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Resilient asset management and governance for deteriorating water services infrastructure

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Abstract

This paper argues that strategic asset management and a sound regulatory regime are required urgently if we want to change the current paradigm of aging and decaying water services infrastructure and expand the coverage of improved water services in the developing economies. In the OECD countries access to safe water supply and sanitation has largely been ensured through substantial investment over many decades. Yet, significant investments will still be required to rehabilitate the existing infrastructures, to bring them into conformity with more stringent environmental and health regulations, and to maintain service quality in the future. In the non-OECD countries the challenges are more daunting. Large parts of their population have no access and many suffer from unsatisfactory services. Nearly one billion people lack access to clean drinking water and 2.6 billion people lack access to improved sanitation services. Lack of sound economic regulatory frameworks and enforcement regimes, and poor asset management practices, in particular underpricing of water services is a common problem throughout the world.

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1. Introduction

Supply of drinking water and collection and treatment of wastewaters, i.e. water services, are extremely capital-intensive: fixed costs generally account for 80 percent of total costs. The construction of networks and treatment plants requires a large one-time investment, while maintaining the operability of the water services infrastructure

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demands constant repair, renewal and replacement. Attaining and maintaining appropriate investment levels is challenging because of the nature of water utility assets: long asset life, the labor-intensiveness of the condition assessment of the physical infrastructure, especially in the case of underground locations, differences between book value and fair value, and the difficulty of assessing the costs of deferred investments (Westerhoff et al. 2005).

In the OECD countries, access to safe water supply and sanitation has largely been ensured through substantial investments over many decades (OECD 2009). Yet, significant investments will still be required to rehabilitate existing aging and deteriorating infrastructure, to bring it into conformity with more stringent environmental and health regulations, and to maintain service quality in the future. In non-OECD countries, the challenges are more daunting. Large parts of the population have no access and many suffer from unsatisfactory services. Currently some 0.8 billion people lack safe water supply and 2.5 billion people do not have proper sanitation (UNICEF 2013). While these estimates indicate the order of magnitude of the problems, the number threatened by poor management of constructed systems is much greater (Biswas 2013).

To solve the problems related to greenfield investment projects and, in particular, to sustain infrastructure assets, the methods of long-term planning and strategic decision-making, often referred to as water utility asset management, have to be put to use (see example in Table 1).

Table 1. Components of Seattle Public Utilities (SPU) Asset Management System (Vinnari 2006a).

Component	Implementation activity
Define service levels	Annual customer surveys, stakeholder interviews
Learn about risks	Tracking and tagging of most critical assets by probability of failure/consequence analysis; lower risks by rehabilitation, operations and maintenance
Focus on life cycle costs	Assess life-cycle costs and benefits of each planned project/investment
Use triple bottom line	Prioritize projects/investments based on societal, economic and environmental impacts
Optimize data and data systems	Inventory of technical characteristics, age, location, maintenance history, condition and current value of each asset component
Create strategic asset management plans	Description of current condition of asset components, and operations, maintenance and rehabilitation strategies; risk management plans for operational and economic risks
Clarify roles and responsibilities	Define work team and individual responsibilities, responsibility areas and decision-making authorities
Make large investment decisions via asset management committee	Meets once a week, analyses and finances large investments (> EUR 200,000), ensures that decisions are based on life-cycle cost and triple bottom line principles, approves project plans, decides customer service and environmental standards

According to EPA (2012), asset management can be defined as follows: “*Asset management is a framework being widely adopted as a means to pursue and achieve sustainable infrastructure. It is the practice of managing infrastructure capital assets to minimize the total cost of owning and operating them while delivering the desired service levels. A high-performing asset management program incorporates detailed asset inventories, operation and maintenance tasks, and long-range financial planning to build system capacity, and it puts systems on the road to sustainability.*”

2. State of water services infrastructure – Africa and selected OECD countries

We will now have a look on the situation of water services infrastructure in Africa and selected OECD-countries. The first selection is due to the first author’s professional experience from the region and especially Kenya. The selected OECD countries are those that seem to be forerunners in strategic asset management and thus relevant knowledge is available while Finland is the home country of the authors.

Africa. The coverage of improved water services in Sub-Saharan Africa is still rather low. In 2012 urban drinking water coverage was 85 percent, rural drinking water coverage 53 percent, urban sanitation coverage 41 percent and that of rural sanitation 23 percent (WHO and UNICEF 2014). Due to operational and efficiency problems, however, the real service coverage figures are lower.

Underpricing of water is widespread across Africa. By underpricing water, the sector forgoes at least USD 1.8 billion a year in revenues (0.3 percent of GDP). In the worst countries, underpricing can mean that utilities collect less than 40 percent of the revenues they need which can shrink GDP by 0.7–0.9 percent. Underpricing has also

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