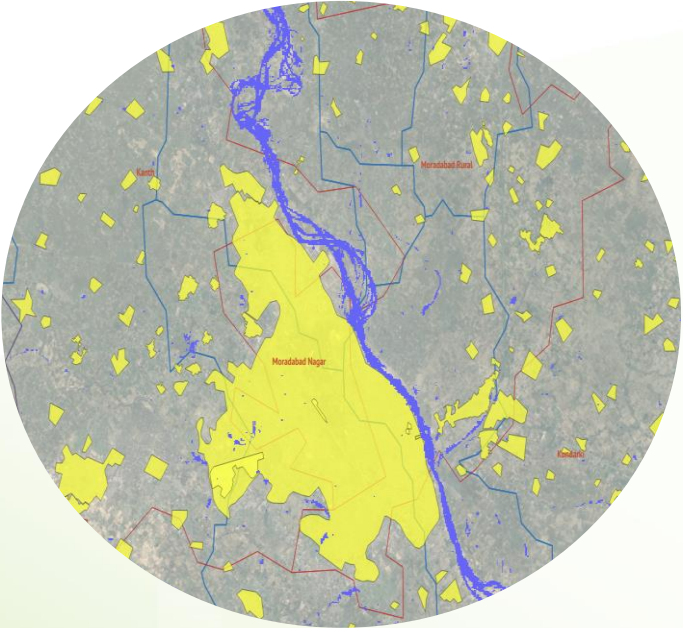
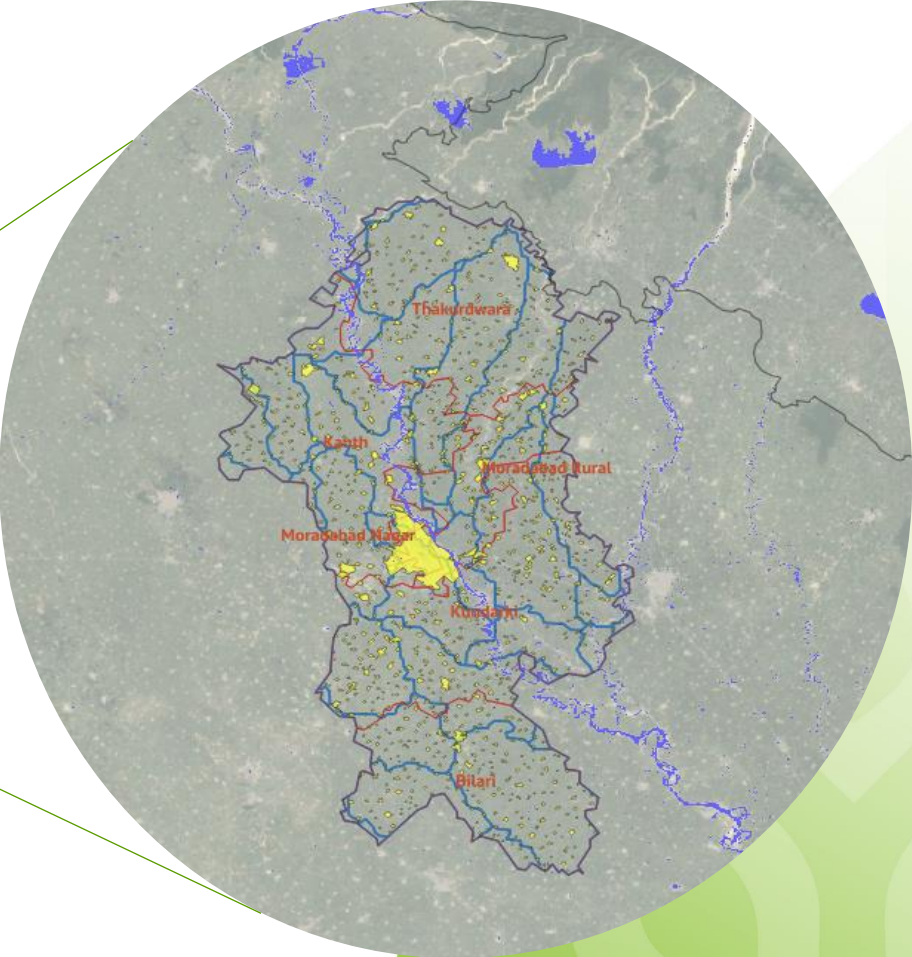
My research emphasis:

- planning for groundwater sustainability = rural+urban
- Opportunities for urban MAR
- Urbanization needs till 2035

Backdrop of urbanization & growth: growing cities + growing agriculture = increased demand of GW, and increased disaster risk of people & property



Where is the study region?

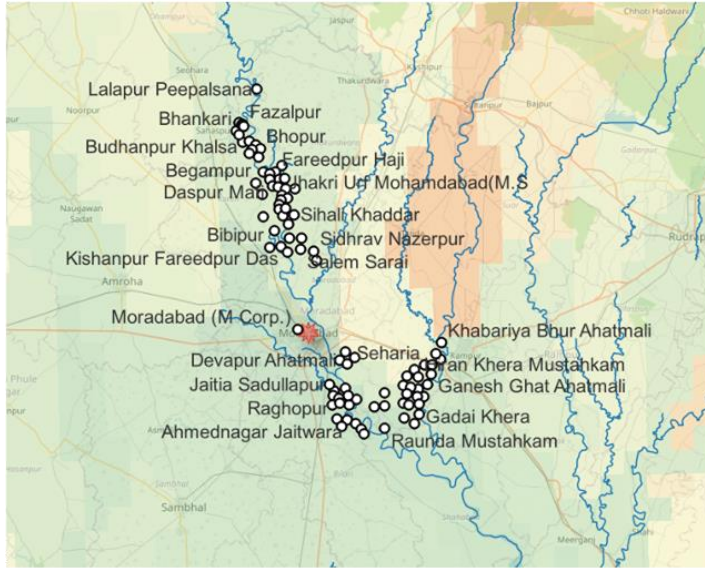


Catchment area
District boundaries
Block boundaries
Human settlement

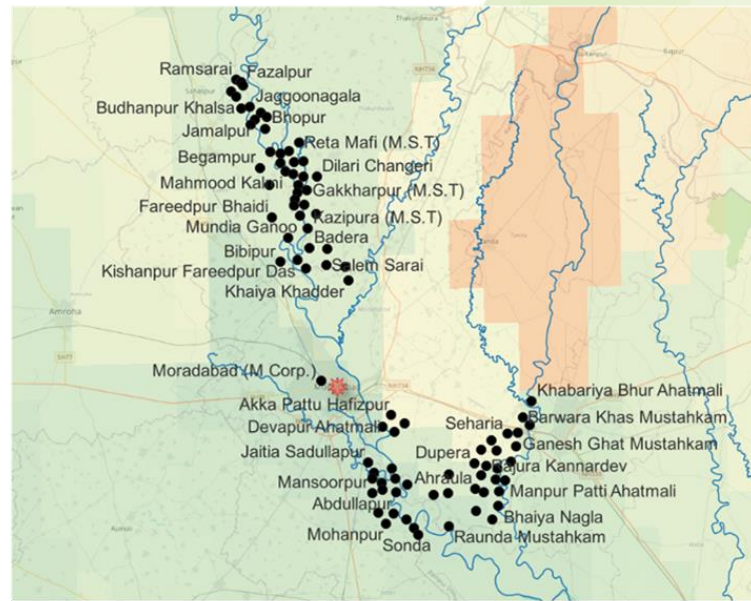


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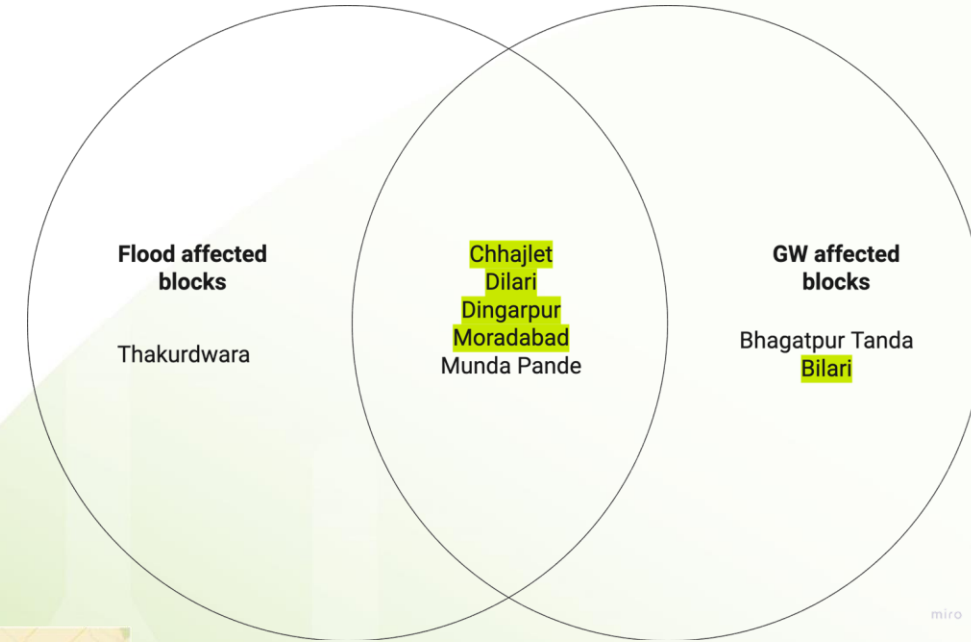
Where is the study region?



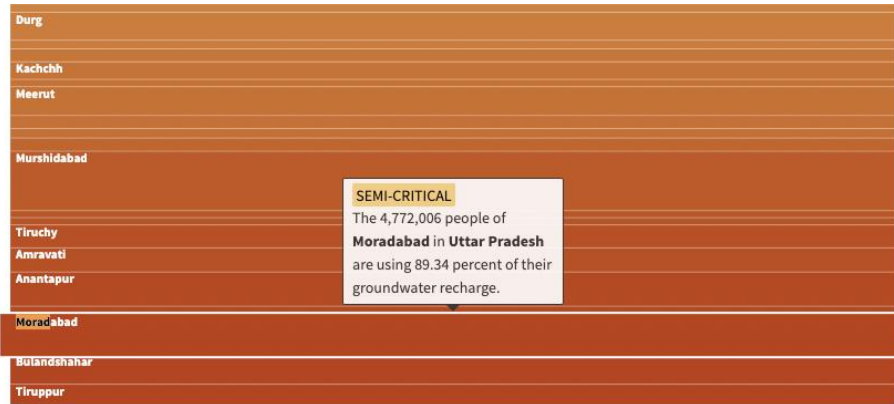
Flood-affected Villages



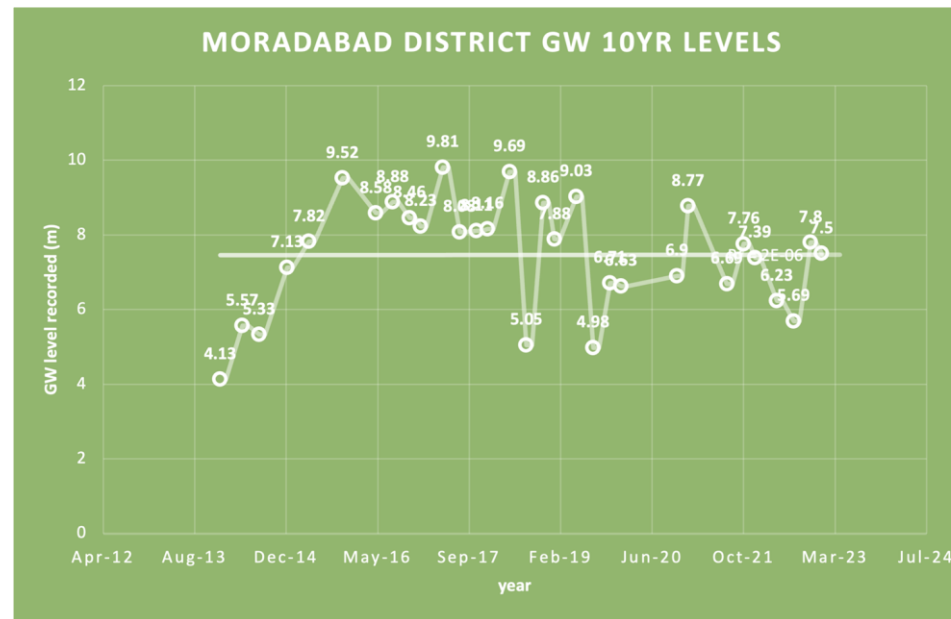
GW-affected Villages



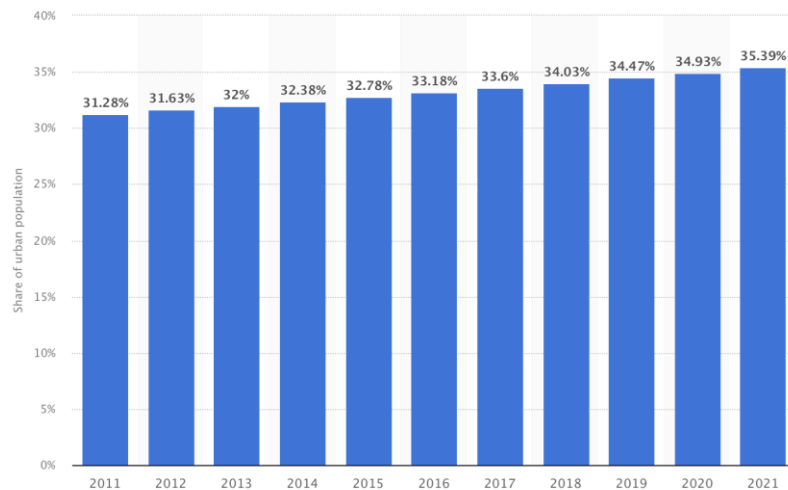
Why here, why now?



source: Reuters, 2019



Data from: CGWB



source: Statista, 2023

300 villages in western UP cut off from district HQs due to flooding following heavy rains

By [HT Correspondent](#), Lucknow

Aug 29, 2018 12:39 PM IST

Most of the affected villages fall in districts Moradabad, Sambhal, Amroha, Rampur, Pilibhit and areas of Lakhimpur Kheri bordering Nepal.



People wade through a flooded road as water level of Ramganga River rose in Moradabad district on Tuesday, Aug 28, 2018.(PTI)

Drought situation in each UP district to be assessed

By [HT Correspondent](#)

Sep 07, 2022 11:59 PM IST

Uttar Pradesh chief minister Yogi Adityanath has directed the officers to conduct survey in all the districts to assess the drought situation following deficient rainfall during the monsoon.



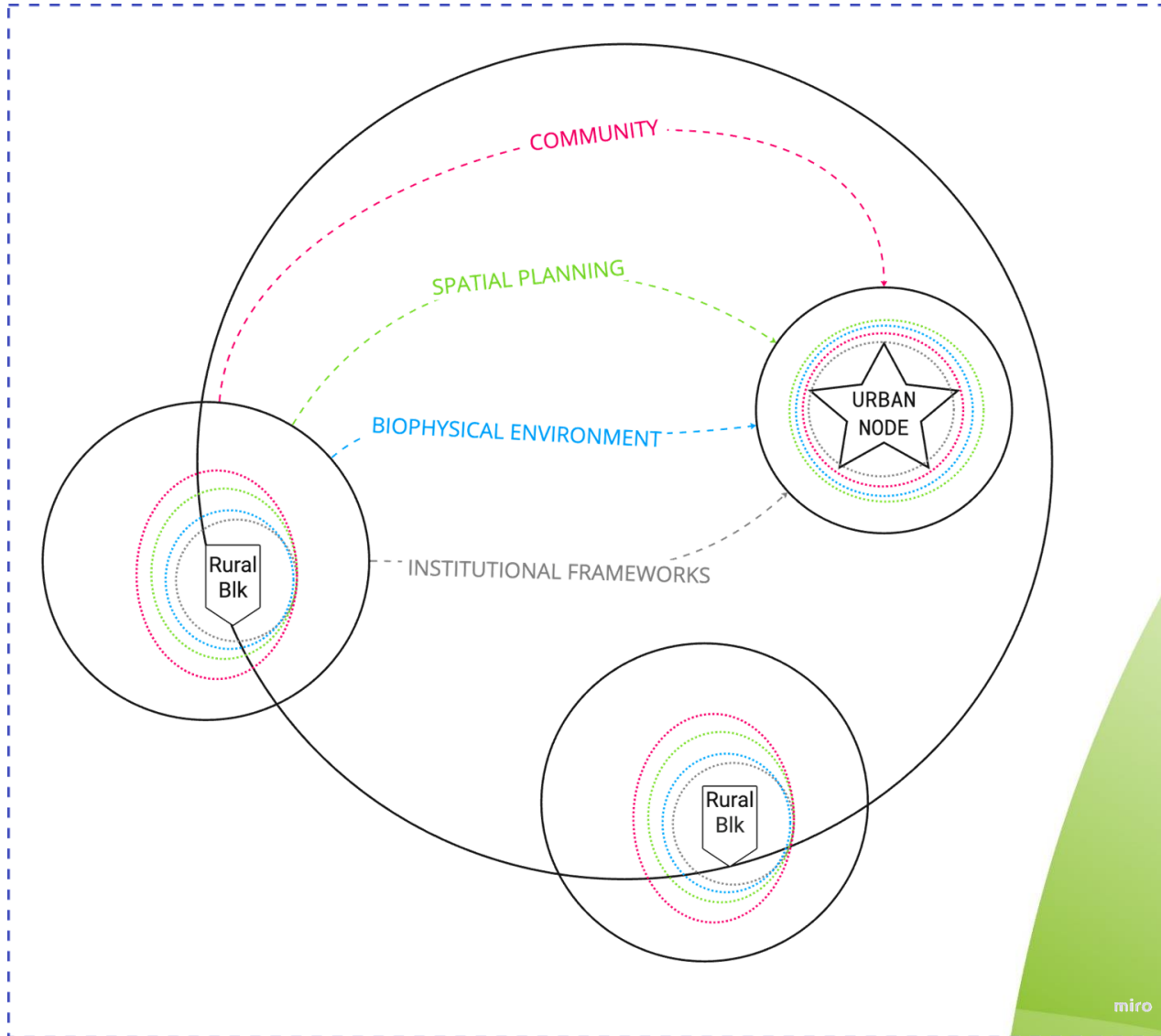
To assess the ground situation, all the district magistrates should constitute teams in their respective districts, the CM said. (Pic for representation)

Growing city, growing agriculture, 2nd tier cities interesting from a development perspective



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Visualizing key R-U linkages



Four pathways of R-U linkages studied:

1. Biophysical environment
2. Community
3. Spatial planning
 1. Institutional frameworks
 2. Design

Community

The linkage

group's connection
to water

therefore, water
ownership

resulting concerns
for the future



Community

Barriers & opportunities

Rural DS:

- Fear floods, flee to city: need solutions now, ponds not immediate help
- Have GW issue concern & awareness for crops

Urban center:

- Disconnected from planning, implementation more likely through municipality than community-maintained ponds



Rural – want river pitching
Urban – city's central water tanks



Spatial planning - policy

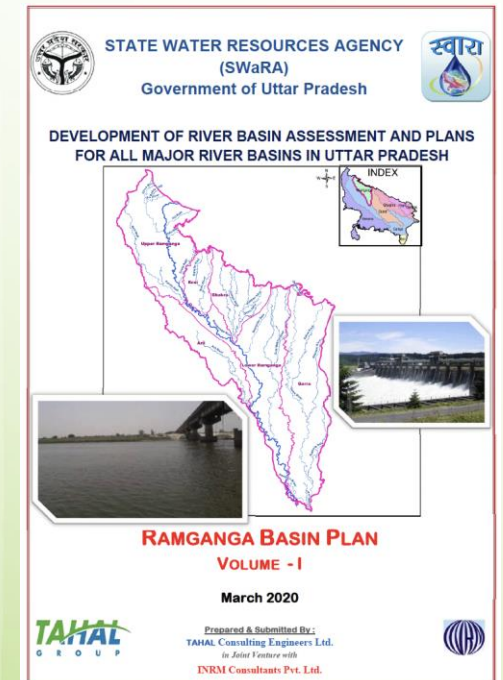
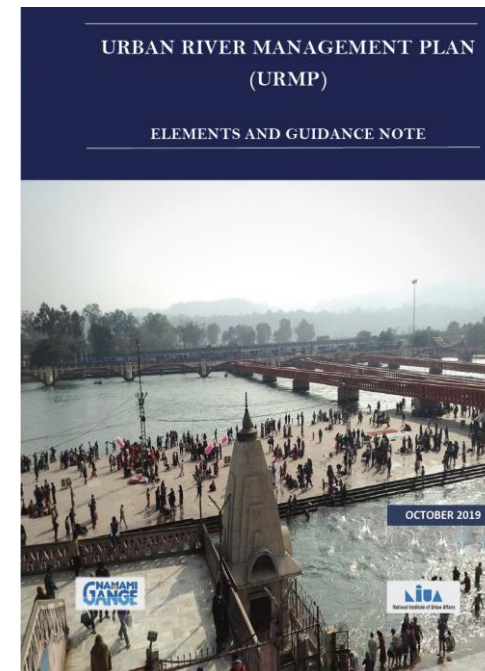
The (de)linkage



- Have space
- Agrarian land ownership
- MGNREGA, Panchayat system

- Space constraints
- Urban land ownership (private, public, govt. bldgs.)
- municipalities, dev. Authorities

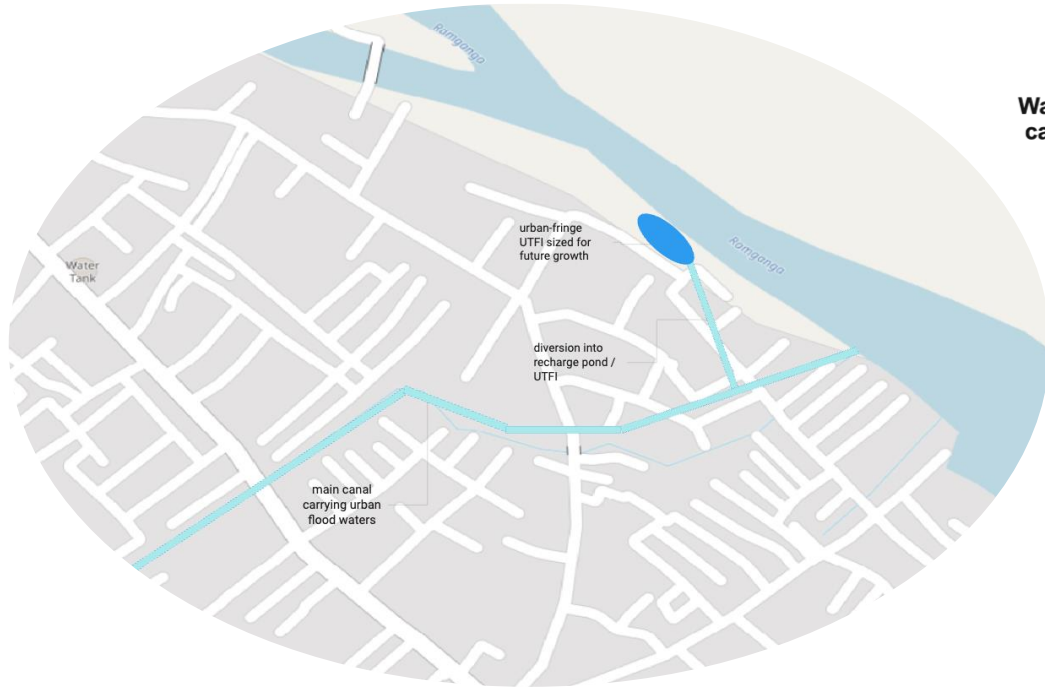
Scale-up will require different cooperation modes on rural & urban. Peri-urban interesting middle zone



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Spatial planning

Barriers & opportunities – WIP proposals



Water budget calculations

current vs. 2035 demand



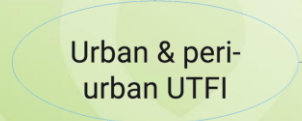
natural recharge (R, U,peri-U)



needed MAR = Demand - Natural (R, U,peri-U)

potential locations based on 2035 needs

miro



Urban parks & existing ponds

peri-urban flood plains

large govt. land eg. Railways campus

Initial #s (urban)

- GW demand today ~ 53,550 MLY, GW demand 2035 ~ 84,408 MLY
- Natural recharge ~same = 13,272MLY from 76,416.7MLY rain

Possibilities / concerns:

- Can recharge ponds cover all needed recharge with barriers of space and land-ownership?
- What combined options are available rural+ urban+ peri?
- Shift to conjunctive use of SW-GW, 60-40?



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Thank you



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