

OPINION

To integrate or not to integrate? Water and waste as unified basic services

Abishek Sankara Narayan, Marisa Boller *

Swiss Federal Institute of Aquatic Science and Technology (Eawag), Department of Sanitation, Water and Solid Waste for Development, Dübendorf, Switzerland

* marisa.boller@eawag.ch

The big question

The provision of basic water and waste services, i.e., water supply, sanitation, solid waste and stormwater management, is essential for ensuring public and environmental health. These services are closely interconnected in their physical chains, creating both opportunities and challenges for service delivery [1]. Negative interlinkages can occur when solid waste enters pit latrines or faecal matter contaminates drinking water. On the other hand, there are opportunities for synergies, such as the reuse of treated wastewater or the co-digestion of faecal and organic waste. Despite these known synergies, institutional arrangements remain fragmented, and sectors continue to operate in isolated siloes. This raises the question: Should planning, implementation and management of these basic services be integrated? At the All Systems Connect Symposium 2023 in The Hague [2], six eminent speakers from academia, government, non-governmental organizations (NGOs) and the private sector debated this issue. This article presents the four key issues that were raised when considering integration of water and waste services in low-resource settings.

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Management and capacity

Integrating water and waste services could improve governance, accountability and cost-efficiency. Often, since the same level of governments are responsible for providing basic services, integrating these sectors can enhance their coordination and accountability, resulting in more efficient service delivery. The costs of unified planning, monitoring and fee collection could also be lower than siloed services. Further, it could encourage systems leadership towards the development of long-term sustainability.

However, there is currently a lack of operational capacity for integrating these services [3]. Each service is often handled by specialists with little operational knowledge of other sectors. Training and developing technical capacities of integrated services would be an arduous task. On the flip side, integration could potentially lead to a loss of specialization and service quality that has been achieved through several decades research and experience. Each sector requires specific expertise and knowledge to ensure its efficiency and effectiveness.

Implementation complexity

For a household user of water and waste services, there is a need for integration, since these services interact directly at the taps, toilets and trash receptacles. Inadequately managed services can hinder service quality and lead to increased costs: for example, faecal matter

contaminated bore-water necessitating water treatment units at the household or trash-clogged small-bore sewers needing repair.

However, for a service provider, integrated implementation of water and waste services would further increase the complexity of planning and managing these services. Each service chain has its own set of complex steps in containment, collection, treatment and end use [4]. Fully integrating these services together may challenge the limits of current technical, financial and infrastructural management.

Operational synergies

An integrated approach could reap the co-benefits arising from synergistic operations. Opportunities for positive interactions include the reuse of treated wastewater, recovery of nutrients and energy, as well as co-treatment and co-management of faecal sludge and organic waste [5]. Such synergies could ultimately lead to improved circularity and cost-effectiveness, benefitting both users and service providers.

Conversely, without integration, stormwater drains fill up due to the dumping of solid waste or faecal sludge, leading to flooding and further public health risks [6, 7]. Many other examples exist in each of the steps in the water, sanitation and solid waste service chains [1]. To prevent such negative interactions and ensure effective management of these services, service integration plays an essential role [8].

Prior experiences

Siloed approaches have not been able to maximize service outputs of basic services for the past several decades. Separate water, sanitation, and solid waste sectors have been ineffective in achieving sustainable service delivery. Such approaches resulted in duplicated efforts, missed opportunities to harness synergies, and led to incongruent policies. In Uganda, for example, solid waste is typically managed by the city authorities, while water and sanitation services are managed by a national utility, resulting in inefficient service provision and inadequate waste disposal practices contaminating water sources due to lack of coordination [9].

However, while siloed approaches have failed in the past, it does not prove that integration is the solution. In fact, there have been cases where integrating basic services has not been successful: for example, slum upgrading projects in Kenya, where planning for infrastructures is integrated, but integrated implementation faces institutional challenges, especially with the departure of the development partner, resulting in a continued lack of basic services for the people [10]. Due to the limited knowledge in the field of integration in terms of successful attempts and best practices, there is limited political will for such integration experiments in reality.

[Fig 1](#) summarizes the main key issues when considering integration of water and waste services in low-resource settings.

The verdict and way forward

Integration should be seen as a continuum, with varying degrees of integration ranging from complete siloes to full service integration including planning, implementation and operational management. Integration also has different manifestations—integration of services at the user end (interface and collection) or integration at the steps further in the service chain (transport and treatment). The context will dictate the form and level of integration considering the benefits and drawbacks of each approach. Further research could provide insights into what the optimal level of integration is for different contexts.

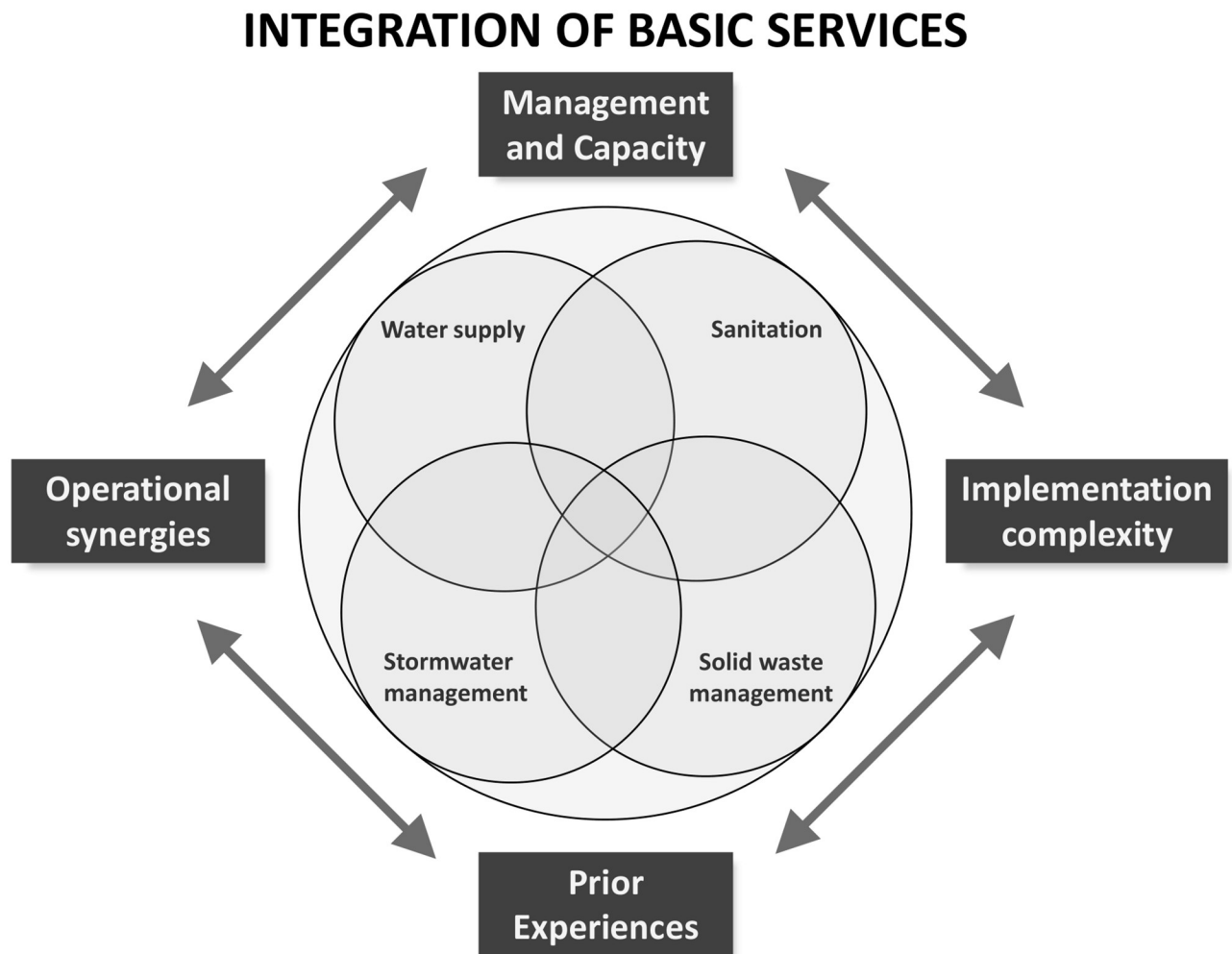


Fig 1. Summary of the main key issues when considering integration of basic services.

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While every level of integration poses challenges such as increased complexity, successful integration can be fostered by strong political will towards innovative service provision and institutional frameworks with clear mandates and accountability. Practical examples will enhance our understanding of integration in operations and its benefits and challenges, which can then be used for building political will. Collaboration between researchers, practitioners, and government representatives is essential to bring evidence to the forefront and to address the unresolved debate over integration.

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Author Contributions

Conceptualization: Abishek Sankara Narayan, Marisa Boller.

Methodology: Abishek Sankara Narayan, Marisa Boller.

Project administration: Abishek Sankara Narayan, Marisa Boller.

Supervision: Abishek Sankara Narayan, Marisa Boller.

Validation: Abishek Sankara Narayan, Marisa Boller.

Visualization: Abishek Sankara Narayan, Marisa Boller.

Writing – original draft: Abishek Sankara Narayan, Marisa Boller.

Writing – review & editing: Abishek Sankara Narayan, Marisa Boller.

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