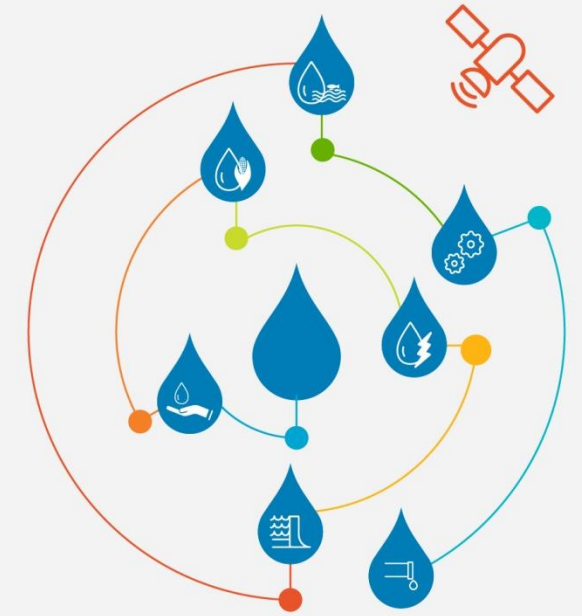


# Rural-urban water management: The need for innovative business models



Miriam Otoo

International Water Management Institute

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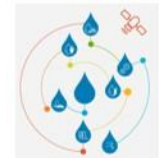
# Cape Town's Day Zero

- There are many 'Cape Towns' and risks of a 'Day Zero' across the globe.
- The Cape Town story has helped to rethink 'water security', which we can no longer take for granted, even in developed country like South Africa.



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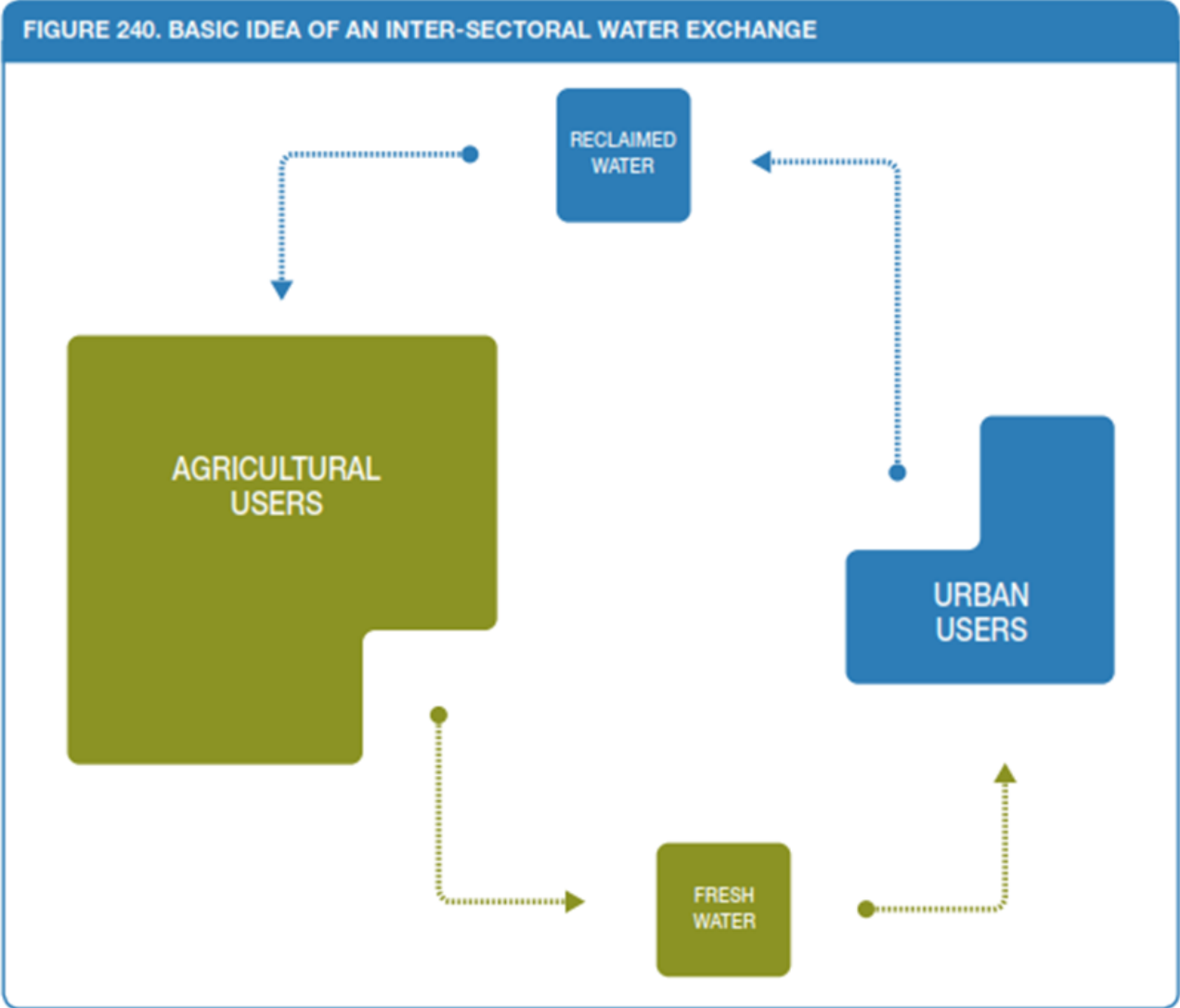
# 'Rural' is becoming a pillar of IUWM

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- Cape Town visualized the emerging urban water challenge, also in view of climate change adaptation.
- Water saving models, desalinization, further groundwater exploitation, and wastewater reuse are commonly discussed options.
- With the agricultural sector usually having the highest water allocation, **rural-urban water swaps** or loops of freshwater for wastewater might offer **interesting business models**.
- Every transfer, trade or exchange requires a business model with **clear contractual gains** and **obligations**.

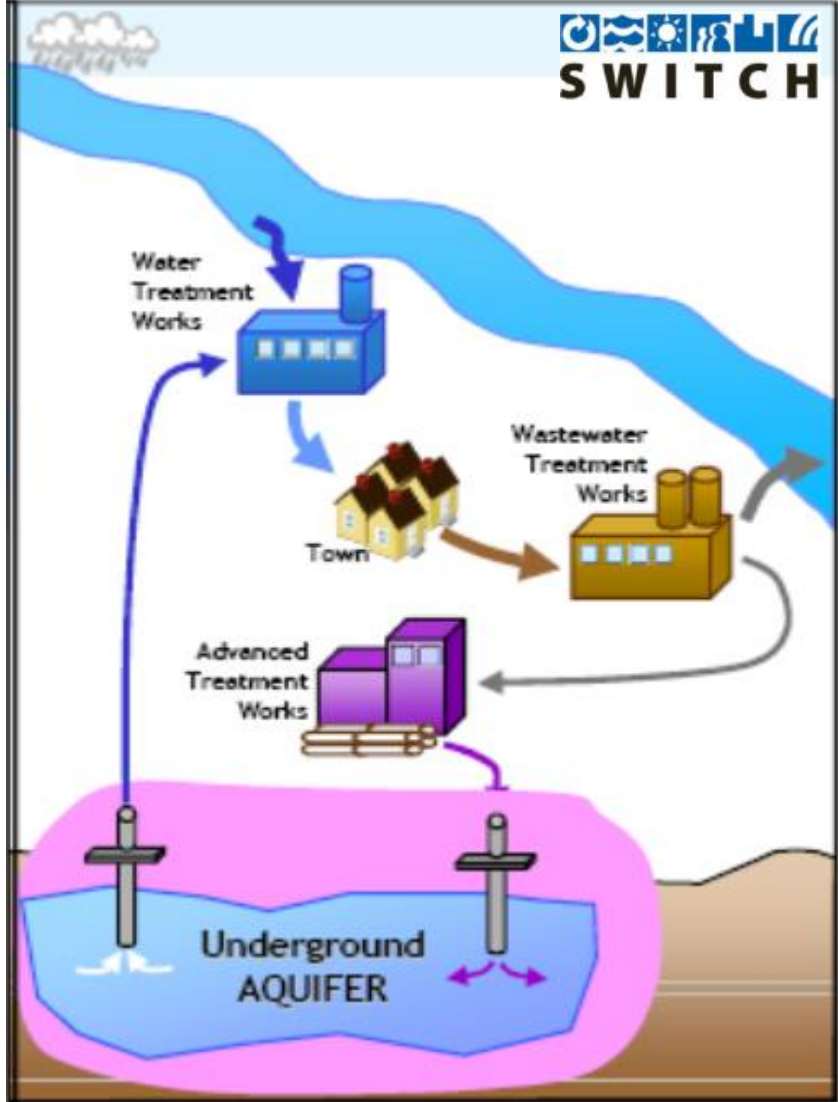
# Two examples of *rural-urban* and *urban-urban* water loops

Inter-sectoral water trade



Source: GWI, 2010, modified

Cities as their own downstream user



# Inter-sectoral water trade example: Mashhad, Iran

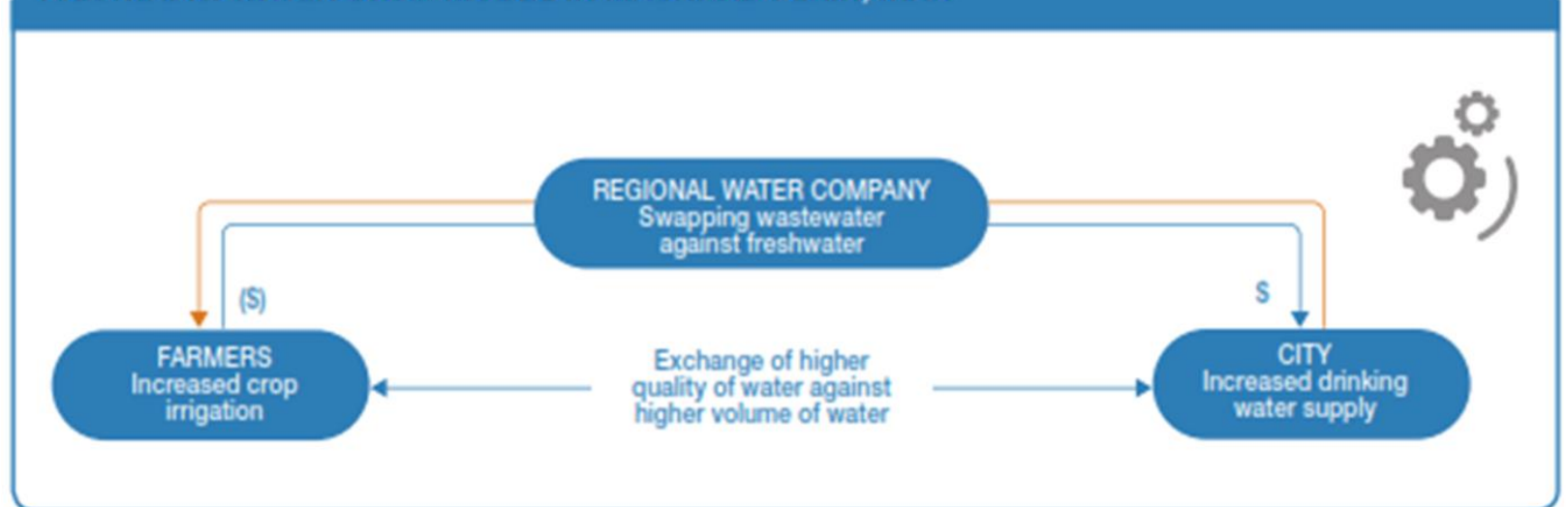
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- In Mashhad, the water deficit is all-year round common reality.
- In 2006, farmers had incentives to swap about 21 million cubic meters ( $\text{Mm}^3$ )/yr of freshwater against 25  $\text{Mm}^3$  of treated wastewater.
- This is a fixed contract, while discussions of an additional swap of 192  $\text{Mm}^3$  of wastewater for farmers' groundwater rights are ongoing.
- To accept the reclaimed water, farmers received a higher volume than they gave away from their dams. However, the received wastewater was not of the expected quality as untreated water got mixed into the stream of treated wastewater channeled back to the farmers.

# Two types of Water right transfer contracts

- Contracts between the Regional Water Company and representatives of the *association of water right owners* from each village based on the total water right of the village.
- Individual contracts between the Regional Water Company and the (larger) *individual water right owner* based on the right of every single water user.

FIGURE 243. WATER SWAP MODEL IN MASHHAD PLAIN, IRAN



# Inter-sectoral water trade example: Barcelona, Spain

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- Severe drought in 2007/08 catalyzed a EUR 15m investments into the production of high-quality reclaimed water for agriculture (Llobregat delta) in exchange for up to 20 Mm<sup>3</sup>/year freshwater in case of severe drought.
- Catalanian Water Agency (ACA) in charge of water and wastewater negotiated with farmers the conditions for an inter-sectoral water exchange.
- Contract remains flexible without volumetric commitments to allow transfers as needed.
- Water trading has been considered a complementary, cost-effective climate adaptation measure compared to inter-basin water transfer and desalinization.

# Cities as their own downstream user: Bangalore and Mexico City

Two examples of many:

- Bangalore is channeling its wastewater to dry reservoirs (tanks) in its vicinity which refill local aquifers. Plans target an increased urban water availability of 65 Mm<sup>3</sup>/year.
- The informal water market brings part of the water back to Bangalore.
- Mexico City excessively replenished the aquifer in the Mezquital valley with urban wastewater.
- The aquifer is now considered an official option to support the city's freshwater needs (so far 160-190 Mm<sup>3</sup>/year) as the city is running out of cost-effective alternatives.

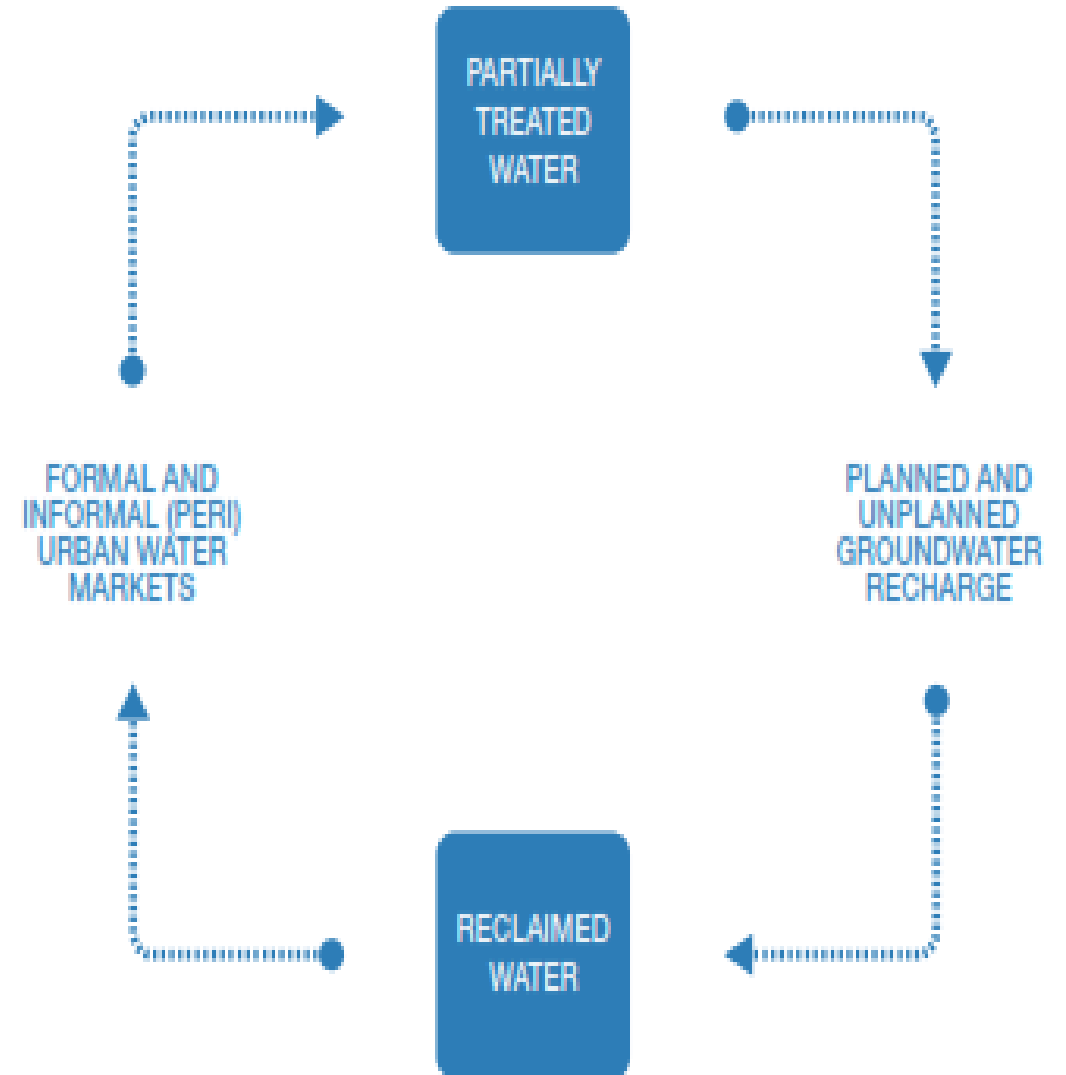




FIGURE 248. VALUE CHAIN SCHEMATIC – INTER-SECTORAL WATER EXCHANGE

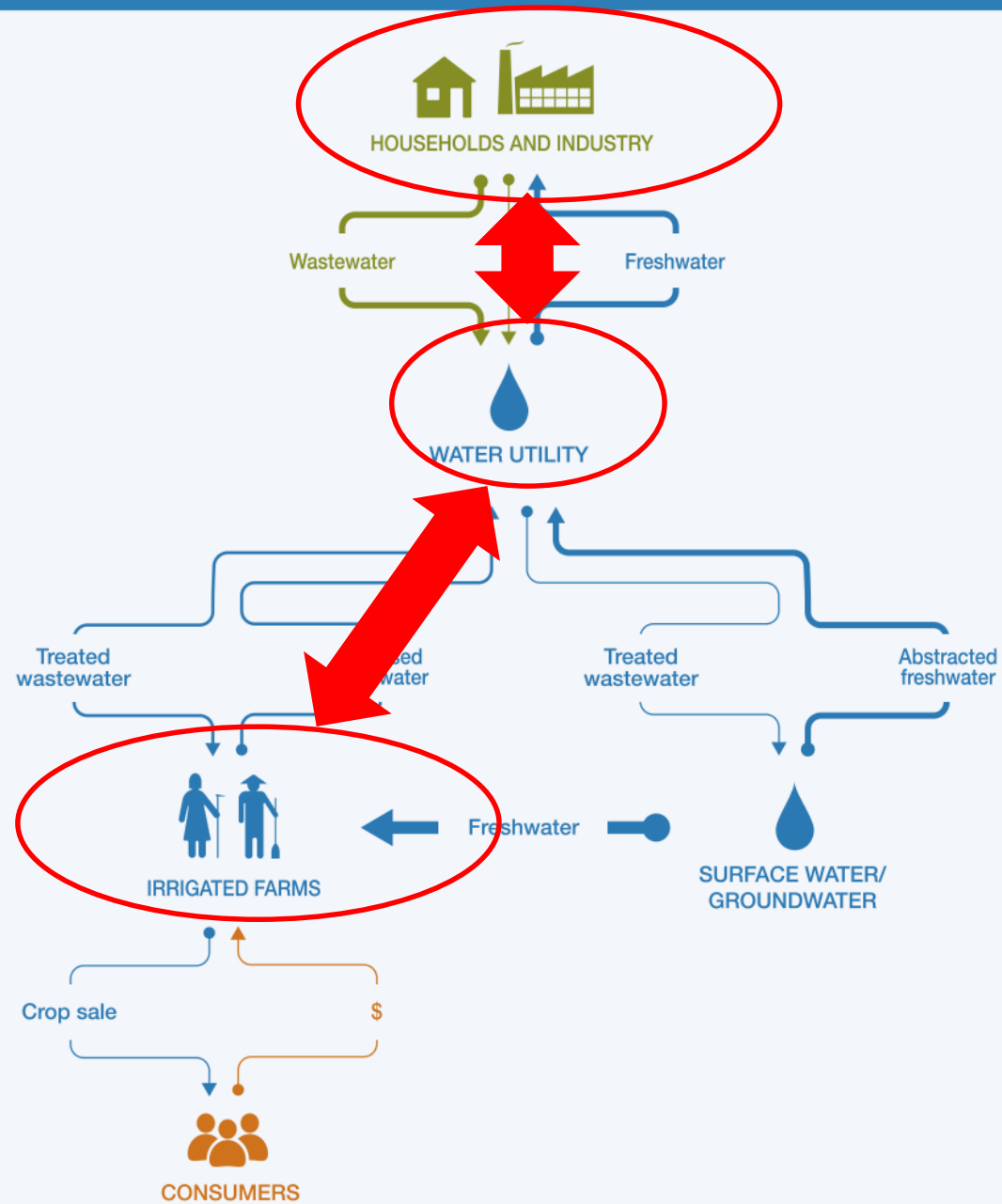
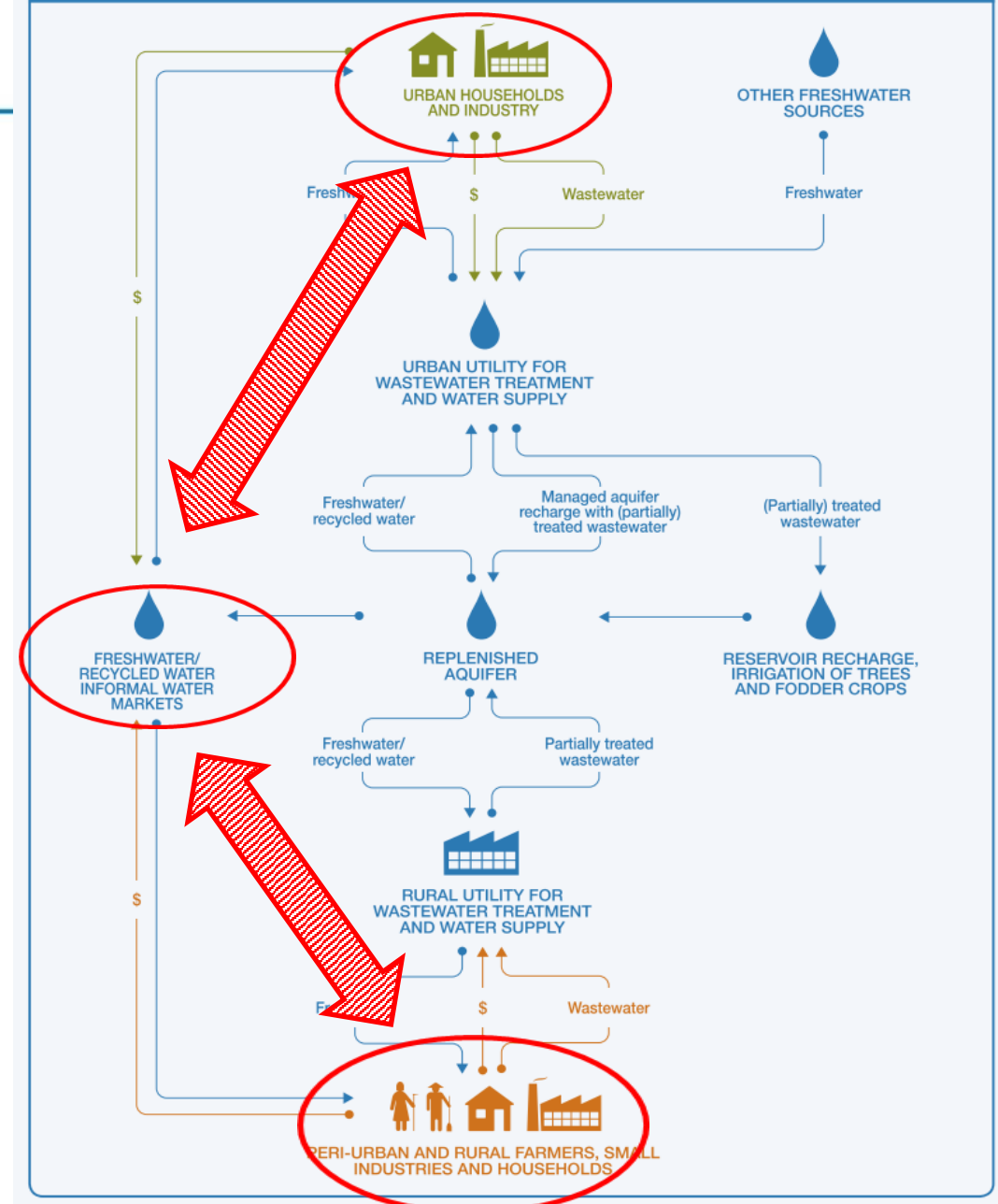


FIGURE 259. SIMPLIFIED VALUE CHAIN WITH ONLY ONE URBAN AND RURAL UTILITY REPRESENTING POTENTIALLY MORE PUBLIC ENTITIES ENGAGED IN THE MANAGEMENT OF WATER AND (TREATED) WASTEWATER FOR GROUNDWATER RECHARGE FOR REUSE



# Challenges

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## **Inter-sectorial water swaps:**

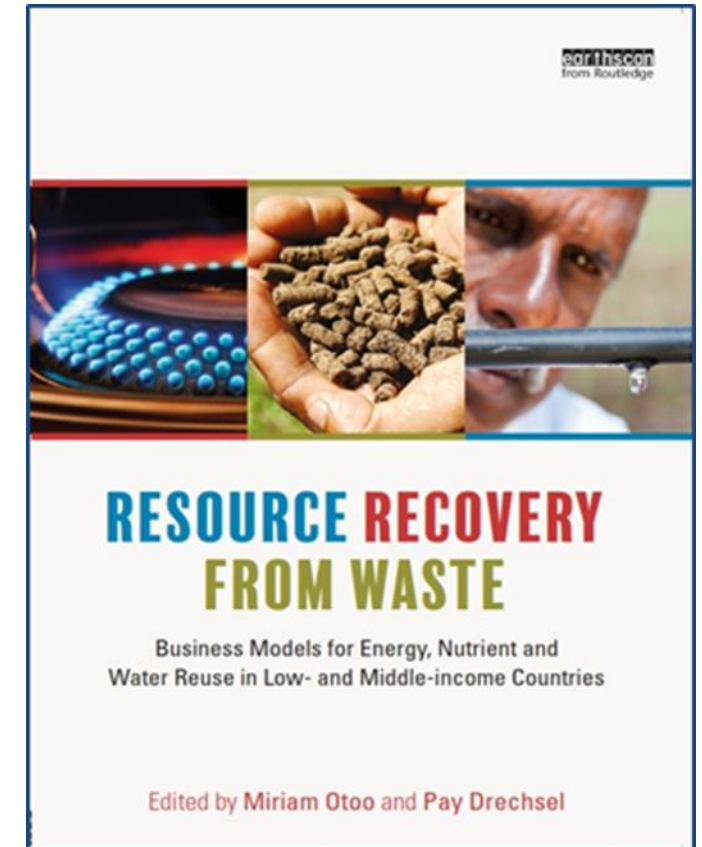
- Business concept depends strongly on incentives offered to (and accepted by) farmers, i.e. the contractual agreement for transfer of water rights vary from case to case.
- There is a risk that water rights are poorly defined or farmers might absorb the wastewater to expand their operations without releasing freshwater.
- Success can be constrained by overly protective water quality guidelines, negative perceptions as well as the inability of the city to provide well-treated wastewater.

## **Cities as their own downstream user:**

- Common challenges refer to unclear institutional responsibilities, limited water quality guidelines, monitoring and wastewater treatment, and an increasing dependency of urban water supply on informal water markets.

# Conclusions

- Resource recovery and reuse linking agricultural and urban water needs will be an important pathway for water security in our urbanizing world.
- Planned coordination across administrative and sectoral boundaries are needed, to avoid possible risks from informal markets (environmental/human health, equity concerns, etc.)
- The case studies were selected from a 2018 IWMI publication – more details on the cases, value chains and models.



The book can be ordered from Routledge and a free pdf is available at:

<http://www.iwmi.org/resource-recovery-from-waste>

Hard copies are available at the IWMI booth.

# Thanks

