Eawag —
Swiss Federal Institute of
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Water Resource Quality (WRQ)

Geogenic Contamination Handbook

Addressing arsenic and fluoride in drinking water

WHO Collaborating Center for Sanitation and Water in Developing Countries

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Cover Photo:

Women collecting fluoride-treated water at the community filter in Wayo Gabriel, Ethiopia, implemented by Eawag, Oromia Self-Help Organization (OSHO) and Swiss Interchurch Aid (HEKS)

6 Financial viability for drinking-water services

Heiko Gebauer

Drinking-water services often fail for the low-income segment living close to the poverty line – not only in terms of quantity and quality, but also in terms of affordability and accessibility (Anderson and Markides, 2007; WHO, 2012; Massa, 2012; Gebauer and Saul, 2014). The low-income segment often suffers from a "poverty penalty", where the least privileged pay more for drinking water than their richer counterparts. The low-income segment does not benefit from subsidies for water provision, or it simply lacks access to adequate water quality and quantity. Arguably, improving access to and affordability of sufficient quantity and quality of drinking water should be guaranteed for income levels of about $5 to $10 per day and even for the poorest among the low-income segment, living on about $2 per day.

The financing of water services remains a major concern. Typical key and follow-up questions are:

- How can I finance the production, distribution and marketing of water treatment options? Where can I get funding from? Can I apply for funds from the government? Can I get access to philanthropic money? Is patient capital available? Do I have to invest my own money?
- What types of cost do I have to cover? How can I identify the necessary costs? What would be a good cost ratio between investment and operational costs?
- How can I ensure that people pay for water services? How do I collect payments from the users?

Philanthropy and donation-based aid programs can make an important impact on the quality and quantity of water services, but they are inherently not economically sustainable. Once the financial resources have been invested in one location, there are often no finances remaining to transfer the water service programmes to another location (up-scaling). On one hand, financial viability would mean that water providers should at least break even – or even attain profitability and a competitive rate of return. This would enable organisations to re-invest in the extension of water services. Non-profit organisations and social businesses providing water services may pass on all savings and profits to their members or may use them to expand their scale and scope of water services. On the other hand, subsidies might be necessary to facilitate the development and use of water services.

The next few sections discuss the key issues on financial viability for water services. Our basic rationale is that financial viability can only be ensured if the water service providers cover the investment and operational costs and are able to manage a certain contribution paid by the consumers for water services. The discussion is divided into two parts. First, we describe financial options for the water service providers. Second, we highlight ways for water service providers to ensure that the consumer pays for the services provided. It

should be noted that the following sections mostly include examples of the treatment of microbially contaminated water, as there is great activity in this field and because the economic issues are independent of the type of contamination.

6.1 Financial options for water service providers

There are different types of water service providers:

- Utilities can be private or public. They manage water treatment units and centralised water networks.
- Micro-utilities are owned by communities. They manage small-scale water treatment units and a decentralised water network.
- Water kiosks are booths that sell drinking water (usually treated). They may also deliver water directly to households.
- Providers of treatment devices for household use.
- Providers of disinfectant products, such as chlorine tabs that are used for water disinfection.

All these providers can use different financial options to invest in water service provision. The financial option depends on the type of organisation (Fig. 6.1) providing the water services. There are three general types of organisation.

1 **Profit-orientated businesses:** Profit-orientated businesses recover their investment and operational costs, generate revenues with the water services and maximise their profits. Typical examples are multinational enterprises such as Unilever, which sells its Pureit Water Filter to generate profit, or smaller firms such as the Indian Sarvajal or the Swiss Trunz Water Systems, that sell water treatment equipment for profit.

2 **Non-profit organisations:** Non-profit organisations do not recover the investments and operational costs. Instead they rely on donors and aid finances to cover these costs. See NWP/IRC (2009) for a listing of donors financing water services. A typical example would be A Vision for Clean Water, which finances Kanchan arsenic removal filters through donations. Publicly owned utilities also act as non-profit organisations using tax money to manage water services.

3 **Social businesses:** Social businesses borrow elements from profit-orientated businesses and non-profit organisations. Social businesses have to cover the investment and operational costs, but they are more cause- than profit-driven. A typical illustration would be the Naandi Foundation, which sets up water kiosks in rural India. Costs are recovered by selling 20 litres of water for $0.045. In addition, some of the investment costs are covered by subsidies. Another illustration of a social business is Grameen Veolia, which supplies simplified surface-water treatment systems to rural populations. Safe and affordable drinking water is distributed at village drinking fountains or via jerry cans. Grameen Veolia covers its

costs by selling water through prepaid card systems, but it still aims to maximise its social impact.

All three types of organisation have to consider their investment and operational costs. Investment costs include all necessary costs to purchase the water treatment equipment. In the case of the Naandi Foundation, investment costs can be as much as $10,000 for a water kiosk. Investment costs for Unilever's Pureit water filter can be up to $40. Operational costs include the costs for operating and maintaining the water treatment equipment. Adequate ratios between investment and operational costs should be about 10:1 or 5:1, but existing ratios, for example in the case of Sarvajal's reverse osmosis water treatment systems, are about 2:1. In general, there is a strong need to reduce operational costs for water treatment.

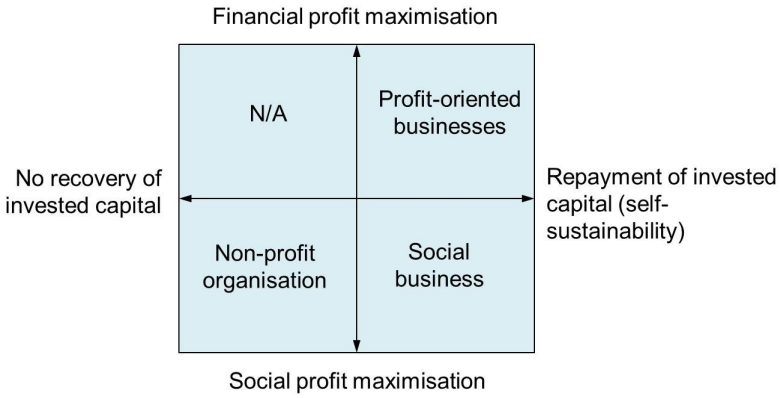

Fig. 6.1 *Orientation of different types of organisations concerning profit maximisation and recovery of invested capital (Yunus et al., 2010)*

Operational costs cover a variety of expenditures, such as operator labour costs, repair costs, electricity costs, costs for filter media and so on. Organisations often refer to life-cycle costs (LCC). LCC analysis is a method for assessing the total cost of ownership of water treatment equipment. LCC analysis takes into account all the costs of designing, acquiring, owning, and disposing of water treatment equipment. Acquisition costs refer to the investment costs, while ownership costs are close to operational costs.

Profit-orientated firms, social businesses and non-profit organisations can source the necessary capital through philanthropy, as investment capital or patient capital.

Philanthropy: Philanthropic activity can be described as caring for, nurturing, developing and enhancing "what it is to be human" on both the benefactors' side (by identifying and exercising their values in giving and volunteering) and beneficiaries' side (by benefitting). In water service provision, philanthropy is usually associated with private donations and corporate philanthropy. The most typical philanthropic activities are private initiatives, for public good, focusing on quality of life. Procter&Gamble, for example, promotes private donations to support its PUR water sachets used for disinfection. Each private donation is supplemented by a philanthropic investment by Procter&Gamble. Philanthropy and donation-based aid programmes can make an important impact, but they are inherently not economically sustainable. Once the financial resources are used in serving one

community, region or country, there are no funds remaining to transfer the water service programme to another location. Investment capital and patient capital offer attractive alternatives, because they can be economically more sustainable.

Investment capital: Investment capital is money that is invested in a profit-orientated firm. The investment is recovered through revenues generated by the firm over several years. Revenues are expected not only to cover the initial investments, but should also generate a competitive rate of return. Investment capital is used for investments rather than for day-to-day operations (operational costs).

Patient capital: Patient capital has a long-term perspective and has gained importance with the rise of social businesses. Patient capital investors are willing to forgo maximum financial returns for social impact. Patient capital has greater tolerance for risk than traditional investment capital, and longer time horizons for returns are expected. As illustrated in Figure 6.2, patient capital is not philanthropy. It is an investment intended to achieve below market-rate returns (or internal rates of return). Patient capital maximises social impact and catalyses the creation of water markets. On the spectrum of capital available to non-profit organisations, social businesses and profit-maximising firms, patient capital combines traditional venture capital, philanthropy, development aid and foreign direct investment. Patient capital is invested in water entrepreneurs that are starting companies and organisations that provide water services.

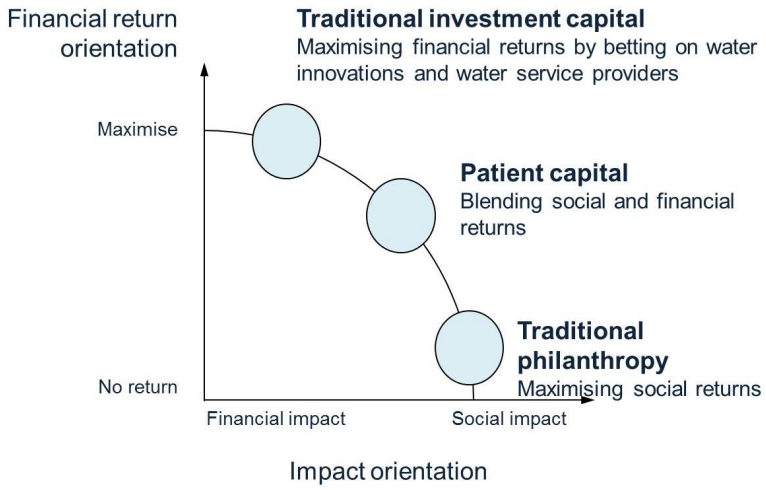

Fig. 6.2 *The orientation of different investment types*

6.2 Consumer contributions to water services

There are three basic options to ensure the financial contributions of consumers to water services: (1) mobile payment systems, (2) micro-credits and (3) consumer subsidies.

Mobile payments systems: Water service providers should explore the opportunities arising from mobile payment systems. Mobile payment systems lower transaction costs significantly. Customers can pay very small amounts, which suits the volatile and complex cash flows in the low-income segment, where customers frequently receive their income on a daily rather than weekly or monthly basis. Mobile payment systems also help to reduce payment defaults.

Micro-credits: Micro-credits are a specific form of group lending. They are used in various ways. The Indian Sarvajal uses micro-credits to enable entrepreneurs to finance the pre-investments required for entering franchising agreements. Entrepreneurs can receive a micro-credit of about $500, which enables them to start a Sarvajal water kiosk. Unilever enters partnerships with micro-credit institutes to propose micro-loans to self-help group members for the purchase of filters. The Water Initiative promotes more expensive and effective filters through leasing models. Micro-credits contribute to financial viability in at least two ways. First, water service providers can partner with micro-credit institutes so that community members can borrow money for buying filters or disinfection products. Micro-credit institutes lend the money to the community, which, in turn, knows more about its community members than outsiders, such as official banks or water service providers. Partnerships with micro-credit institutes enable the water service providers to transfer some of the screening and monitoring costs. Secondly, while water service providers typically cannot impose either financial or non-financial sanctions on people who default on a loan, community members who might belong to the same village or who are neighbours, relatives or friends might be able to impose effective non-financial sanctions on each other at low cost.

Subsidies: Here we are referring to consumers needing subsidies to be able to afford safe water. Subsidies can come from local, regional or national governments. The poorest of the poor in particular may need targeted financial support to purchase water filters or chemicals for water purification. Managing such subsidies does, of course, bring its own challenges. To target the poorest of the poor, it is important to identify the various household income levels and to discriminate between them to avoid an unfair distribution of subsidies (Easterly 2005).

6.3 Summary

Water service providers, such as utilities, micro-utilities, water kiosks, water devices and the providers of flasks and tabs, have to ensure that they remain financially viable. For non-profit organisations, financial viability depends on getting access to philanthropic investments. Profit-orientated companies have to ensure that their investments create sufficient revenue to recover the investments and to create an appropriate rate of return. Social businesses rely on patient capital, which offers a more long-term perspective, focuses on social impact and aims at a low rate of return. Profit-orientated companies and social businesses need to ensure that that the consumers pay for the services provided. Subsidies for the very poor, mobile payment systems and micro-credits are promising ways to tackle these challenges. Table 6.1 summarises the answers to our key questions:

Table 6.1 *Answers to key questions on the financing of water services*

How can I finance the production, distribution and marketing of water treatment options? Where can I get the money from? Do I have to invest my own money?
The answers to these questions depend on the type of organisation: • Non-profit organisations finance water services from external sources, such as donors or government. • Social businesses finance water services through patient capital and contributions from consumers (water users). • Profit-orientated organisations have to invest their own money and expect a financial return on their investments with a certain interest rate. New investments are financed through these revenues. All these types of organisations can also receive subsidies from the government. Such subsidies should specifically target the poorest of the poor.
What types of cost do I have to cover, and how can these be identified? What would be a good cost ratio between investment and operational costs?
• Important costs are investment and operational costs. • LCC-analysis (life-cycle cost analysis) is most suitable for identifying these investment and operational costs. Good cost ratios between investment and operational costs are 10:1 to 5:1.
How can I ensure that people pay for water services? How do I get the money from the users?
• Mobile payment systems and pay-per-use approaches are most suitable to motivate people to pay for water services. • Micro-credits for financing water services help consumers to avoid up-front investments.

References and further reading

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Links with further information

Water service providers

Access to Safe Water for the Base of the Pyramid (Report) http://hystra.com/safe-water/

Safe Water at the Base of the Pyramid (Booklet) http://static.squarespace.com/static/51bef39fe4b010d205f84a92/t/51f23b56e4b05adf4a8ee570/1374829398315/Access_to_Safe_Water_for_the_BoP_FULL_REPORT.pdf

Financing WASH services

Financial Sustainability of WASH Services (SSWM Toolbox) www.sswm.info/category/planning-process-tools/programming-and-planning-frameworks/frameworks-and-approaches/sani-9

Various publications on financing WASH services (Trémolet Consulting) www.tremolet.com/publications

Patient capital

Patient capital http://en.wikipedia.org/wiki/Patient_capital

Acumen makes investments that generate both social and financial returns http://acumen.org/investments/investment-model/

Investment and operating costs

Operating cost http://en.wikipedia.org/wiki/Operating_cost

Life-Cycle Costs (LCCs)

Life-cycle cost approach www.ircwash.org/resources/briefing-note-1a-life-cycle-costs-approach-costing-sustainable-service

Mobile payment systems and financial services in developing countries

Mobile Water Payment Innovations in Urban Africa (Report) www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/Mobile-Water-Payment-Innovations-in-Urban-Africa.pdf

Trends in Mobile Payments in Developing and Advanced Economies www.rba.gov.au/publications/bulletin/2013/mar/8.html

The mobile financial services development report 2011 http:\\www3.weforum.org/docs/WEF_MFSD_Report_2011.pdf

The Economist: “The Bank of SMS” www.economist.com/blogs/graphicdetail/2012/04/daily-chart-12