



Waste Water - The Untapped Resource

Blue Planet Berlin Water Dialogues

Wasser Berlin International, 30 March 2017

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Our 19th century approaches have not worked well in many countries



~780 million without access to improved water

Linear, energy intensive, single quality, use once and throw away systems

**'All or nothing proposition'
Unaffordable to 2/3 of the planet**

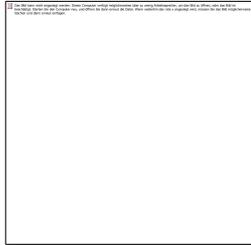
~2.5 Billion without access to improved sanitation



Global change pressures will make things even more difficult



Major trends also play important role 4th Industrial Revolution



Low Carbon Economy: **20-20-20**

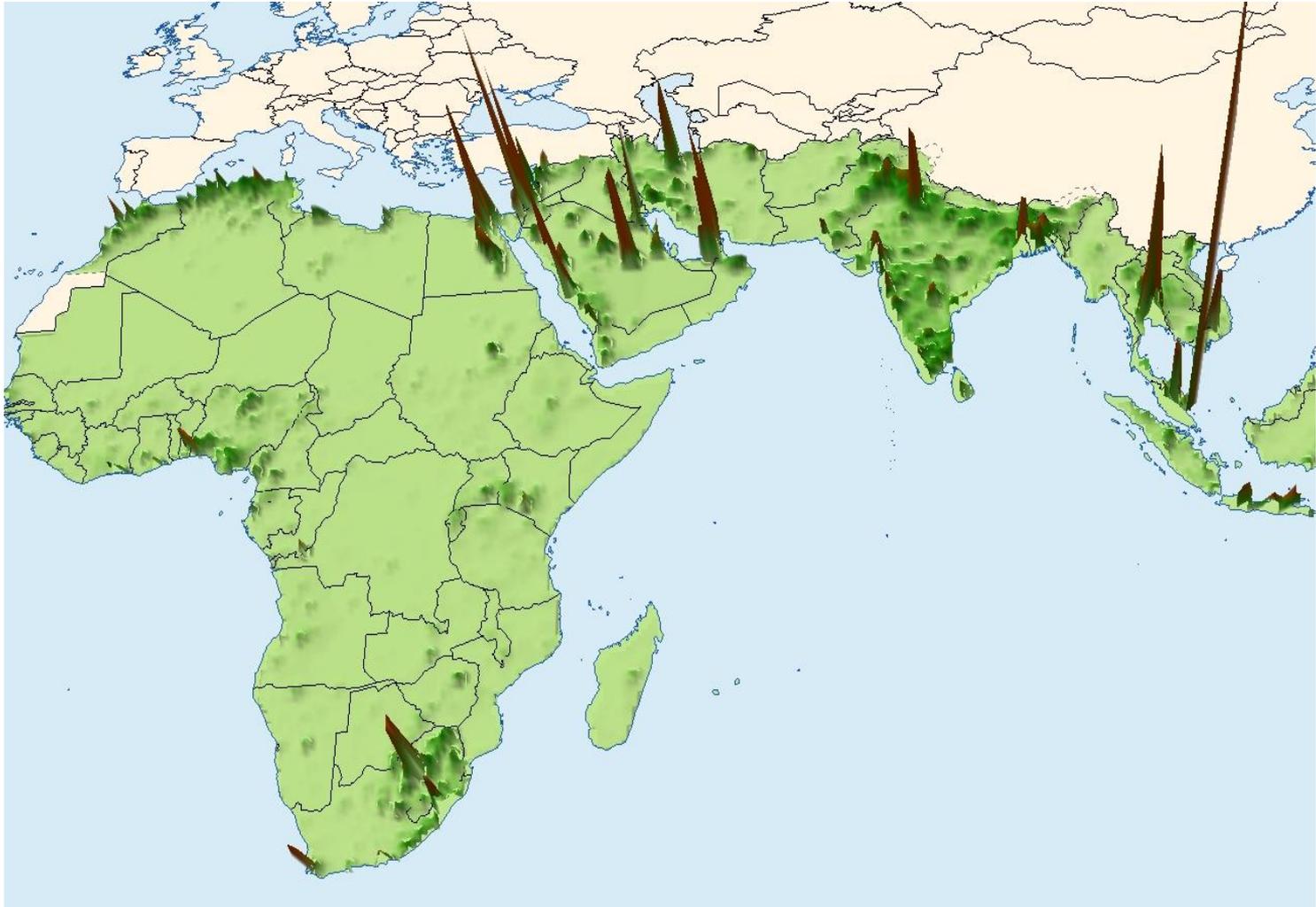


Circular Economy: **Resource miners**



Digital Economy: **IoT and automation**

Opportunity to do things differently



Source: World Bank (2010) *World Development Report 2009 Reshaping Economic Geography*, second edition, pp. 35



major change in perspective

productive use of water

Changing our perspective creates opportunity to do things differently



Quality A

Quality B

Quality C

Durban Water Recycling



Mondi

SAPREF



Tertiary: **Irrigation**



2nd+RO+MF: **AAR**



Nitrified: **Cooling**



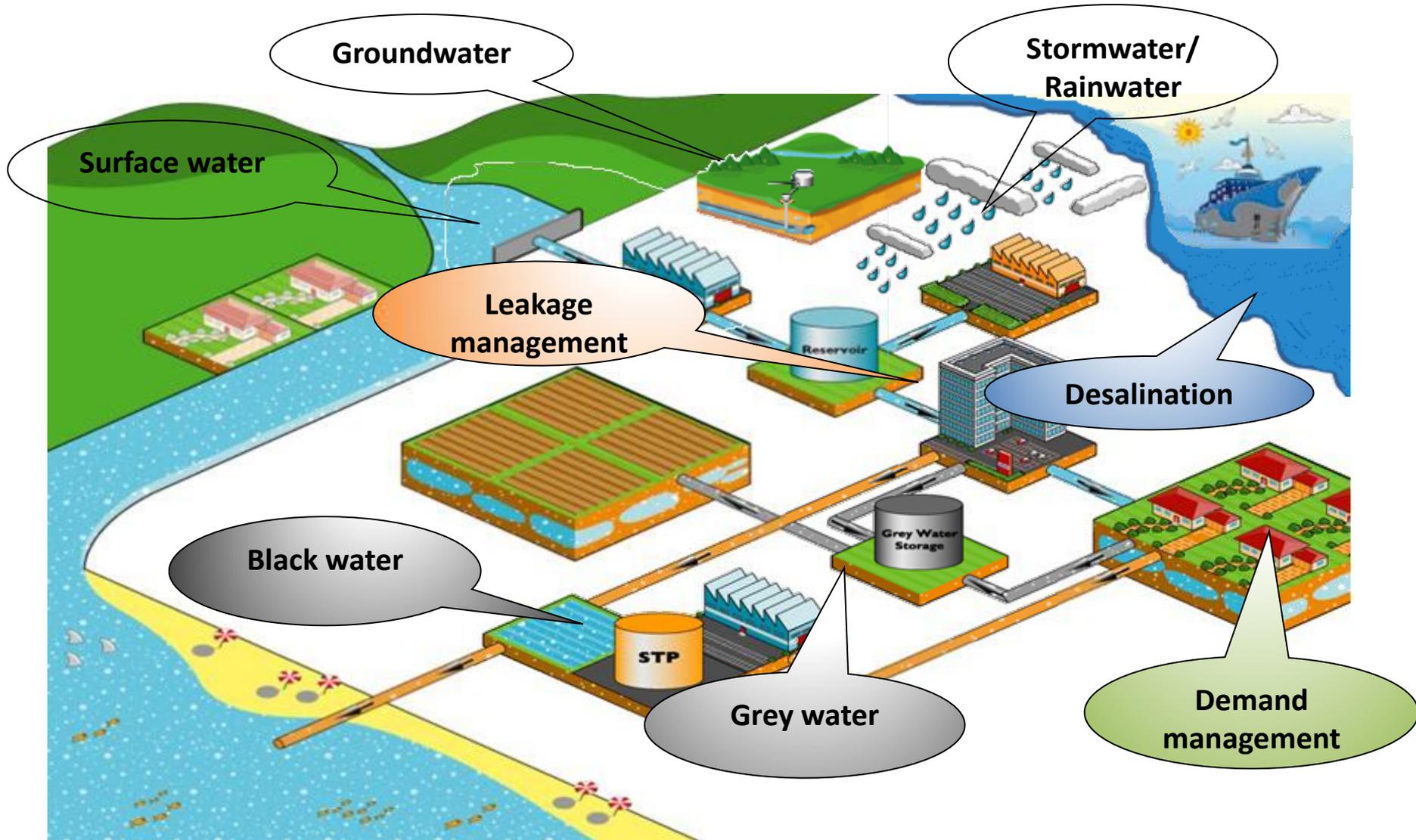
RO: **Refinery**



RO(x2): **Refinery**



We need to have a systems perspective of the water cycle



Exploring alternative urban water solutions to rapid population growth



Water demand will at least double until 2035

I.C.L.E.I
Local
Governments
for Sustainability



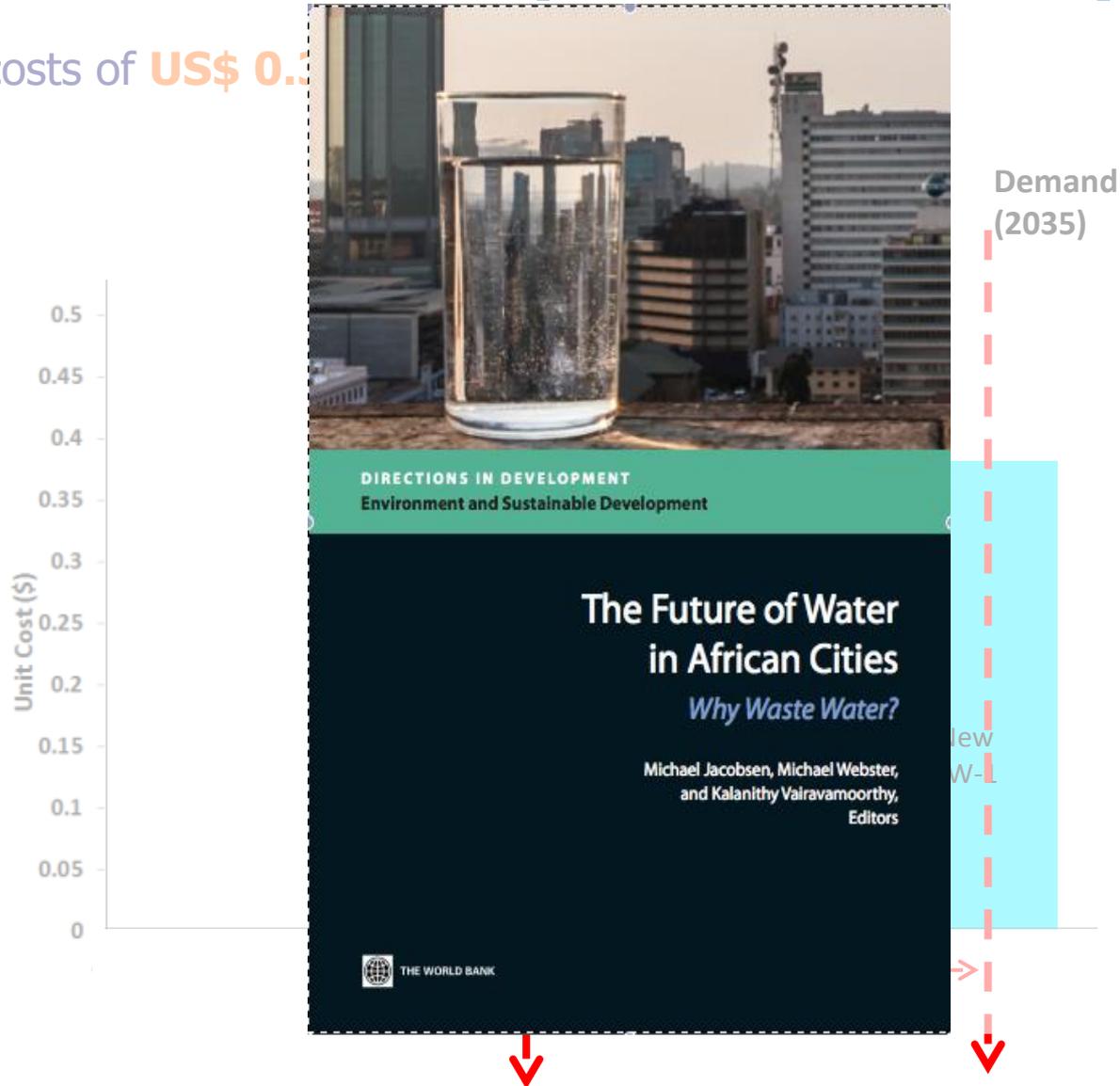
MAKERERE UNIVERSITY

Panafcon



Need to consider non-conventional resources – a portfolio of options

- Unit costs of **US\$ 0.3**

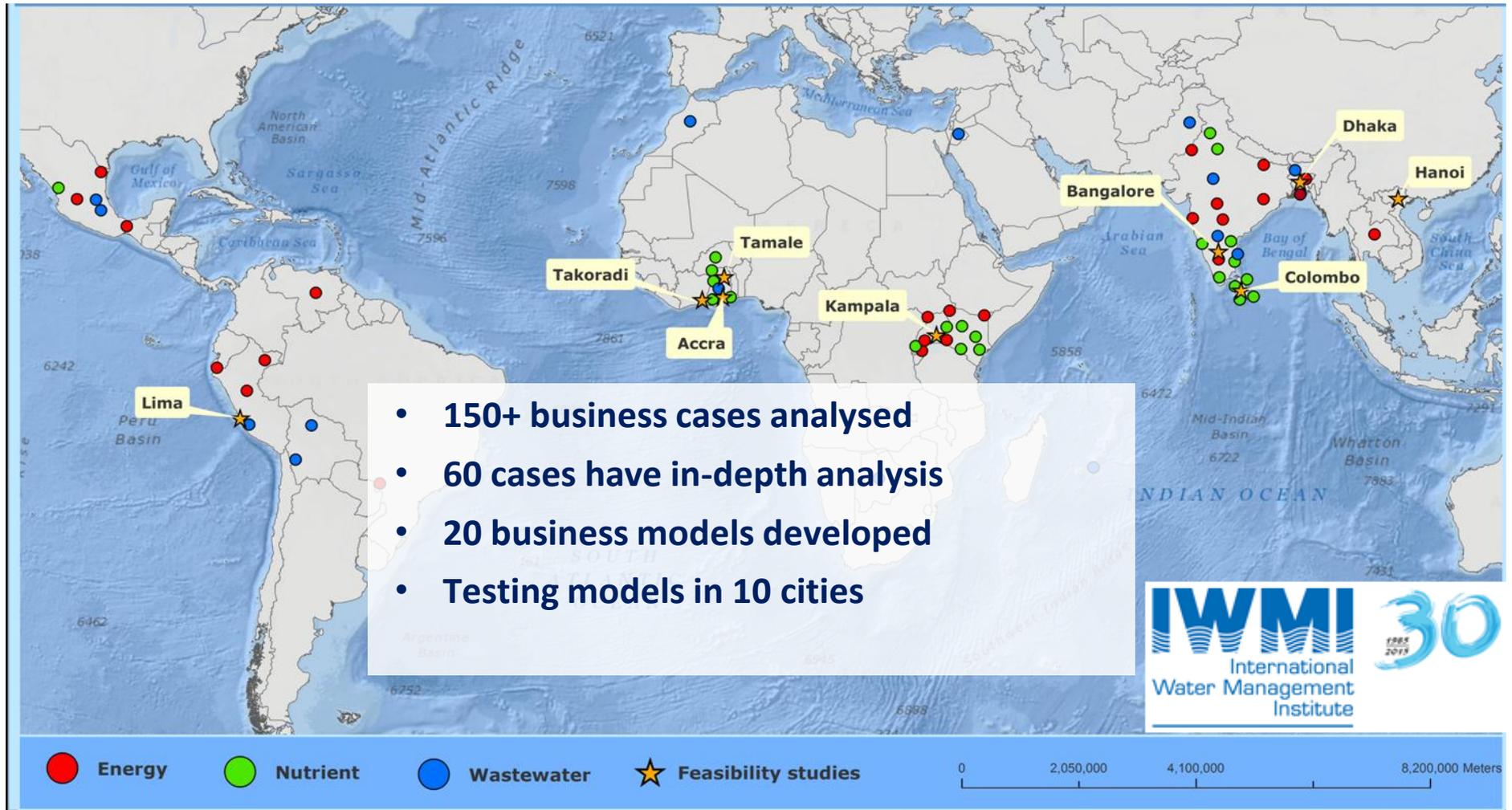




major change in perspective

waste as a resource

IWMI catalogue of RRR business cases



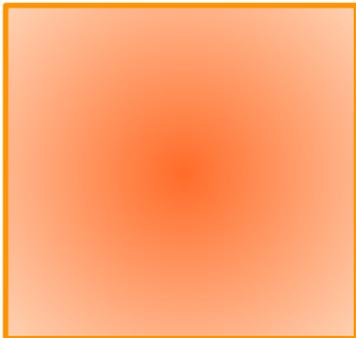
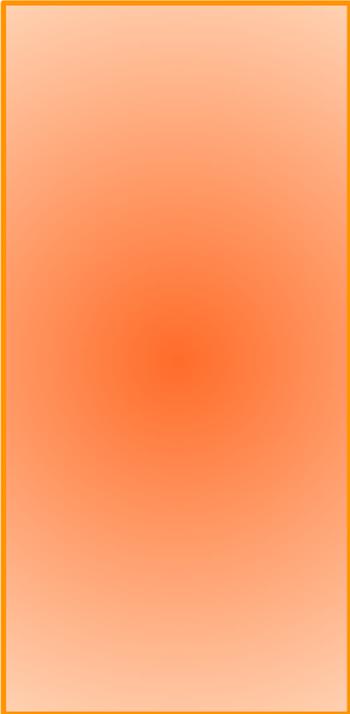
Key Partners

Key Activities

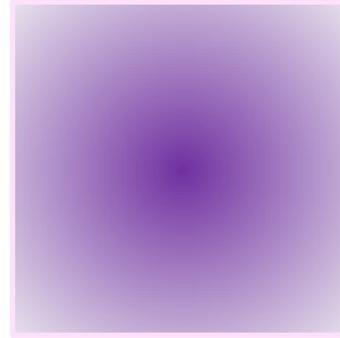
Value Proposition

Customer Relationships

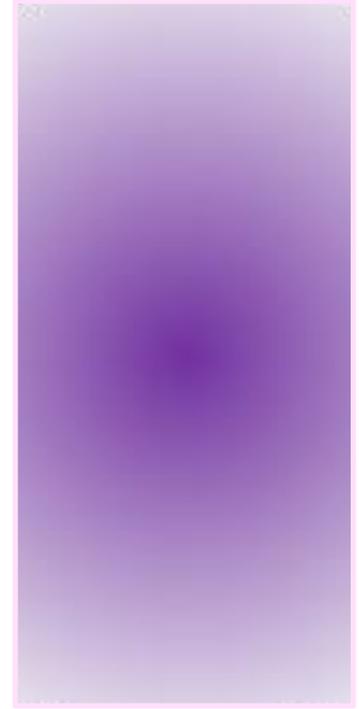
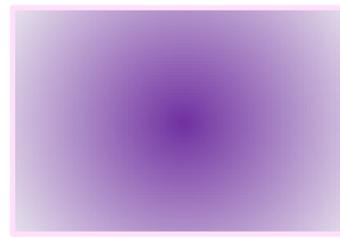
Customer Segments



Key Resources



Channels



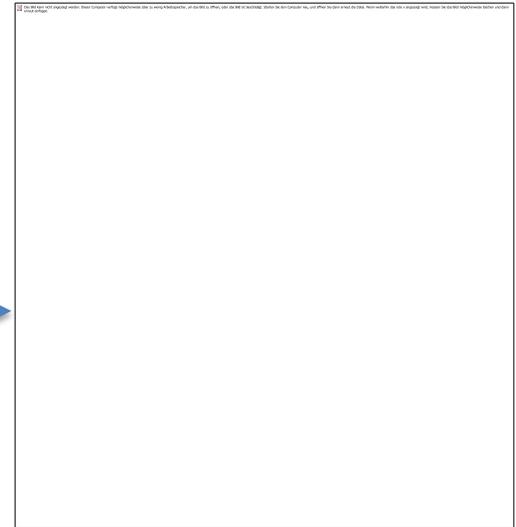
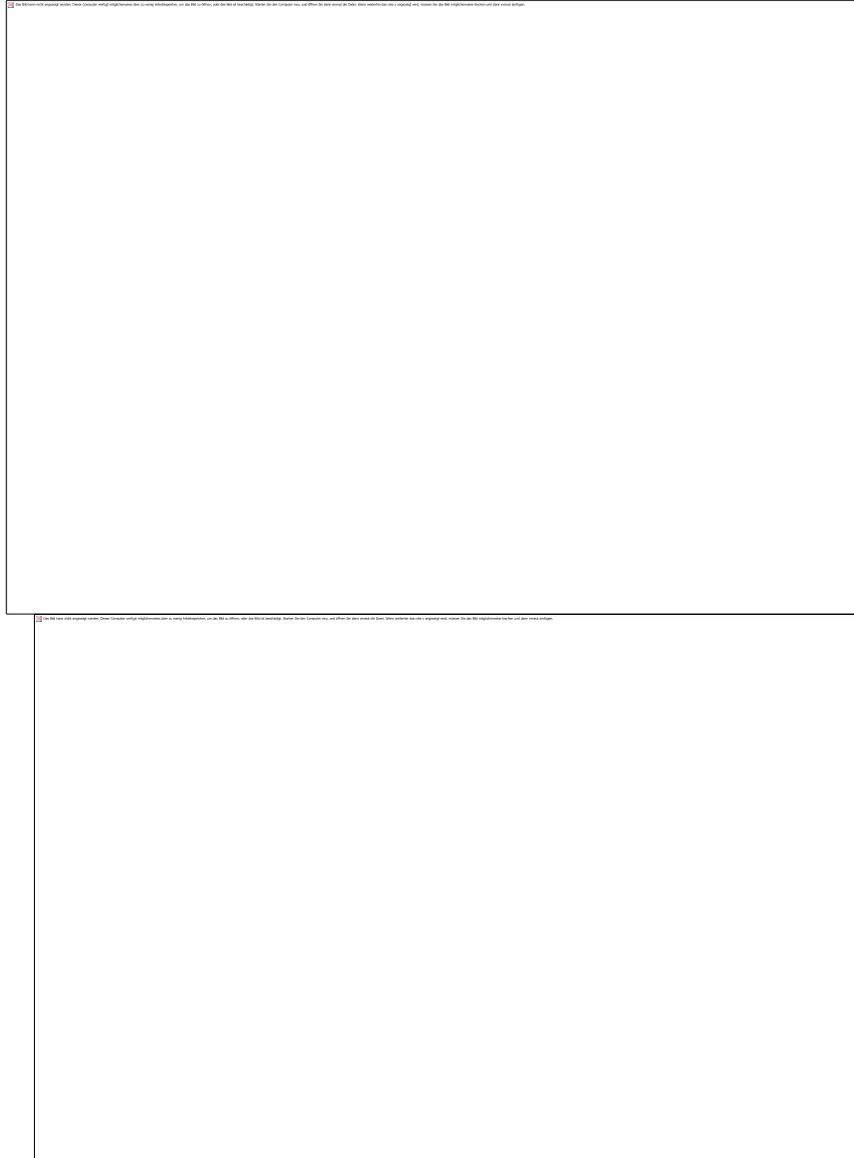
Cost Structure



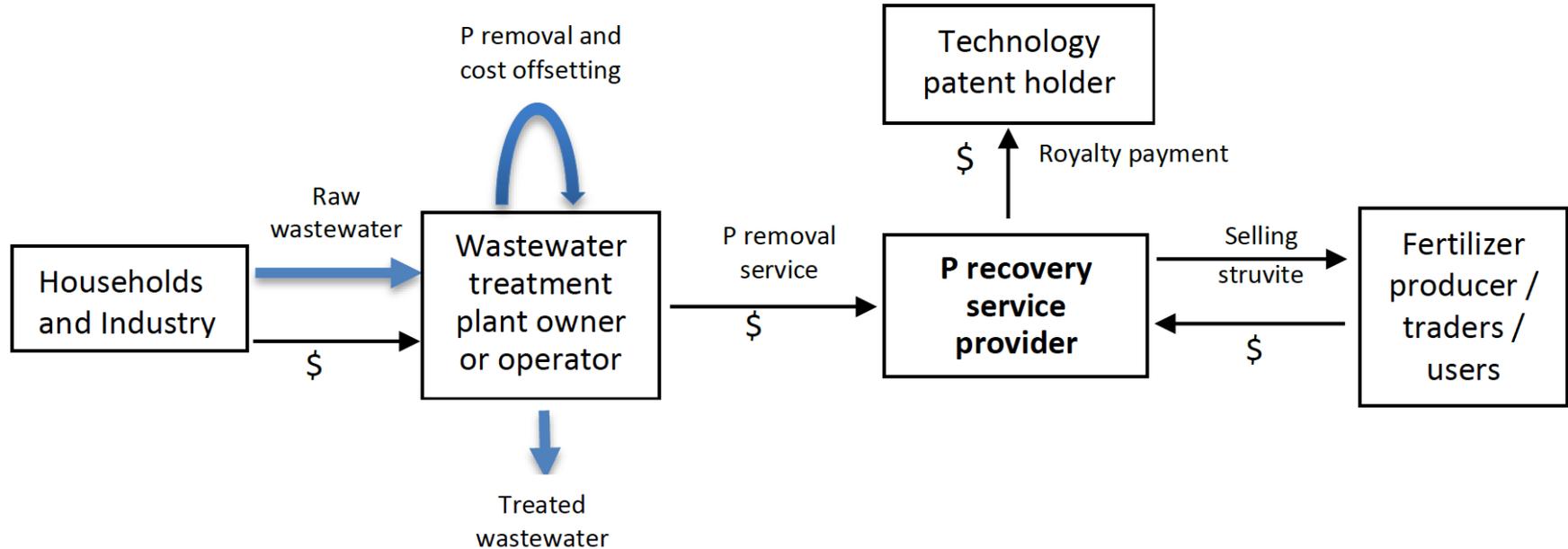
Revenue Streams



Important to understand the business model



Important to understand the business model



capital purchase business model OR treatment fee model

Value Proposition

- Modular P removal system to recover a non-renewable resource with a potentially high fertilizer value.
- Savings in M&O cost from unwanted P crystallization

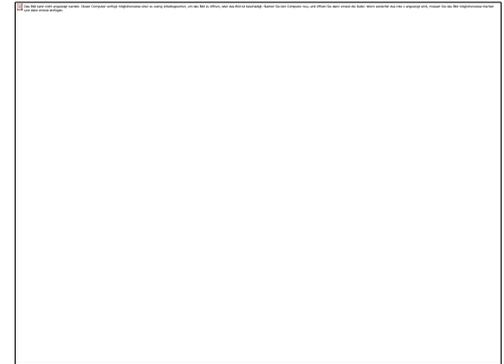
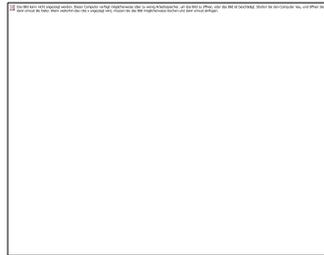
Customer Segments

- Treatment plant operator/municipality
- Fertilizer market (so far mostly niche markets)

Revenue Streams

- Sales of P technology
- Monthly treatment fees based on P removal
- Sales of premium grade P fertilizer

Maximizing the recovery of resources



Value Proposition

- Cost effective WWT
- High quality wastewater for irrigation
- Competitively priced clean energy

Customer Segments

- Irrigated farmers
- City authorities
- National energy grid

Revenue Streams

- Sale of treated wastewater, compost etc
- Sale of biogas energy
- Sale of hydro-power

IWMI Resource Recovery & Reuse Books

www.taylorandfrancis.com/books/details/9781138016552/

Taylor & Francis
Taylor & Francis Group

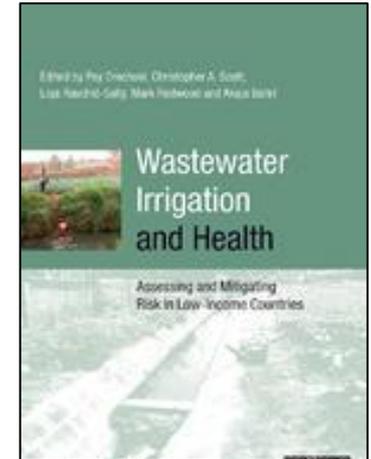
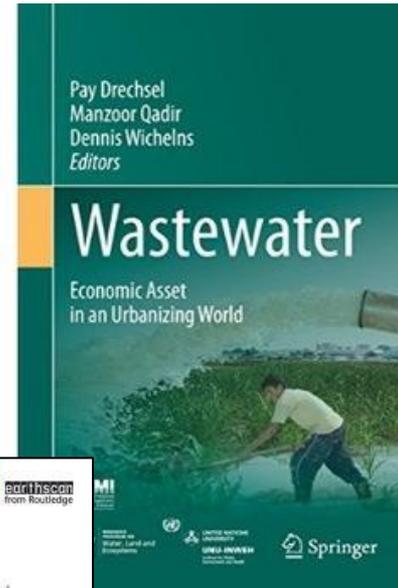
Books Journals eProducts Info & Help

Resource Recovery from Waste

Business Models for Energy, Nutrients and Water Reuse

Edited by Miriam Otoo, Pay Drechsel

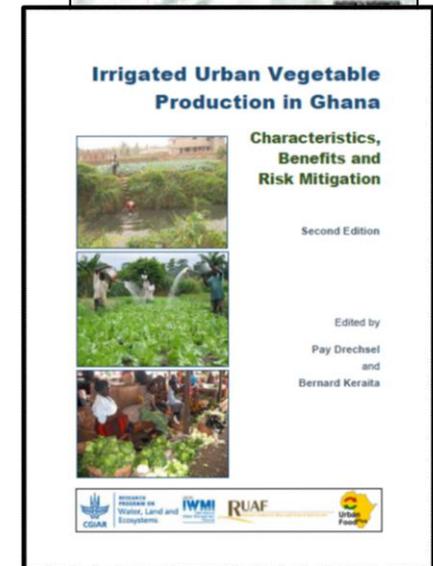
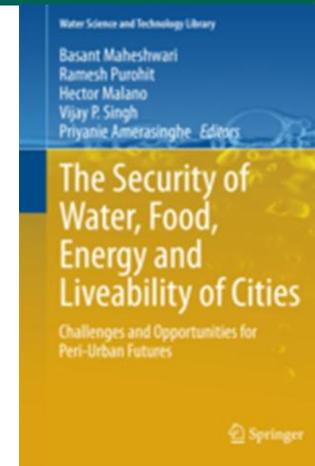
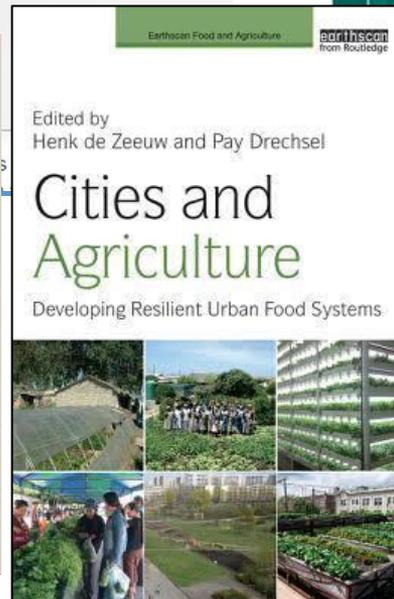
Routledge – 2015 – 640 pages



Waste Composting for Urban and Peri-urban Agriculture: Closing the Rural-Urban Nutrient Cycle in Sub-Saharan Africa

Edited by Pay Drechsel and Dagmar Kunze

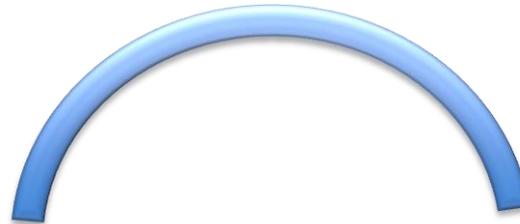
IWMI International Water Research Institute
CABI Publishing



Closing the output-product gap

IWMI RRR/FSM Outputs

Go-to market products



Intelligent Evidence Base

FSM Optimax

MOOC

African Urban Water Program

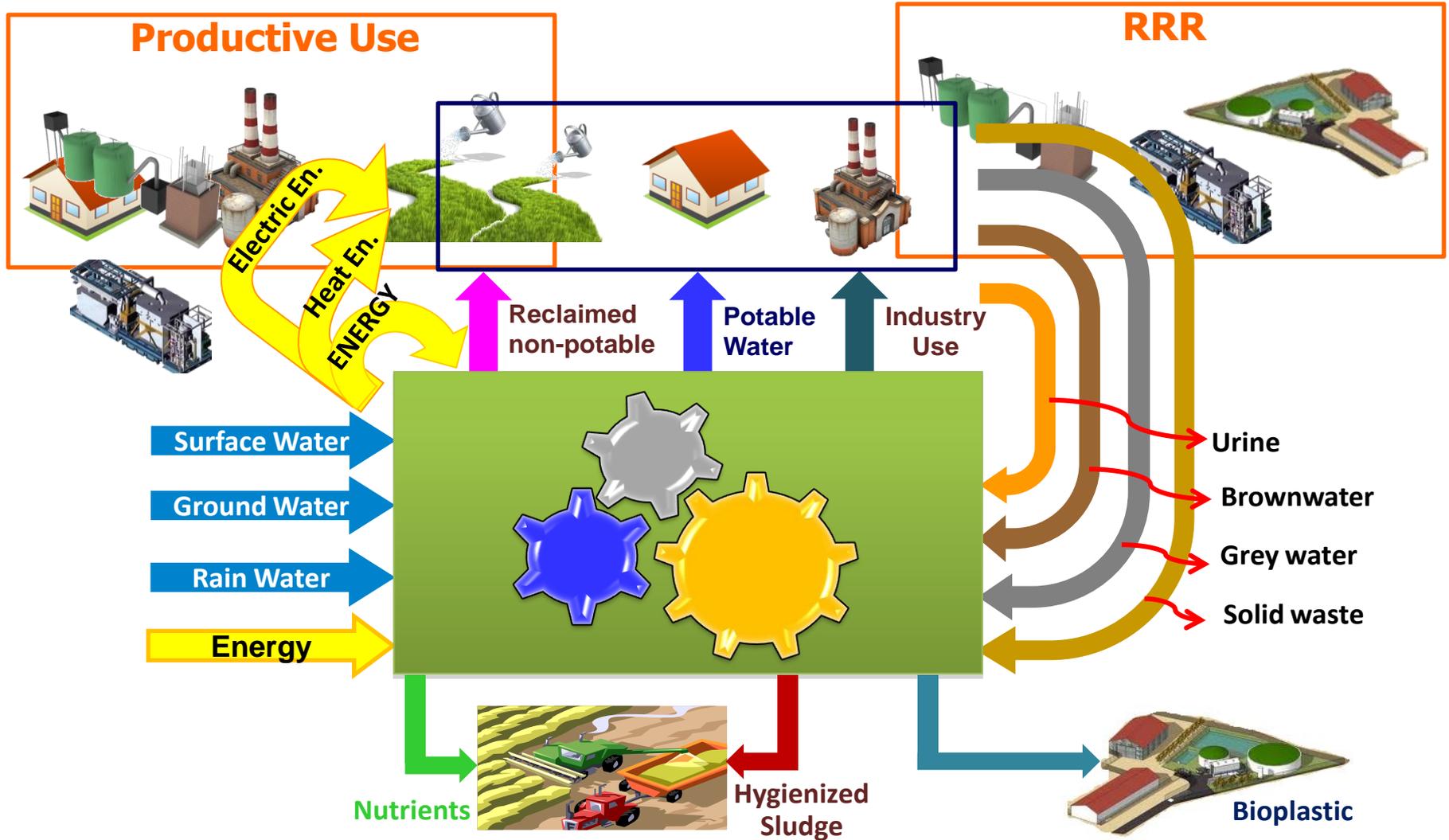


4 years, 12 cities/countries

- Development of conceptual designs + Master Plans TORs
- Awareness raising and capacity building
- Advise on demonstration projects

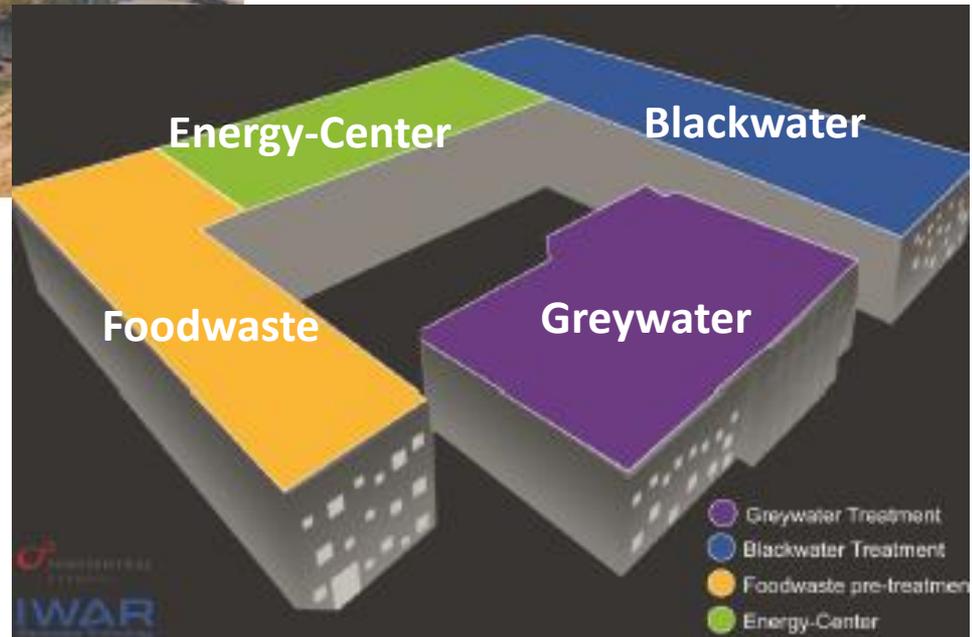
In addition there are discussions on-going with World Bank on requests made from Bangladesh, Mexico, Mozambique, Tanzania

We're starting to talk about machines and factories



April 2014: Semizentralized Resource Recovery Center Qingdao Shiyuan

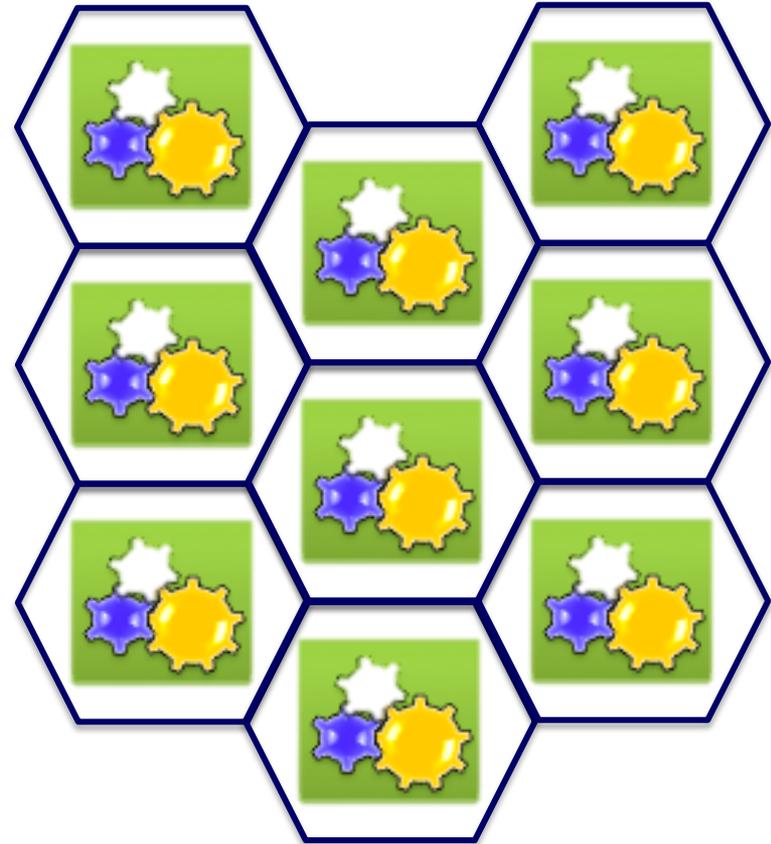
© Cosalux u. Susanna Neunast



These perspectives lead to a more decentralized type of thinking?

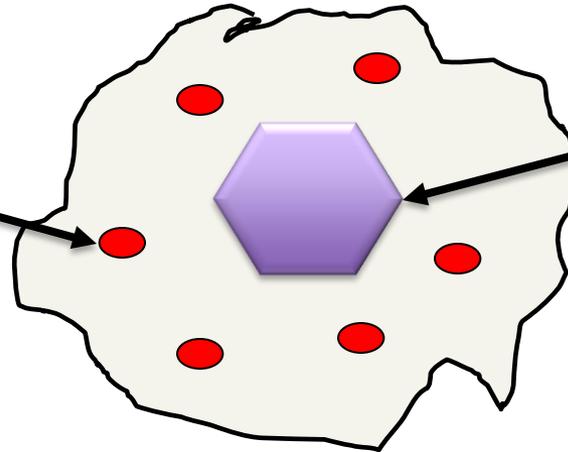
Decentralization well suited for:

- Energy recovery (heat recovered and used close to source)
- Minimizing energy consumption (for moving water)
- Source separation (to maximize nutrient recovery)
- Adjusted growth (to deal with rapid growing cities)
- Increased resiliency (dampens the propagation of failures)



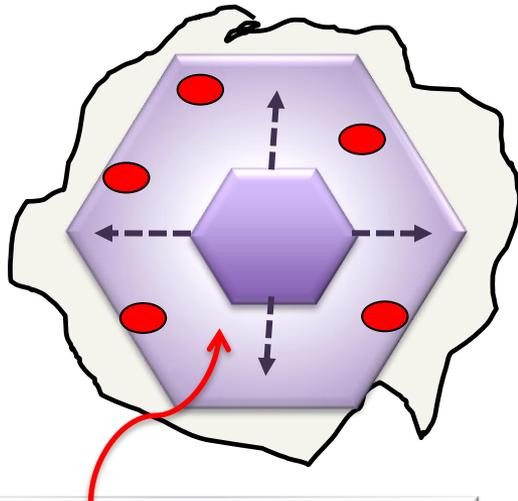
Look for opportunities to create new paradigms (not extend old ones)

Outskirts
Demand met by
informal systems

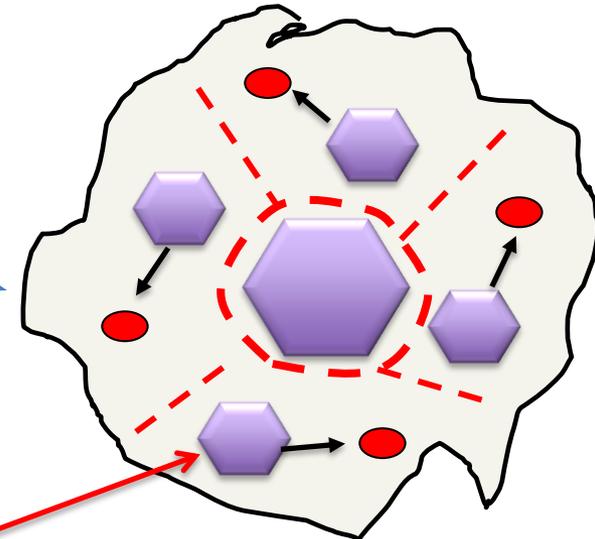


City Core
Formalised water &
waste system

Growth



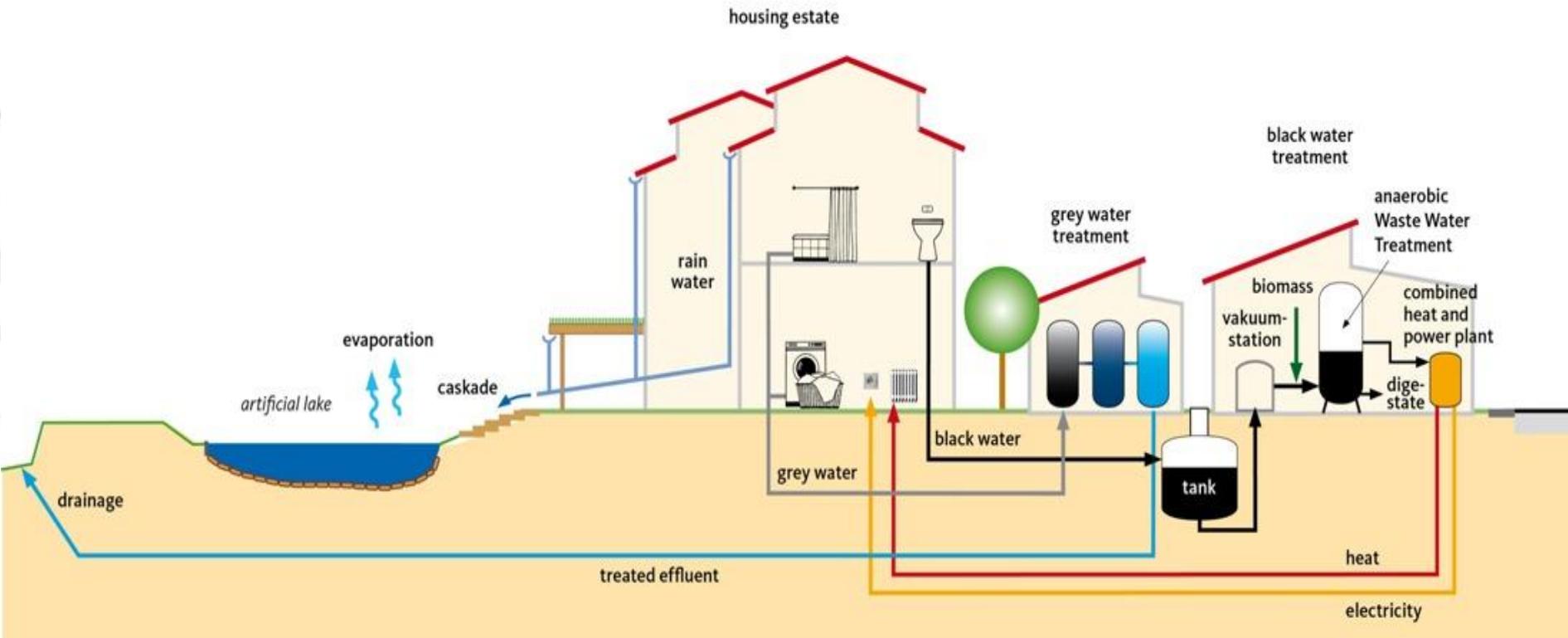
**Expansion of existing
system to growing areas**



**Distributed &
Decentralized**

Traditional utilities are proactively seizing the opportunities – Hamburg

Hamburg Water Cycle™



Getting of the grid – disruptive

Dockside Green, BC

2,500 people; Recycling, RWH, waste-to-energy

Siyuan Campus

18,000 students, Recycling, Comsump. down by 50%

Xi'an new districts



Hammarby Sjöstad

12,000 people, Recycling, waste-to-energy





Choices Before Us

Stay in Lane

Business as Usual

Try Harder

Spend More for Traditional Sys

Paradigm Shift

Truly Different Approach





Thank You

Kalanithy Vairavamoorthy