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# CLOSING THE WATER CYCLE:

A COMPARISON OF THE INSTITUTIONAL SETTINGS FOR WASTEWATER REUSE IN 4

COUNTRIES WITH A FOCUS ON THE AGRICULTURAL SECTOR

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# BACKGROUND

- Water scarcity
  - Increased demand and competition
  -  alternative water sources
  
  - Urbanization
  - Water pollution
-  generation of waste water

## TWO REALITIES

- Developing countries: use of untreated (diluted waste water) often in an informal setting
  - Health risks for farmers, consumers...
  - Environmental risks
- Developed countries : planned controlled use of waste water
  - Reduction of the risks

# OBJECTIVE

- Obtain insight in process of formalization by identifying key drivers, constraints and institutional arrangements

# METHODOLOGY

- Comparative analysis
  - 4 countries along a formalization trajectory
  - India, Bolivia, South Africa and Israel
- Institutional Decomposition Analysis (IDA):
  - water law, water policy and water administration/organization
- Data: peer-reviewed articles, official reports and websites, books + complemented with semi-structured interviews with key informants

## RESULTS: DEGREE OF FORMALIZATION

- Israel : driven by water scarcity highly organized water sector embracing reuse
- South Africa: reuse seen as strategy to reduce pressure on resources
- Bolivia and India : reuse is result of pollution and lack of adequate water management, only recent policy attention

# RESULTS : CURRENT INSTITUTIONAL SETTINGS

- Israel:
  - water public property
  - one water authority for management
  - waste water treated specifically for agricultural use
- South Africa
  - Public property
  - Decentralized management: CMA
  - Reuse formally introduced in policy
  - Paper vs practice



# RESULTS : CURRENT INSTITUTIONAL SETTINGS

- Bolivia:
  - communal based irrigation water management
  - lack of formal legal framework for water management
  - attempt to introduce reuse policy framework : practical implementation unclear
- India:
  - integrated water resources management framework
  - pollution
  - reuse: no focus on agricultural sector

## DISCUSSION: NEED FOR INSTITUTIONAL CHANGES

- institutional arrangements too complex
- conflicts exist among concerned agencies ranging from overlap of responsibilities to the absence of well-defined mandates
- political will is essential
- budgetary constraints

# DISCUSSION : WATER RIGHTS

- For informal wastewater reuse systems, water rights might exist or not, depending on the local practices for water management
- ? What happens under formalization
- Value of water will increase (more competition?)

## DISCUSSION: PROFITABILITY OF AGRICULTURAL MARKETS

- implementation of treated wastewater irrigation systems might be justifiable when agricultural production is linked to profitable markets
- for subsistence agriculture, planned wastewater reuse systems might be too expensive for the users, if they are to share the costs

# CONCLUSION

- agricultural wastewater reuse is rather complex
- key element for the formalization of wastewater reuse is clarity in the institutional arrangements
- water scarcity is a powerful driver
- public awareness with respect to water pollution is necessary to trigger policy makers

# Thank you for your attention !!!

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