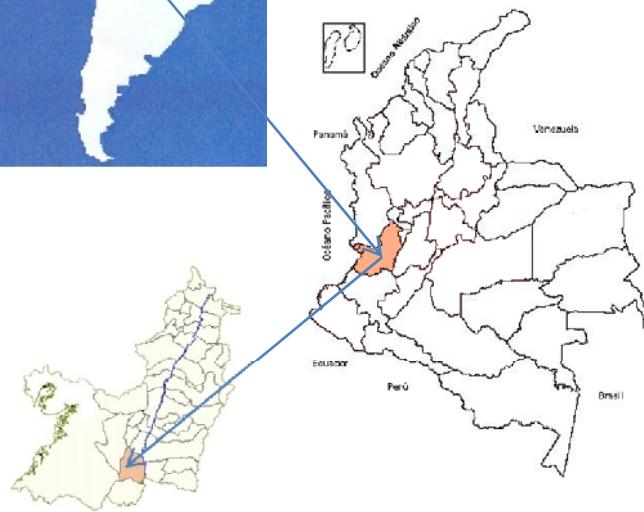
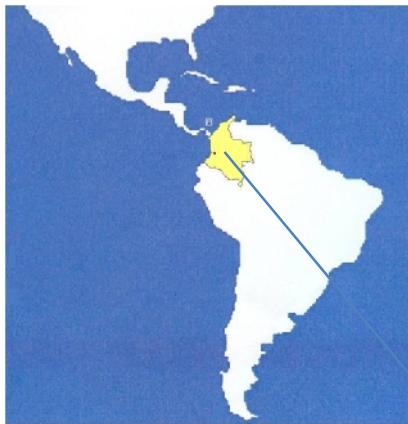


KEY ISSUES FOR DECENTRALIZATION IN MUNICIPAL WASTEWATER TREATMENT

Diana Paola Bernal and Inés Restrepo

12th edition WWW-YES workshop
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Urban water: resource or risks?





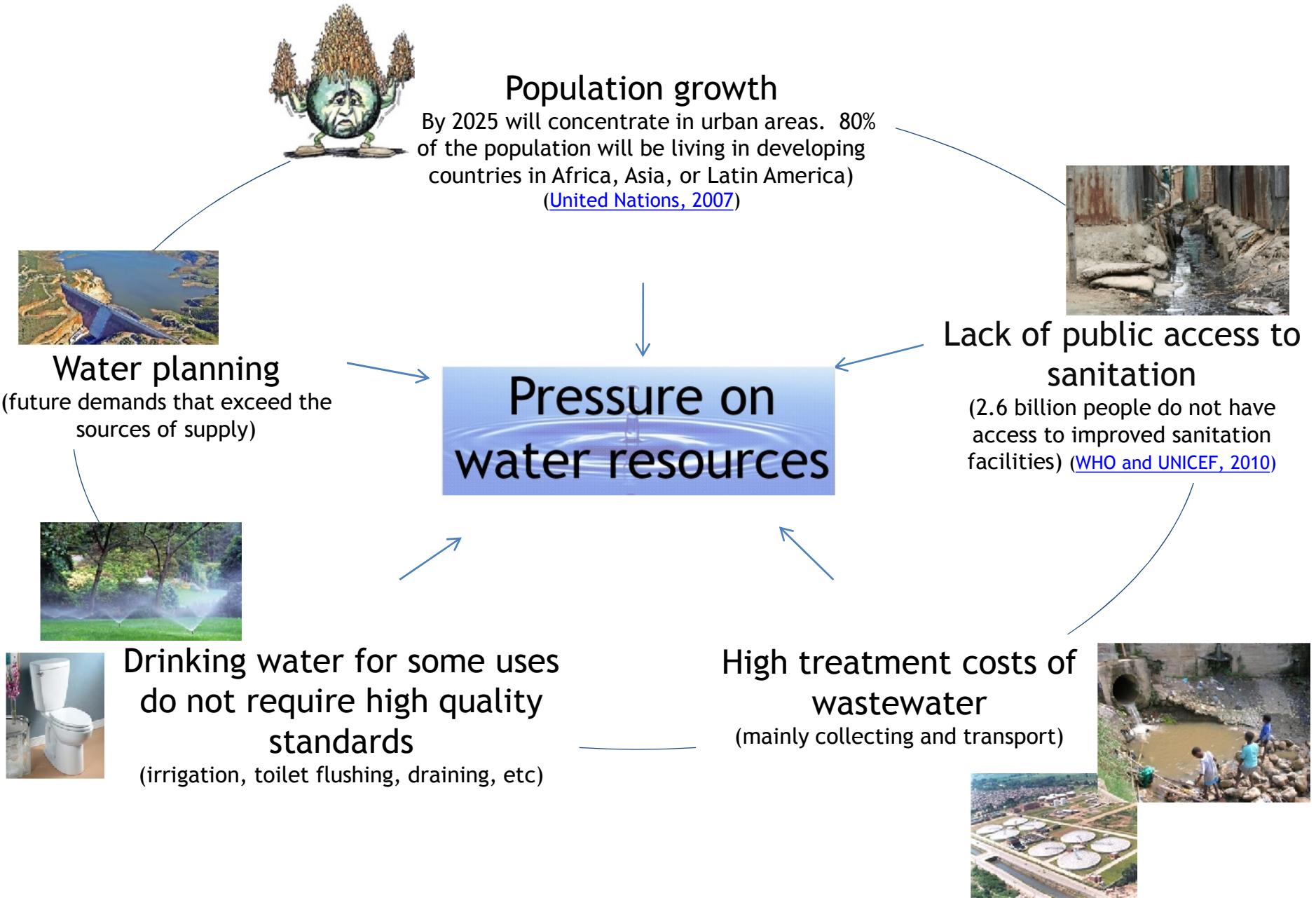
Cali, Colombia



Universidad del Valle



BACKGROUND



A PARADIGM SHIFT

- ✓ Tendency aimed at achieving a self-sustainable urban water cycle - closed-loop cycle in terms of water flows, minimises energy requirements and waste volumes discharged to the environment
- ✓ The new approach: integration of social, economic, and environmental aspects with practices such as rainwater management, water conservation, wastewater reuse, rational energy management (incorporating the use of alternative sources), nutrient recovery, and sorting at source.
- ✓ This approach can be applied to centralised and decentralised schemes or even a combination of both

DECENTRALISED WASTEWATER MANAGEMENT AS AN OPTION FOR URBAN AREAS



The raw wastewater is treated next to the source,
this approach is a viable alternative for
wastewater management, minimizing the
environmental impacts and facilitating the
resources recovery.

TYPES OF DECENTRALISATION

- ✓ Levels of decentralisation:
 - Individual solutions,
 - Clusters and individual buildings
 - Semi-centralised or satellite treatment systems

- ✓ 3 categories:
 1. *Simple sanitation systems* (to assure minimum hygienic standards, water pollution control less significance)
 2. *Small-scale mechanical-biological treatment plant* (to limit water pollution, assuring a high standards of hygiene)
 3. *Recycling systems* (priority is the environmental protection , while maintain high standards of hygiene, a common principle is separation of the different sewage or material streams - urine, feces, grey water, and stormwater).

DRIVERS AND CONSTRAINTS FOR DECENTRALISATION

Drivers	Constraints
<ul style="list-style-type: none">▪ <u>Water crises</u> and other new societal demands on the infrastructure– Droughts and water supply shortages– Water quality and habitat degradation– Climate change and resilience– Aging infrastructure costs - repairs and expansion– Alternatives to sprawl development (promoted by sewers and large-lot septic systems)– Quality of life in urban and rural communities—pervasive grey infrastructure▪ Population growth▪ Water scarcity▪ Resource constraints▪ Available technology▪ Increased demand▪ New ideas and design concepts— natural, social, economic systems▪ Niche innovations by advocates and entrepreneurs	<ul style="list-style-type: none">▪ Government policies and regulations founded on centralised infrastructure▪ Market failures, with fragmentation and little information▪ Distorted rates of water▪ Fragmentation of the water and sanitation agencies▪ Civil society based on the conventional▪ Minimum investment in research▪ Lack of local models that combine technology, management, financing and customer acceptance▪ Segregation of actors (entrepreneurs, professionals, and academics) in three different areas: supply, storm water and wastewater▪ Lack of acceptance public▪ Lack of economic evaluations procedures▪ Stove-pipe professional thinking▪ Institutional constraints▪ Existing practices

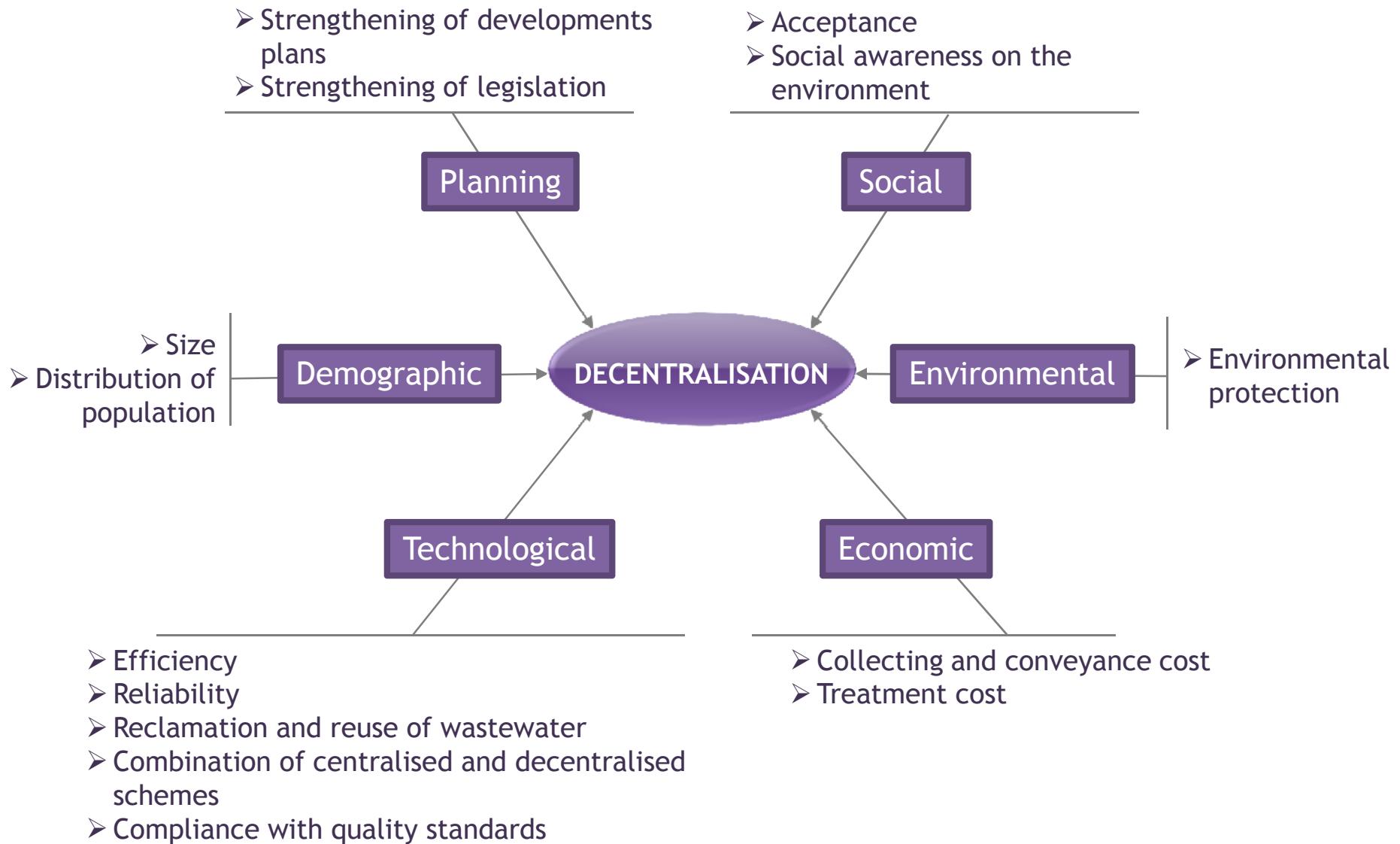
Source: ([Daigger, 2009](#), [Nelson, 2008](#))

COMPARISON BETWEEN CENTRALISED AND DECENTRALISED SCHEMES

Parameter	Centralised	Decentralised
Collecting system	Large diameters, long distances	Small diameters, short distances
Requirements space	Large area in one place	Small areas in many places
Operation and maintenance	Full time technical staff requirements	Less demanding, can be monitored remotely
Uniformity of water	Many types of water	More uniform water
Dilution grade	Less control over the stormwater, more dilution	More control over the stormwater, more concentrate
Risk	Risk on a larger scale	Risk distributed
Water transfer	Increase the needs for water transfer	Water is used and reused in the same area
Social control	Social control is lost	More social control
Ease of expansion	High costs, more complexity to implementation	Low cost, less complexity to implementation
Potential to reuse	All water is concentrated in one point	Water can be reused locally

Source: Adapted by CODESAB ([2011](#))

THE MOST RELEVANT KEY ISSUES OF DECENTRALISATION



CONCLUSIONS

Environmental pollution, water scarcity, population growth, innovation, and technological developments are drivers that encourage rethinking the current approach to urban water management.

Decentralisation encourages us to think of urban water management in a holistic way, integrating all sectors, drinking water, wastewater, and stormwater to get the most benefit out of them, thereby reducing costs, improving environmental management, expanding service coverage, and considering social and environmental benefits that are not visible with the current perspective.

The decentralised planning should be accompanied by a reform of policies and guidelines that govern urban development plans and water management plans in cities in developing countries.

CONCLUSIONS

The incorporation of decentralisation as a viable option for wastewater management in urban areas and the regulation of reuse practices such as defining quality criteria are necessary actions to articulate the conceptual framework with the actions that occur in reality.

The level of decentralisation may be a critical issue to achieving sustainability of a wastewater management system. In many cases, a semi-centralised scheme can be a feasible option to introduce decentralisation in an urban area in a developing country, considering that the planning policies and the regulatory framework do not have many components that facilitate a different kind of management than the traditional "end-of-the-pipe" solutions and with use of conventional technologies in centralised systems