World Health Organization
REGIONAL OFFICE FOR Europe

UNECE

Costing and financing of small-scale water supply and sanitation services

PROTOCOL ON WATER AND HEALTH

ABSTRACT

Small-scale water supply and sanitation systems form an essential part of the provision of services in the pan-European region, particularly in rural areas, and sufficient financial means are required to facilitate their safe operation and safeguard public health. Challenges for these systems include a large financial gap between the costs of providing services and availability of funding sources, insufficiency in ability to cover all recurrent costs, low economies of scale and lower policy attention and financial priority from governments. This publication guides national and subnational policy-makers responsible for water and sanitation interventions in defining strategies for the sustainable financing of service provision through small-scale water supply and sanitation systems.

KEYWORDS

COSTS AND COST ANALYSIS
EUROPE
FINANCING
SANITATION
WATER SUPPLY

Address requests about publications of the WHO Regional Office for Europe to:

Publications
WHO Regional Office for Europe
UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark.

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office website (http://www.euro.who.int/pubrequest).

ISBN: 978 92 890 54973

Layout and design: Imre Sebestyén/Unit Graphics

World Health Organization
REGIONAL OFFICE FOR Europe

UNECE

Costing and financing of small-scale water supply and sanitation services

PROTOCOL ON WATER AND HEALTH

Contents

Acknowledgements

The WHO Regional Office for Europe and United Nations Economic Commission for Europe wish to express their appreciation to all those whose efforts have made the production of this publication possible.

The quality of this product derives from the invaluable contributions of experts who assisted in its conceptual development, provided technical content and undertook a process of peer review. In particular, the contributions of the following individuals are acknowledged.

Authors

Stef Smits (IRC, the Netherlands)
Catarina Fonseca (IRC, the Netherlands)

Contributors and reviewers

Ana Barreto Albuquerque (Water and Waste Services Regulation Authority, Portugal)
Mark Hoeke (WHO headquarters, Switzerland)
Dragana Jovanovic (Institute of Public Health, Serbia)
Nataliya Nikiforova (United Nations Economic Commission for Europe, Switzerland)
Dirk Osiek (German Environment Agency, Germany)
Bettina Rickert (German Environment Agency, Germany)
Oliver Schmoll (Water and Climate Programme, WHO European Centre for Environment and Health, WHO Regional Office for Europe, Germany)
Enkhtsetseg Shinee (Water and Climate Programme, WHO European Centre for Environment and Health, WHO Regional Office for Europe, Germany)
Aleksandar Sotic (Association of Water Technology and Sanitary Engineering, Serbia)
Nebojsa Veljkovic (Environmental Protection Agency, Serbia)
Verena Zügner (German Environment Agency, Germany)

The financial support provided by German Environment Agency and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany, is also gratefully acknowledged.

Abbreviations

3Ts	taxes, tariffs and transfers
ERSAR	Entidade Reguladora dos Serviços de Águas e Resíduos (Water and Waste Services Regulation Authority) [in Portugal]
FLAG	Fund for local authorities and governments [in Bulgaria]
GLAAS	Global Analysis and Assessment of Sanitation and Drinking-Water
MDF	municipal development fund
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goal
TrackFin	Tracking Financing to WASH
UNECE	United Nations Economic Commission for Europe
UNICEF	United Nations Children's Fund
UN-Water	United Nations Water
WASH	water, sanitation and hygiene

Executive summary

Small-scale water supply systems form an essential part of the provision of drinking-water in the pan-European region,[1] serving some 207 million people, or about 23% of the region's population. Small-scale sanitation services are also of importance to a significant proportion of the region's population: facilities that serve individual households – i.e. improved latrines and toilets with septic tanks – are used by over 164 million people (9.2% of the population), the majority of whom live in rural areas.

Small-scale systems are likely to play a key role in moving towards achievement of the targets of Sustainable Development Goal (SDG) 6 on safe water supply and sanitation for all in the region and providing "at least basic" services to populations that are currently unserved. As these populations largely live in rural areas, it is likely that a significant number will need to be served by small-scale systems. The latest available data indicate that 52% of the population in rural areas do not use safely managed sanitation services, compared to 23% in urban areas; this indicates a major disparity in service provision in the region.

Provision of small-scale water supply and sanitation services in the pan-European region faces a range of financial challenges. These include a large financial gap between what is required and what is available to reach universal access and to move towards safely managed services; and often insufficiency in ability to cover all recurrent costs of provision of services. The root causes of these challenges are the low economies of scale inherent to small-scale water supplies and sanitation, the high degree of fragmentation and dispersion of this sector, and the lower policy and financial priority given to these types of system compared to larger utilities. This lower priority is also one of the main reasons the institutional, regulatory and financial framework that governs these systems tends to be less well developed.

These challenges make small-scale systems vulnerable to breakdown and poor management, which in turn can lead to unsafe services or insufficient quantities of drinking-water. This may increase the risk of water-, sanitation- and hygiene-related diseases – primarily diarrhoeal illness and soil-transmitted helminth infections – and thereby pose a threat to public health.

The Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, jointly served by the United Nations Economic Commission for Europe and WHO Regional Office for Europe, is the first and only international legal agreement linking sustainable water management and the prevention, control

1 This publication uses the term "pan-European region" to refer to the Member States in the WHO European Region and Liechtenstein. The WHO European Region comprises 53 countries: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, the Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, the United Kingdom and Uzbekistan.

and reduction of water-related diseases. It promotes equitable access to drinking-water and to sanitation for all members of the population in the pan-European region, including those who live in rural areas and who suffer a disadvantage or social exclusion. Under the Protocol, challenges related to small-scale systems have been broadly recognized, and several tools and guidance documents have been developed to support improvement action. In the past decade, countries in the region have worked towards improving the situation in terms of regulation, management and surveillance. The objective of this publication is to provide national and subnational policy-makers responsible for water and sanitation interventions with complementary guidance on defining strategies for the sustainable financing of service provision through small-scale water supply and sanitation systems, so that these systems in turn can manage public health risks properly.

This publication proposes a framework consisting of the six life-cycle costs that need to be taken into consideration to ensure the sustainability of small-scale systems:

- capital expenditure;
- operating and minor maintenance expenditure;
- capital maintenance expenditure;
- expenditure on direct support;
- expenditure on indirect support;
- cost of capital.

The framework highlights three sources of financing for various costs: the 3Ts – taxes, tariffs and transfers. The publication elaborates on how to collect information on costs and how to gather funds, as well as on how to track the available funding sources. The framework also proposes bringing the costs and sources of finance together into a financial balance, facilitating identification of possible finance gaps. Finally, it identifies three types of strategy to reduce the identified gaps: reducing costs by lowering spending and improving efficiency of service provision; increasing one or more of the sources of finance; and using repayable finance (payback loans and their interest from taxes or tariffs in the future).

Within these three groups, a number of specific options and examples can be identified to reduce the financial gap for small-scale systems:

- increasing the tax base for allocation to small-scale systems;
- creating challenge funds for small-scale systems;
- accessing long-term loans through aggregation and intermunicipal cooperation;
- using municipal development funds;
- providing incentives for household investment;
- clarifying tariff policies, legislation and regulation;
- increasing revenue from tariffs, within affordability parameters;
- providing financial incentives linked to performance indicators;
- decreasing costs of capital maintenance by increasing preventive maintenance;
- advocating increased public expenditure, based on evidence;
- increasing efficiency by collaboration and cooperation;
- increasing capacity at the local level.

Many of these options are complementary. Thus, national policy-makers may need to develop an overarching financial strategy that can be translated practically into the

realities of small-scale systems, so that the relationships between the specific options can be clarified and well sequenced.

Ideally such a strategy should be prepared not solely for small-scale water supply and sanitation systems but for the water sector as a whole: small-scale systems should be an explicit part of a broader sector strategy because the way larger-scale systems are financed affects small-scale systems. At the same time, larger utilities also provide opportunities. By collaborating with them, small-scale service providers may achieve further economies of scale – for example, by sharing technical resources or laboratory space and, most importantly, by acquiring skills to manage small utilities efficiently.

1. Introduction

1.1 Background

Small-scale water supply systems form an essential part of the provision of services in the pan-European region,[2] serving some 207 million people, or about 23% of the region's population. No uniform definition of small-scale water supply systems is in use across the region, however. National definitions – where they exist – are based on criteria such as the size of population served, quantity of water provided, type of management (by community, public entity or individuals) and piped or non-piped distribution. Combining these criteria, Rickert et al. (2016a), in a survey of such systems across the WHO European Region, describe small-scale supplies as:

> all drinking-water supplies serving up to 5000 people or supplying less than 1000 m³ water per day. This category includes both individual supplies and small public supplies.

The latter are supplies managed by any public or private entity (such as a local authority, public company or community-based organization) that fall within the definitions of size.

Similarly, small-scale sanitation services are of importance to a significant proportion of the region's population. Facilities that serve individual households – i.e. improved latrines and toilets with septic tanks – serve 164 million people in the region (WHO & UNICEF, 2019). The definition of small-scale sanitation systems includes those types of system and collective systems (sewer systems) that are small in size, as defined by the number of people served by them.

Small-scale systems are likely to play a key role in moving towards achievement of the targets of Sustainable Development Goal (SDG) 6 on water supply and sanitation in the region in two ways.

- They may aid provision of "at least basic" services to populations that are currently unserved. Some 16 million people in the region lack access to "at least basic" water supplies, and 31 million lack access to "at least basic" sanitation (see Fig. 1). As these populations largely live in rural areas, it is likely that a significant number will need to be served by small-scale systems.
- They may improve the level of service provided to populations that are currently served, enabling a move from "basic" to "safely managed" services. The WHO and United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply, Sanitation and Hygiene progress report (2019) indicates that, for

2 This publication uses the term "pan-European region" to refer to the Member States in the WHO European Region and Liechtenstein. The WHO European Region comprises 53 countries: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, the Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, the United Kingdom and Uzbekistan.

Fig. 1. SDG drinking-water and sanitation ladders

SERVICE LEVEL	DEFINITION
SAFELY MANAGED	Drinking water from an improved water source that is located on premises, available when needed and free from faecal and priority chemical contamination
BASIC	Drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing
LIMITED	Drinking water from an improved source for which collection time exceeds 30 minutes for a round trip, including queuing
UNIMPROVED	Drinking water from an unprotected dug well or unprotected spring
SURFACE WATER	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal
Note: Improved sources include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water.	

SERVICE LEVEL	DEFINITION
SAFELY MANAGED	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite
BASIC	Use of improved facilities that are not shared with other households
LIMITED	Use of improved facilities shared between two or more households
UNIMPROVED	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines
OPEN DEFECATION	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or with solid waste
Note: Improved facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs.	

Source: WHO & UNICEF (2017a).

example, 52% of the population in rural areas is not served by "safely managed" sanitation services compared to only 23% in urban areas. These groups need concurrent improvements in accessibility, availability and safety of water and sanitation services. Although insufficient disaggregated data are available, it is likely that small-scale systems are ones where meeting the three elements of "safely managed" services is most difficult. For example, Rickert et al. (2016a) present statistics on low levels of compliance with water quality parameters in small-scale systems. Moving towards universal access to safely managed services thus requires a special emphasis on small-scale systems.

Nevertheless, service provision through small-scale systems also faces a number of challenges, particularly related to operational and managerial issues (WHO Regional Office for Europe, 2011; Rickert et al., 2016a). These include, among others: limited legal recognition and support, limited compliance with regulation requirements, limited capacity of service providers for adequate operation and maintenance and poor monitoring. Moreover, a challenge remains in financing the expansion of water and sanitation services, including through small-scale systems. The European Investment Bank estimates that financial unmet needs related to water and sanitation will reach €160 billion per year by 2020 (Zachariadis, 2018). In addition, United Nations Water (UN-Water) Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) data indicate a funding gap between identified needs and available funding to meet national water, sanitation and hygiene (WASH) targets of 61% (WHO, 2019). Addressing these limitations is necessary for small-scale systems to play their role in moving towards the SDG targets.

These challenges mean that small-scale systems are vulnerable to breakdown and poor management, which in turn can lead to unsafe services or insufficient quantities of drinking-water (Rickert et al., 2016b). This may increase the risk of water-, sanitation- and hygiene-related diseases – primarily diarrhoeal illness and soil-transmitted helminth infections – and thereby pose a threat to public health. In many countries, regular water quality surveillance and reporting of data on small-scale water supplies to the national level are inadequate or non-existent (Rickert et al., 2016a; 2016b). Nevertheless, the information currently available indicates a clear relationship between the size of the supply and drinking-water quality: in smaller supplies the risk of noncompliance with limit values is higher.

For these reasons, since 2007, countries that cooperate under the framework of the Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, jointly serviced by the United Nations Economic Commission for Europe (UNECE) and WHO Regional Office for Europe, have regularly discussed the need for special emphasis on small-scale water and sanitation systems. The Protocol is the first and only international legal agreement linking sustainable water management and the prevention, control and reduction of water-related diseases in the pan-European region. It aims to provide access to drinking-water and sanitation for everyone by promoting equitable access to such services for all members of the population, including those who live in rural areas and who suffer a disadvantage or social exclusion. Under the Protocol, studies were done to develop estimates of the extent to which the European population is served by small-scale systems and to characterize these services (WHO Regional Office for Europe, 2011; Rickert et al., 2016b).

In 2016, a guidance document was developed in support of effective policy action and to promote good practices for creating an enabling environment for small-scale systems (Rickert et al., 2016a). The programme of work of the Protocol for 2016–2019 identified the need to share and promote good practices around the financing of small-scale water supply and sanitation service provision because small-scale systems – by definition – represent limited economies of scale, both in initial development and in operation and maintenance. As such, they are often perceived as unattractive for investment. Service providers that operate them face financial challenges and are not always able to carry out the required operation and maintenance tasks.

Furthermore, limited insight is available at the sector level into the financial gaps related to small-scale water and sanitation service provision. Data obtained through the UN-Water GLAAS surveys illustrate this (WHO, 2019). Of the 14 countries in the European region that participated in the survey, 11 had developed cost estimates for plans to reach water and sanitation targets in rural areas (the subsector in which small-scale systems are most common). Of these, only five provided a quantitative estimate of the costs of these plans, and only two indicated having sufficient funding available. The same survey shows that only six countries were able to report data on their budgets for WASH.

The core provisions of the Protocol – including processes of target setting, reporting and surveillance – also come at a cost. Their implementation may represent

significant costs in the case of small-scale water and sanitation systems, given their small and dispersed nature. Ensuring adequate finance for compliance with these core provisions is therefore crucial.

Extension and improvement of small-scale systems requires financing strategies that recognize the specific needs and challenges of such systems. To develop such strategies, national and local authorities responsible for small-scale water and sanitation need to be equipped with a good understanding of the key financing concepts and issues in this field to be able to collaborate with the entities responsible for financing, such as finance departments, economic regulators, (development) banks and investors.

1.2 Objective and target audience

The objective of this publication is to provide guidance on defining strategies for the financing of service provision through small-scale water supply and sanitation systems to ensure safely managed services that protect health and the environment. It is particularly relevant for national and subnational policy-makers responsible for drinking-water and sanitation interventions. The publication includes:

- key concepts and terminology related to the costs and financing of drinking-water and sanitation services;
- discussion of the challenges related to financing small-scale drinking-water and sanitation services;
- a broad framework to identify strategies and options to address these challenges.

1.3 Structure of the publication

This publication contains two main chapters, bookended by an introduction and conclusion. Chapter 2 presents the conceptual framework, describing the six life-cycle costs of drinking-water and sanitation services and the three potential sources of finance, and how these can be brought together.

Chapter 3 provides specific considerations for application of this framework to small-scale water supply and sanitation systems. An analysis of the particular financial challenges and opportunities to identify strategies to address them is presented for each of the cost categories.

2. Conceptual framework: life-cycle costs and sources of financing

2.1 The life-cycle costs of drinking-water and sanitation services

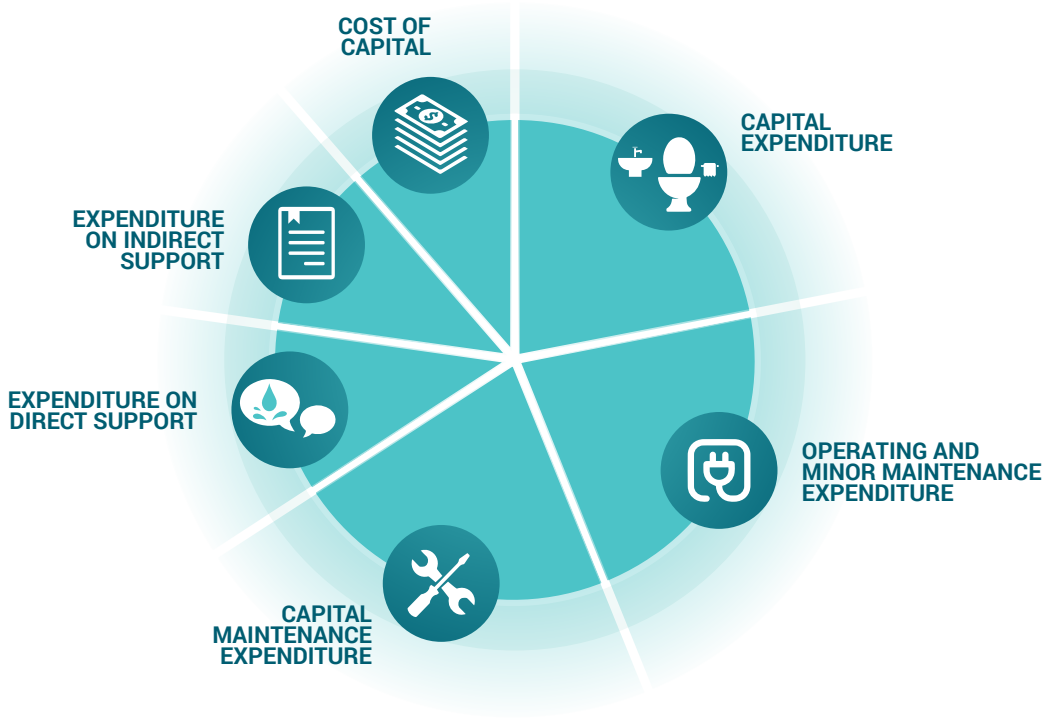
Provision of water supply and sanitation services can be conceptualized as going through a life-cycle. It starts with the costs for construction and installation of infrastructure and establishment of a service provider. This is followed by a phase in which the infrastructure is operated and maintenance takes place. Over time, major maintenance starts taking place. Once components of the infrastructure stop working or come to the end of their effective functioning, they need to be replaced or rehabilitated. This often takes place in the form of construction projects.

The costs associated with each of these steps are referred to as the life-cycle costs. They are defined as the aggregate costs of ensuring adequate services to a specific population in a determined geographical area. Knowing the (approximate) size of these costs is necessary in order to be able to identify the amount and sources of finance that will be required on an annual basis to ensure sustainable and safe service provision.

The life-cycle costs are made up of six categories (see Fig. 2) (Fonseca et al., 2011).

- Capital expenditure is hardware and software expenditure on fixed assets such as concrete structures, pumps, pipes, treatment devices and toilets for both initial construction and installation, and system extension to additional customers. It includes software costs such as assessment studies, development of designs, environmental impact studies, capacity-building and hygiene promotion when these take place as one-off costs. System upgrade and replacement is also considered capital expenditure.
- Operating and minor maintenance expenditure is recurrent (regular, ongoing) expenditure on labour/staff, fuel, energy and materials needed for operation, safe management and routine maintenance to keep systems running. Ideally, these costs include the amortization of infrastructure, whereby a certain amount is set aside for future replacements on an ongoing basis.
- Capital maintenance expenditure is renewal and rehabilitation costs that go beyond routine maintenance.
- Expenditure on direct support is costs of ongoing support by local government to operators and local stakeholders, and any associated licence fees or charges – for example, the costs of surveillance and providing operators of small-scale water supply and sanitation systems with technical assistance and advice.
- Expenditure on indirect support is costs of government planning, policy-making and regulation.

Fig. 2. The six categories of life-cycle costs



- Cost of capital is costs of servicing capital, such as repayment of loans or payment of dividends.

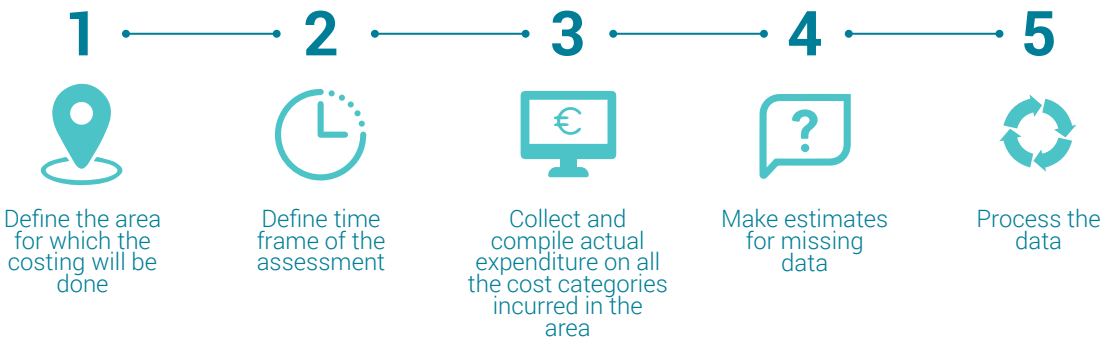
These costs occur at different frequencies. Capital expenditure occurs only once, when infrastructure is initially constructed or when it is expanded. Capital maintenance expenditure occurs at irregular intervals that are hard to predict, usually when infrastructure breaks down (or ideally before that). All other costs occur continuously and routinely, and are relatively easy to forecast.

2.2 Life-cycle costs assessment

A life-cycle costs assessment enables identification and quantification of the various costs for a specific area; this is necessary for financial planning. The scope of a life-cycle costs assessment depends on its purpose. National and subnational policy-makers mostly require broad ranges of costs of small-scale systems for macro-level financial planning and regulation. Service providers require more detailed assessments for asset management planning. The remainder of this publication focuses on the former.

The life-cycle costs assessment consists of five steps (see Fig. 3). The first is to define the area for which the costing is being done. For more macro-level planning the unit of analysis is usually a country or a subnational administrative unit, like a province, district or municipality. Such an area is typically composed of a large number of service areas – areas served by particular systems or service providers. This means that data need to be obtained from (a sample) of service areas within the unit. That in itself requires an inventory of small-scale service providers and systems for the area of consideration to be in

Fig. 3. The five steps of the life-cycle costs assessment



place, containing information on the number of systems and providers, their location and populations served. From this inventory, a sample size can be defined, depending on the exact purpose of the study. If no full inventory exists, assumptions need to be made (for example, based on past surveys) on the characteristics of the service area. Data collection may include establishing part of the inventory of small-scale systems and providers.

As a second step, the entity responsible for the assessment needs to define its time frame. For the type of financial planning led by (sub) national policy-makers considered here, a life-cycle assessment often starts as a one-off study covering a certain period (e.g. all costs over the last 4–5 years). Most costs will not vary greatly from one year to another. Only those costs that are likely to change more frequently, whose coverage tends to be most problematic, should be tracked over time. At larger time intervals – for example, every five years – a full life-cycle costs assessment may be done.

The third step is to collect and compile actual expenditure on all the cost categories incurred in that area. Table 1 presents the typical sources of information for each cost category, along with further references to more detailed methodological guidance.

As Table 1 shows, this information is typically taken from financial records from (local) government, service providers, households, project implementers and other entities involved in paying for services. The entity leading the assessment thus needs to compile the data from these sources. Interviews with stakeholders (including household surveys) form an important additional source of information where records are missing. More detailed information on the specific methods and tools for data collection can be found in Veenkant and Fonseca (2019).

The fourth step is to make estimates for missing data. The records needed to carry out a life-cycle cost analysis are often lacking or incomplete, particularly for small-scale systems**.** Moreover, records usually only capture the actual expenditure and not the "ideal" expenditure required to cover all related costs needed for provision of safe services. For example, a service provider may have low expenditure on operational costs when it does not carry out chlorination or water quality testing, giving the impression that costs are low. The costs of proper operation, however, would be much higher. To deal with lacking and incomplete data, and with the gap between actual and required expenditure, estimates need to be made of the costs that are ideally required. Two alternative

Table 1. Sources of information on life-cycle costs

Cost category	Source of information	Further methodological guidance for cost collection
Capital expenditure	• Actual expenditure on infrastructure development from procurement and construction records and bills of quantity • Surveys of service providers and household investment in water and sanitation infrastructure	Veenkant and Fonseca (2019)
Expenditure on operation and minor maintenance	• Annual financial records of service providers, listing expenditure on operational items such as staffing, repairs, materials for maintenance, consumables and energy	
Capital maintenance expenditure	• Records of actual expenditure on replacement of infrastructure from service providers, local government and others • Project records for replacement and rehabilitation works	Franceys and Pezon (2010); Fonseca et al. (2013)
Expenditure on direct support	• Records of staff time spent by local government and other support service providers (such as nongovernmental organizations (NGOs) or private support providers), and of expenditure on transport and related costs for support • Interviews with direct support providers	Smits et al. (2011)
Expenditure on indirect support	• Estimates of current and ideal spending by national government and other sector entities	
Cost of capital	• Tracking of interests and dividends paid by national and local government on loans for water and sanitation • Tracking of interest paid by households for loans on water and sanitation	Franceys et al. (2011)

approaches may be followed: modelling and using reference costs.

- Based on a mix of known primary data and estimates, models can be developed that estimate the required costs of provision of services. IRC's costs and budgeting tools (IRC, 2017) could assist with this process.
- In many countries, reference costs have been established for some life-cycle costs, obtained from historical reviews or bills of quantity. These can be used as an approximation of future costs. Hutton and Varughese (2016) provide reference costs for different types of drinking-water and sanitation systems (rural and urban, and different types of technology) for almost all countries around the globe. Note, however, that these reference costs are mostly available for capital expenditure, are context specific and tend to become out of date quickly. Data are much less readily available on reference values for other cost categories.

When following either of the two approaches, it is important to specify the expected or achieved service level for a given cost. It is

likely that it will cost more to provide a safely managed than a basic level of service.

The fifth and final step is to process the data. This refers primarily to converting costs into comparable units, including monetary units, reference years, costs per capita and annualized costs.

- Depending on the purpose of the study, the costs may need to be converted into either the local currency or a comparable international one such as euros or United States dollars. This is particularly relevant in contexts where investment projects are done in currencies other than the local currency.
- When cost data from different years are obtained, they need to be converted to an agreed reference year, to account for inflation effects. Fonseca et al. (2011) provide guidance on this.
- For the kind of financial planning considered here, it is useful to express the costs per capita, dividing all costs by the population living in the service area. (In)direct support costs are usually spent on an entire local government unit and cannot be attributed to a particular service area, unless the entire unit is the service area. These costs may therefore need to be apportioned to the service area.
- Almost all life-cycle costs are usually expressed as costs per year, as they are recurrent. For capital maintenance expenditure this may be complicated, as these occur not regularly but at infrequent intervals. Capital expenditure is usually expressed as a one-off cost, as in many contexts these costs are not to be recovered through tariffs but are covered through one-off (public) expenditure. Where, however, these costs need to be recovered, they may be annualized to account for depreciation over the expected useful lifetime of the infrastructure components. Alternatively, the net present value of the assets can be defined.

For examples of this approach and the specific methods applied and adapted for small-scale systems by several governments, large NGOs, utilities and United Nations agencies, see McIntyre et al. (2014); Jones (2015); Pezon et al. (2015); and Snehalatha et al. (2015).

2.3 Sources of financing of water and sanitation services

Three main sources of finance cover the life-cycle costs for provision of a drinking-water and sanitation service: tariffs, taxes and transfers – often referred to as the "3Ts" (OECD, 2009).

- Tariffs are defined as user fees and contributions. They include recurrent fees that users pay for receiving a drinking-water or sanitation service, such as monthly water bills. They may also include contributions made by users to infrastructure development.
- Taxes refer to funds raised by governments (national or subnational) through the tax base, which are subsequently spent on drinking-water and sanitation service delivery.
- Transfers are payments that come from foreign sources (such as aid funds), official development assistance and private philanthropic contributions.

When these three sources are not enough to cover costs, governments and service providers can borrow money (via loans or equity). Loans help to bridge the finance gap and cover some of the required upfront investment costs. As the Organisation for Economic Co-operation and Development (OECD, 2009) clarifies, however, these forms of finance need to be repaid or require provision of a return on the investment, and that means that ultimately the funds come from one of the 3Ts.

2.4 Assessing the sources of finance

To define, identify and track the various financial flows in a quantitative manner, the sources of finance need to be assessed. National or subnational policy-makers lead such assessments for various objectives:

- to assess the extent to which the different sources of finance can cover each of the life-cycle costs – this is the main requirement and is further elaborated in the next chapter;
- to identify blockages in the financial flows – for example, national government may allocate budget from taxes to small-scale drinking-water and sanitation, but local government may not have the ability to spend allocated funds during the fiscal year (known as absorptive capacity), so finance assessments are needed to identify the blockages and define strategies to remove them;
- to enhance the transparency of funds allocated to and spent in the sector, thereby reducing opportunities for corruption, illicit financial flows and wrong investment data and highlighting inequalities in allocation of (public) funds across regions, specific population groups and subsectors – making this information available can support decision-makers in (re)prioritizing intergovernmental transfers and project funds.

As with the cost assessment, the first step includes defining the geographical area of analysis, frequency and time frame. As the eventual purpose considered here is consolidation of costs and sources of financing, the geographical and temporal units of the finance analysis should be the same as for the cost analysis.

The second step is defining and identifying the various financial flows. This is often needed because there may be a large number of specific financial flows behind each of the 3Ts, some of which feed into each other. Clearly identifying each is therefore a cumbersome but necessary step in the process. This is best illustrated by reviewing the 3Ts in turn.

- Tariffs include consolidation of the total amount of tariffs paid by users to their service providers. If there are many small-scale providers in a particular area, this requires adding up the total paid by all users in the area to all service providers. As this is often impractical, it can also be done for a sample of service providers and extrapolated to the entire assessment unit. The category of tariffs also includes capital investments made by households themselves. This is common in small-scale systems, where households may develop their own wells or rainwater harvesting systems, or construct their own latrines. Tracking tariffs thus also

includes tracking – or estimating – the total amount of capital investment spent directly by households.

- Taxes include all funding flows from (sub) national and local government into the area. These typically include funds from the main ministries responsible for water and sanitation services into a specific area, funds from local government (either transferred from national government or generated internally), funds from other line ministries and special sectoral or project funds for drinking-water and sanitation. Each of these sources may have its own reporting mechanisms and legislation, and there may be some duplication between them.
- Transfers include official development assistance flows for drinking-water and sanitation, which are tracked and reported through the OECD. One of the particular purpose codes used by the OECD for such tracking is for aid to small drinking-water and sanitation, and good national estimates of transfers for small-scale drinking-water and sanitation systems can be obtained there. However, these data apply at the national level and are often not tracked to the level of a specific service area. The amount of funding provided from private philanthropic contributions (such as from NGOs) is not part of the OECD database and may need to be identified separately for the area of concern.

Once the various flows are defined and identified, they need to be quantified. The main sources of information are as follows.

- (Local) government records: in most countries, governments are required to publish their expenditure, which should allow flows of taxes to be tracked, identified and quantified. Usually the amounts are reported through official audits (see Jaćimović and Fonseca (2012) and Koziol and Tolmie (2010) for more information). In practice, there may be difficulties. Sometimes, the reported expenditure does not provide the level of disaggregation needed (for example, where water and sanitation are part of a larger budget, such as health or infrastructure) or makes no differentiation between large-scale and small-scale systems. Also, there may be significant differences between budgets and expenditure. A government budget is a plan of how money is intended to be spent, specifying the maximum amounts that can be spent. Expenditure is the amount that has actually been spent. When preparing the quantification, it may be important to do it for budgets and expenditure separately. This may also help to identify bottlenecks in the execution capacity.
- Records of service providers: these should contain the total amount of revenue generated from users, and details of whether that has been spent on one of the costs or saved. When referring to small-scale providers, it may be difficult to obtain data from all of them, simply because the number of such providers is typically large. An alternative is to obtain records of a sample of providers in an area, and extrapolate to all providers in the area. This presumes that service providers have good administration, which may not always be the case among small-scale providers.
- Household surveys: these are another source of data on tariffs paid to service providers, as well as the amount spent through self-supply on capital investments. They can also serve to

capture data on a household's overall income and expenditure pattern, so that expenditure on WASH can be calculated as a percentage of a household's total income or expenditure, thereby obtaining insight into the affordability of water and sanitation services. Findings of surveys done in the past can be used, or surveys can be designed and implemented for the purposes of the assessment.

- OECD-DAC database: this tracks official development assistance from members of the OECD Development Assistance Committee, multilateral organizations and other donors, including commitments and expenditure on small-scale drinking-water and sanitation (OECD, 2019).
- Records of NGOs and other philanthropic contributions, although, depending on the number of such organizations active in an area, this may become complex. There is also a particular risk of double counting, for example, where a government contracts NGOs to carry out work on drinking-water and sanitation.

Given the complexities of identifying and quantifying the various sources of finance, WHO has developed a comprehensive method for tracking financial flows called Tracking Financing to WASH (TrackFin) (WHO, 2017a). This methodology finds its root in the fact that many countries were not able to report consolidated financial figures to the UN-Water GLAAS surveys. In response, WHO developed TrackFin to support countries in systematically assessing the amounts of money mobilized from the three sources of finance and allocated to the life-cycle cost categories. It aims to answer four key questions:

- What is the total expenditure in the sector?
- How are funds distributed between the various WASH services and expenditure types?
- Who pays for WASH services?
- Which entities are the main channels of WASH funding, and what is their respective share of total spending?

WHO (2017) provides a detailed guideline for TrackFin analysis, indicating for each type of cost and each source of financing where and how information can be obtained and how it needs to be processed. It also provides guidance on how to account for repayable finance in these accounts (see Box 1).

2.5 Balance between life-cycle costs and sources of finance

Once the costs and financial assessments elaborated above are done, the life-cycle costs can be brought together with the various sources of finance into a financial balance. This facilitates analysis of the extent to which there is a gap between the costs of providing services and the sources of finance, enabling identification of strategies for financial planning (see section 2.6).

Fig. 4 is a conceptual diagram of the financial balance. The left-hand chart shows the sum of the life-cycle costs, broken down by cost category. The right-hand chart shows the breakdown of the sources of funding. For full financial balance the charts need to be of equal height; in that case, the total funding is equal to the total costs. In reality, however, this is rarely the case, and the resulting gap needs to be added to the right-hand chart to identify the shortfall in finance sources.

Any financial gap will inevitably lead to a reduction in the level of service provided.

Box 1. TrackFin in Brazil

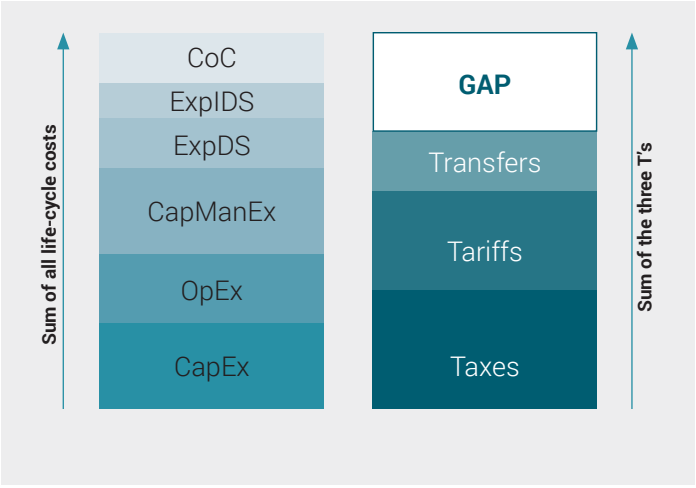
Brazil was one of the countries where the TrackFin methodology was piloted. The exercise aimed to quantify the main sources of financing for drinking-water and sanitation and to provide a breakdown between subsectors (water, sanitation or hygiene; rural or urban), comparing these with targets established in the national plan. It proved impossible to get a full comprehensive picture of funds flowing into the rural subsector; only some of the flows into this subsector could be quantified. Nevertheless, the exercise showed that most public funding was going to the urban subsector, and that the amount going to the rural subsector was well below its needs. At the same time, it revealed the relatively large contribution of household investment in own water supplies and sanitation systems (self-supply). The study thus helped to give insight into small-scale systems and the way they are financed. In addition, it identified the need for better tracking of financial flows into the rural subsector.

Source: UN-Water & WHO (2014).

A gap in capital expenditure means that there is insufficient finance to develop new facilities for those currently unserved, or to develop drinking-water management procedures and/or treatment infrastructure to bring those with basic access up to a level of "safely managed service". A gap in one of the recurrent costs means that less is spent on operation and (capital) maintenance than is needed. This may result in reduced service levels, decreased water quality, and/or deferred maintenance leading to more frequent infrastructure failures, and lower availability of services.

For that reason, the financial balance needs to be assessed in relation to both current and future target levels of service provided. This is ideally expressed using the service ladders, such as those proposed by the WHO/

Fig. 4. Example illustrating the gap between life-cycle costs and sources of finance



Notes: CapEx = capital expenditure; CapManEx = capital maintenance expenditure; CoC = cost of capital; ExpDS = expenditure on direct support; ExpIDS = expenditure on indirect support; OpEx = expenditure on operation and minor maintenance.

UNICEF Joint Monitoring Programme on Water Supply, Sanitation and Hygiene, which indicate both the percentage of population with access to a certain service and service level parameters of accessibility, availability and water quality. This also means that financial balance is best assessed once national or subnational targets are set – as per the requirements of the Protocol on Water and Health – and ideally expressed in terms of levels of service.

2.6 Strategies to reduce the financial gap

This analysis of costs and financial sources also makes it possible to identify strategies to reduce the financial gap. There are three main strategies, each containing several options. This section presents the three main groups conceptually. Examples of specific strategies, and their applicability to small-scale systems, are presented in Chapter 3.

- Reducing costs entails reducing expenditure on service provision to the extent that the sum of costs is equal to the sum of sources of financing available, while still reaching the target level of service. A cost reduction can come from efficiency gains, achieving the same level of service at a lower cost (e.g. through more streamlined procurement processes) or from joining operations with neighbouring communities to share resources.
- Increasing the sources of financing entails increasing one or more of the 3Ts to the extent that the sum of sources of financing becomes equal to the sum of the costs, making the gap disappear.
- Using repayable finance to fill the gap entails borrowing money – for example, for capital investments – so that the current financial gap can be reduced. This means, however, that at a future point in time the costs of interest on loans (cost of capital) will need to be paid back, either from taxes or tariffs. The main assumption is that, over time, improvements made on services will be more beneficial than the costs of paying back the loans and their interest. Moreover, long-term loan repayment spreads the costs of capital infrastructure more equitably among current and future users of the system, and over the useful life of the asset.

3. Applying the framework to small-scale water supply and sanitation systems

Section 2.6 identified three strategies to reduce the financial gap. This chapter reviews the applicability of each to the various life-cycle costs, with a focus on small-scale drinking-water supply and sanitation systems. Expenditure on operation and minor maintenance and capital maintenance expenditure are grouped together in section 3.2 because the way they are financed is mutually interdependent. Expenditure on direct support and expenditure on indirect support are also grouped together in section 3.3 because the way they are financed and associated strategies to reduce the financial gap are similar. Cost of capital is not addressed as a separate cost category as it needs to be paid back out of taxes or tariffs, as described in section 2.6. Section 3.1.3 also presents examples of repayable finance and dealing with cost of capital.

3.1 Capital expenditure

3.1.1 Sources of finance

For capital investments in small-scale drinking-water supply and sanitation systems all three sources can be used. This is not different from other systems except that dependence on taxes will be higher.

- Taxes are the most common way to finance capital investments for small-scale water supply and sanitation systems. The budgets for capital investment are typically allocated by the ministry of finance to the line ministries responsible for water and sanitation, then distributed through the country's administrative areas or to specific projects. Alternatively, responsibility for investments may lie with local authorities, who receive funds from the treasury and can spend part of their budget on (small-scale) drinking-water and sanitation. In that case, local authorities in rural areas – where most small-scale systems are typically located – are reliant on the central government structure for funding, whether through block grants, subsidies for specific public services or, in more developed economies, guarantees for sub-sovereign borrowing. Some municipalities have their own resources, collected through municipal taxes, property taxes and other fees. These can also be used for capital investment required in small-scale systems.
- Transfers for building WASH infrastructure are provided in general from international donors to the ministry of finance of the recipient country, which allocates funds to the line ministries responsible for drinking-water and/or sanitation or to local governments. In

some cases, donors provide funding directly to these line ministries; in others, transfers are provided through decentralized cooperation, whereby local governments or utilities from a richer country provide funding to local governments or utilities in other countries (see Box 2). The category of transfers also encompasses funds in the form of concessional loans from development banks and funds from the European Union, including European structural and investment funds jointly managed by the European Commission and EU countries that address infrastructure needs in the area of the environment and renewable energy.

- Tariffs refers to cases where households make their own capital investments in onsite water and sanitation. Generally speaking, data are lacking on the total volume of such investments in the pan-European region. In countries where TrackFin has been implemented outside the region – such as Brazil (UN-Water & WHO, 2014) – this appears to be a very large source of funding, particularly for onsite sanitation. Given that onsite sanitation is practised by about 164 million Europeans (WHO & UNICEF, 2019), the volume of money invested by households is likely to be large. It is also a relevant source of funding for those households in the region that do not yet have access to at least basic sanitation. It is also likely to be an important source of funding for individual drinking-water supplies.

3.1.2 Financial gap and challenges

Since investments in water and sanitation in rural areas are mainly funded through national taxes (either centrally or via decentralized structures), in theory it should be possible to cross-subsidize poorer local government areas that are unable to raise sufficient revenues from the local tax base from richer areas. However, that route may face challenges in the processes for planning, budgeting and disbursements. In particular, delays between and through different levels of government may lead to delays in disbursement and hence in the necessary investment works.

Another challenge is the prevalence of annual budget allocations, despite the need for longer-term planning and investment with

Box 2. France subnational solidarity mechanisms

In France, subnational authorities can fund decentralized cooperation in the water and sanitation sector using funds from their budgets (owing to a 1992 law on decentralized cooperation) and from water bills (thanks to a 2005 law that allows up to 1% of the water and sector budget to be allocated to decentralized cooperation). This second option means that water and sanitation users in France directly finance access to water and sanitation in less developed countries. Potentially, up to €120 million could be mobilized through decentralized cooperation. In 2009, only €18 million was mobilized, however, partly because many local authorities had not included this element in their contracts with water and sanitation service providers. Similar approaches have been developed in the Netherlands and Switzerland.

Source: UNECE (2012).

flexible multiannual budgets, particularly within smaller local government areas. In addition, this route faces challenges from the national government perspective, as the decentralized structure of drinking-water and sanitation services complicates central governments' ability to allocate funding to the sector effectively. It is easier for national governments to provide funding in bulk to larger investment projects, rather than spread it over many relatively small investments. As a result, it is common that larger utilities receive the bulk of public financing available for drinking-water and sanitation.

3.1.3 Options for reducing the financial gap

Specific mechanisms that can be put in place by (sub)national policy-makers to reduce the financial gap include the following:

- increasing the tax base for allocation to small-scale systems;
- creating challenge funds for small-scale systems;
- accessing long-term loans through aggregation and intermunicipal cooperation;
- using municipal development funds;
- providing incentives for household investment.

3.1.3.1 Increasing the tax base for allocation to small-scale systems

The total amount of taxes to be spent on drinking-water and sanitation can increase through:

- economic growth (if the economy grows – at the same level of taxation – total tax revenue increases, as does the share that can be allocated to drinking-water and sanitation);
- increasing taxation levels, or improving tax collection efficiency (this increases tax revenue, and could proportionally benefit the drinking-water and sanitation sector);
- allocation of taxes away from other sectors to the drinking-water and sanitation sector.

These are all macroeconomic and financial measures, which typically fall outside the responsibility of national policy-makers responsible for drinking-water and sanitation. Nevertheless, representations can be made to decision-makers responsible for macro-finance to request use of part of the extra tax revenue for the water and sanitation sector. An important tool in this is the "fiscal space analysis", which assesses the extent to which each of these measures is possible, and analyses the potential effect on the water and sanitation sector. For more information on methods of fiscal space analysis for the water and sanitation sector (and other social sectors), and their application in eastern and southern Africa, see UNICEF (2018).

Local policy-makers can undertake similar analyses and increase the tax base locally. Taxes on property/real estate and, to a lesser extent, business activities are the major potential sources of local revenue. A combination of factors – ranging from technical issues, such as the lack of computerized databases, to legal issues of property rights – have suppressed opportunities for many municipalities to yield additional local resources. A strategy that could be pursued by local policy-makers is removing the bottlenecks for local tax revenue so that total revenue can be increased.

When increasing the total local tax base may be too difficult, local policy-makers can also focus on ensuring a more careful balance in the use of taxes for investments in smaller and large systems. This is particularly relevant, as it is often easier to invest in larger systems from other sources of finance. For example, utilities in larger systems have more potential to raise part of the investment needs from tariffs, and may be better able to attract repayable finance.

3.1.3.2 Creating challenge funds for small-scale systems

Allocating funds to decentralized service providers requires support structures in central government and a finance allocation mechanism. One such mechanism that national policy-makers could establish is a challenge fund (Sida, 2013) to give relatively small cities and towns the incentive to compete for increased access to public finance. Such funds include open application processes, expert review of submissions and matched funding. They invite applicants to submit their most creative ideas to solve specific problems; they thus differ from traditional grant funding, for which activities are fully defined in advance. Challenge funds also encourage unlikely players to participate in creative problem-solving in the sector (Results for Development Institute, 2017). In spite of positive examples, however, the literature also emphasizes that much remains to be done to understand how such support funds can be designed and executed effectively (Results for Development Institute, 2017; Sida, 2018).

3.1.3.3 Accessing long-term loans through aggregation and intermunicipal cooperation

Larger utilities normally have easier access to repayable finance, for many reasons. Essentially, funding for capital expenditure requires access to long-term borrowing, broadly related to the working lives of the assets to be financed, whereas the debt costs need to be financed annually, either from internally generated funds or from general revenues for tax-borne services. Local governments need debt management capability to draw on the range of financial options and instruments to finance their capital investment needs. These capabilities are typically not prevalent among many local administrations, let alone rural service providers. Finance providers would need to assess the risks of each borrower, making it cumbersome and expensive for small providers or small local governments.

National policy-makers may therefore develop supporting strategies to overcome these limitations. One approach has been for groups of municipalities to obtain pooled financing as members of specialized subnational entities. This requires a financial intermediary whose size and managerial capacity allows it to access financial markets on better terms than its individual members (see Box 3).

For more details and policy recommendations, the EU Water Initiative & OECD report (2012) provides an overview of the experience of 11 European countries with intermunicipal cooperations for water supply and sanitation services: Austria, Bulgaria, France, Germany, Hungary, Italy, the Netherlands, North Macedonia, Poland, Romania and Spain. It also explains the rationale and describes the incentives used to foster cooperation

Box 3. Romania and its associations for small municipalities

Intermunicipality cooperation in the water sector of Romanian rural areas mainly exists in the form of associations, through which small municipalities can implement their investment projects jointly, reducing project costs and improving the quality of services.

Arieş Valley Water Association was formed by 11 municipalities solely to establish joint management of water treatment and distribution and sewage services. Its financing comes from membership fees paid by member municipalities; co-funding for specific projects developed and implemented by the Association from the development fund of the county council; and in-kind contributions from member municipalities.

Direct benefits for municipalities are the opportunity to promote their own projects that would otherwise not have been possible due to a lack of financial and human resources; low costs for project management and fundraising services; provision of new (rural areas)/improved (urban areas) services for citizens (water supply and sewage); and increased experience in cooperation.

Source: EU Water Initiative & OECD (2012).

arrangements and implementation in the pan-European region.

3.1.3.4 Using municipal development funds

Municipal development funds (MDFs) are set up by national governments to lend to local governments for infrastructure development. These types of fund are considered an entry point to create systems at a municipal level that can eventually borrow from local or international capital markets. By providing loans to projects identified by local governments, MDFs use similar criteria to multilateral or regional development banks, but are able to fund smaller projects and at a more local level.

There are two types of MDF model: they either work as substitutes for government grants to local authorities or act as a bridge to private credit markets (Kalcheva, 2013). Under the first model, which is funded by donors and the national government, these provide lending to the local authority at concessionary rates, often in conjunction with subsidized loans and grants (again, from donors and/or central government). This helps to stimulate a market for domestic finance and introduces local authorities to municipal lending. Because the market is relatively weak, the MDF can seek to incorporate investment priorities from the central or state government level, and work with the local authority to ensure strong project preparation.

Under the second model of bridging to private credit markets, the MDF works to strengthen both the municipal and financial sectors to support transactions between the private sector and municipalities. Because of this structure, the MDF tends to lend at market interest rates, and works with commercial banks and other private sector lenders in its funding decisions. Further, the MDF requires that private lenders assume the credit risk of the municipal loans, to help the municipality develop a credit history (see Box 4).

Box 4. MDFs in Czechia

In Czechia, the MDF borrows funds from international markets with a sovereign guarantee and lends these to domestic commercial banks, who then lend to municipalities. For a transaction to happen, a municipality must conduct all the project identification and preparation, while the commercial banks conduct the credit analysis and accept repayment risk. The MDF, meanwhile, confirms the creditworthiness of the commercial banks it lends to, and makes capital available to a range of banks to foster competition.

Source: Kalcheva (2013).

Another similar mechanism is the creation of dedicated water sector funds managed at a national or district level. These funds are often created for a social purpose, as part of a broader sector reform. They can be structured either as sinking or revolving funds,[3] depending on their objectives, and can often be disbursed more rapidly and flexibly than funds made available through the budgeting process (see Box 5). Such water-sector "piggy banks" can also pay for elements of infrastructure that communities cannot afford. But national funds face challenges similar to those faced by the proliferation of other funds: a lack of "good" projects and channels for disbursing the money.

Box 5. Fund for local authorities and governments (FLAG) in Bulgaria

FLAG was established in March 2007 by the Council of Ministers of Bulgaria with funding provided through the national budget. Its aim is to provide financial assistance to municipalities for the absorption of as much funding as possible from the EU's Structural Funds and Cohesion Fund.

FLAG is an independent legal entity with the status of a commercial company (joint stock company). It is structured as a revolving mechanism for financing development and implementation of economically and financially viable projects in the area of municipal infrastructure – including water and sanitation – and for supporting the administrative capacity of municipalities with a view to absorbing EU funds. FLAG is designed as a financial mechanism to overcome the problem of ensuring cash funds to municipalities when they develop project proposals or finance-approved projects in the framework of the Operational Programmes co-financed by the EU.

FLAG established a partnership with a managing bank, whose roles are to assist in assessing applicants' creditworthiness and to administer the loan repayment. The risk associated with the projects is minimized by the managing bank's evaluation, and FLAG has also adopted additional criteria that aim to reduce risks for the fund itself, to ensure prudent management of its portfolio.

Source: FLAG (2016).

3 A sinking fund disburses a share of its capital each year over a defined period of time until it sinks to zero. A revolving fund is replenished or augmented on a regular basis, usually through fees, taxes or levies.

For additional case studies and specifics on how to reduce risk to attract private finance, see the European Commission (2015) study.

3.1.3.5 Providing incentives for household investment

A final option for increasing finance is mobilizing households' own investments in drinking-water supply and sanitation. This may be particularly relevant in the most dispersed rural areas, where the technical feasibility and costs of connection to public infrastructure would be very problematic. In such cases, households often already make their own investments by developing their own wells or onsite sanitation, but such infrastructure may not always comply with the necessary standards. Financial incentives may be considered so that people invest in adequate infrastructure. For example, in Scotland (United Kingdom), owners of private wells can obtain grants from local councils (see Box 6).

One option is for national or local governments to partner with local financial institutions to develop products that allow households to access small loans for small-scale systems or sanitation solutions. For European good practices in rural microfinance see, for example, European Microfinance Network & ADA (2014) and Trémolet (2012).

It must be noted that this approach is contentious. Several countries, including France and Portugal, encourage households who are not yet connected to public networks to do so, and not to develop their own solutions. Other countries, like Scotland (United Kingdom) and Ireland, promote the private investment approach and support owners of wells in further developing and improving them. Generally speaking, promoting household investment is most relevant in dispersed and remote settlements, where the costs of household supplies are lower than the costs of public supplies.

Box 6. Grants for private water supply improvements in Scotland

In Scotland (United Kingdom), owners of private supplies can obtain a grant of up to £800 per property from their local councils. These grants originated from the recognition that while a small but important proportion of the Scottish population (164 000 people, or 3.4% of the population) are served by over 20 436 registered private water supplies, not all these supplies meet quality standards. The grants can be used for improving domestic, or commercial, private water supplies; setting up a new private water supply; or setting up a domestic distribution system. In addition, the Government of Scotland provides information about rights and responsibilities of private supply owners and technical advice concerning these.

Sources: Government of Scotland, 2018; Smithers, 2018.

3.2 Expenditure on operation and minor maintenance and capital maintenance expenditure

3.2.1 Sources of finance

In most countries, sector frameworks indicate that expenditure on operation and minor maintenance needs to be covered fully from tariffs paid by consumers. It is a fair principle, whereby individuals and institutions pay a proportion of the costs of the service depending on how much water they consume (and how much wastewater they produce). The same applies for capital maintenance expenditure. Service providers – through the tariffs they collect – should gather enough funds for asset management and large replacements.

A second (potential) source of finance for capital maintenance is taxes. In some cases, (local) governments recognize that tariffs are insufficient to cover larger infrequent capital maintenance needs, and support providers with such repairs and replacements.

Transfers are not usually expected to be used to cover for regular operation and minor maintenance or for capital maintenance. In reality, however, they are used for rehabilitation work and de facto thus cover some capital maintenance costs.

3.2.2 Financial gap and challenges

The main financial gap is one whereby tariffs are insufficient to cover these costs, particularly capital maintenance expenditure. In the latest GLAAS survey (WHO, 2019) only five of the 11 responding countries indicated that tariffs in rural areas are sufficient to cover expenditure on operation and minor maintenance costs. The principle that all expenditure on operation and minor maintenance and capital maintenance expenditure are paid from tariffs is common in larger, utility-managed systems, and can in effect be practised in such systems. In small-scale systems, however, this principle is much more difficult to put into practice for a number of intrinsic reasons.

- Smaller service providers do not benefit from economies of scale and face high fixed costs on administrative and technical overheads. For example, they cannot buy chemicals for drinking-water treatment in bulk; they may also have the same expenses for purchasing equipment and software or for hiring capacity as larger utilities, but they divide these costs among fewer users. This means that expenditure on operation and minor maintenance and capital maintenance expenditure are relatively high compared to costs for larger utilities.
- At the same time, small-scale systems often serve users who tend to be poorer, as poverty levels in rural areas tend to be higher. As a result, capacity to pay tends to be lower. Further, small service areas contain far fewer opportunities to cross-subsidize between different wealth groups. This means that affordability of the real costs of water supply and sanitation is lower, limiting the possibility of having tariff levels high enough to cover all costs.
- Smaller systems need relatively large savings to accommodate the difference between continuous cash flow from revenue and irregular expenditure on capital maintenance. Users pay tariffs, which allow the service provider to make the savings needed to pay for repairs at

a future time. In small-scale systems, however, capital maintenance expenditure occurs infrequently – only when larger infrastructure components break down or need to be replaced – meaning that relatively large savings are needed. In contrast, larger systems always have major components that need replacement or repair, simply because they contain more water supply system components of different ages. As a result, cashflow on capital maintenance happens on a more regular basis and runs on a par with the cashflow of tariff revenue. The latter is a more efficient use of capital than keeping savings, as small-scale systems must.

As a result, revenue from tariffs is often insufficient to cover all costs in small-scale systems, and capital replacements are particularly challenging. This eventually translates into delayed maintenance or emergency repairs when major components break, which in turn may result in a gradual reduction in the level of service provided. Moreover, lenders are reluctant to provide loans to service providers who do not recover their costs, as they need to ensure sufficient and constant operating surplus to service the debt over the maturity period. As a result, service providers have less access to finance to expand or renew services, and a vicious cycle starts.

As indicated above, in some instances taxes are used to make up for the shortfall for capital maintenance expenditure. This in itself has some benefits, of which the main one is that tariffs in small-scale systems can be kept at a level affordable to users. Cross-subsidy does not happen between richer and poorer users within a service area but via general taxation. However, this also poses a number of challenges.

- It can be a disincentive for efficiency improvements and dependency. Where service providers know that taxes are available to make up for any financial shortfall, they may not be incentivized to make efficiency improvements. As a result, taxes subsidize inefficient larger utilities rather than smaller rural ones.
- It can cause an ad hoc approach to repairs, with service level interruptions. (Local) government taxes are often called for by service providers on an "emergency" repair basis – for example, when main lines are washed away or major pumps break. Local governments may have the funds available for such repairs, but the procedures for accessing them take time, and in the meantime, users face service interruptions.

3.2.3 Options for reducing the financial gap

The most common options for reducing the gap in the medium and long term include a combination of increasing revenue from tariffs and reducing costs by increasing efficiency:

- clarifying tariff policies, legislation and regulation;
- increasing revenue from tariffs, within affordability parameters;
- providing financial incentives linked to performance indicators;
- decrease costs of capital maintenance by increasing preventive maintenance.

3.2.3.1 Clarifying tariff policies, legislation and regulation

Revenues from tariffs are the most certain source of financing for drinking-water and sanitation providers. Policies and legislation on who is responsible for large maintenance

and rehabilitation, and how this is to be funded in different types of system, are absolutely critical to cover the financial gap.

Generally speaking, such clarity exists. The GLAAS survey (WHO, 2019) indicated that 10 of the 14 participating countries in the pan-European region have a clear regulatory authority for tariff-setting for rural water supply and sanitation. The exact roles and responsibilities for tariff-setting differ, however, as summarized by EurEau (2018) for 29 countries across Europe. In some places, regulators provide detailed frameworks for how to calculate and establish tariffs; in others, this is defined in contractual arrangements between the provider and local authorities, whereby the content of these arrangements is guided by a regulator. In some countries, responsibility for tariff-setting differs between large and small-scale systems. In Demark, local governments set tariffs for small-scale systems, whereas for large-scale systems the regulator provides more guidance. In Estonia, responsibility for tariff-setting in small-scale settings rests exclusively with local governments (EurEau, 2018).

Whether through an independent regulator or through contracts, it is essential that a framework of sound tariff-setting rules and mechanisms is established at the national or subnational level to promote more efficient provision of water services. Such a framework needs to take into account the economic realities of small-scale systems, as well as affordability and social criteria. It is important to ensure that tariffs in effect are set in such a way that costs are recovered without passing on inefficiencies to users. This approach has led to several benefits – notably depoliticizing tariff-setting and providing independent oversight (Mumssen et al., 2018). In spite of good examples of expanding such regulatory oversight to rural areas and small-scale systems (as in Portugal – see Box 7), much more scope remains to increase such oversight among rural providers across Europe.

3.2.3.2 Increasing revenue from tariffs, within affordability parameters

Once clarity on tariff-setting and regulation is achieved, revenue from tariffs can be increased. This can be done in several ways:

Box 7. Regulating wastewater connection in smaller municipalities

In Portugal, uptake of connections to wastewater infrastructure has been slower than expected. A study by Entidade Reguladora dos Serviços de Águas e Resíduos (ERSAR), the water regulator, suggests that this may be due to the high cost of connection. While on average it only represents 26% of monthly income, for low-income households in some smaller municipalities the cost of connection can reach three times their monthly income.

To address this issue, ERSAR has recommended that service providers eliminate the connection charge and compensate for this loss of revenue by increasing the fixed part of the tariff gradually over a five-year period. In this way, all users contribute to paying the cost of connecting unserved population groups.

Source: UNECE (2012).

by improving billing and collection efficiency, by raising the overall tariff to be more cost reflective and by changing the structure so that larger consumers or businesses have higher tariffs. Tariff change is often a sensitive issue, however, and needs to be done in a careful manner. More details on the three ways of increasing tariff revenue are available in the World Bank's Water Utility Turnaround Framework (Soppe et al., 2018). This requires a joint strategy between service providers, which are responsible for increasing their own revenue, and national (and subnational) policy-makers who provide the frameworks, incentives and control mechanisms for service providers to do so.

Careful consideration needs to be given to affordability to users. Affordability of water and sanitation means that

> people must be able to afford to pay for their water and sanitation services and associated hygiene.

The price paid must

> not limit people's capacity to buy other basic goods and services […] guaranteed by other human rights

or

> prevent individuals from acquiring other services and goods protected by human rights such as food, housing, health, clothing and education

(EurEau, 2016). No global benchmark of affordability is yet available under the SDG framework, but the most commonly used references define affordability by the percentage of a household's expenditure on water, in relation to its total expenditure (WHO & UNICEF, 2017b).

From the perspective of users, other factors may affect affordability. Users may be willing to pay more or less depending on the performance of the service provider and their satisfaction with the service. Availability of alternative sources of supply (even if these are unimproved) may also affect their willingness to pay for the service. When considering strategies to increase revenue from tariffs, research into affordability as well as willingness to pay will provide important insights.

Specific measures may be put in place to address affordability for the poorest users, particularly through tariff structures. A commonly cited affordability measure is the increasing block tariff, through which households that consume more pay a relatively higher tariff. According to the EurEau (2018) report on water tariffs in Europe, the most common tariff structure is one that consists of a fixed component and a volumetric part, whereby the latter may have a block tariff structure. Concern about this measure is increasing, however, as it only applies to those with access to services already, and may in fact discourage people from using enough water. Another common measure is cross-subsidy between wealth groups, whereby households that are classified as on higher income pay a relatively high tariff than those on lower income. This, however, requires a very good system of administration of households by their wealth status. Some countries have made an explicit decision not to carry out income/wealth policies through public services. In such cases, all users pay according to the same tariff structure and the government supports poorer households through instruments outside the water sector, such as poverty grants (see Box 8).

Box 8. Wallonia water social fund for households

Wallonia (Belgium) has created water social funds to help households pay their water debts. They were first launched by the major water service providers in the late 1990s and generalized in 2004 by law for all water service providers. Currently, the social water funds manage about €2 million per year. Of the total, at least 85% is used to subsidize the water bills of 11 000 families.

The resources are allocated to municipalities based on criteria such as the number of users in the municipality and the number of consumers experiencing difficulty in paying their water bills. This approach requires strong municipal social services, as they are charged with assessing the financial situation of households that are late with their water payments — at least 9% is allocated to pay for the running costs of the municipal social services. By contrast, the costs of running the funds themselves are small, at a maximum of 1%. The remainder of the funds are allocated to pay for technical improvements to houses (such as repairing leaks or installing water-saving devices). The income of the water social funds is generated by a surcharge of €0.0125 on each cubic meter sold. Thus, the cost to consumers is transparent.

Source: UNECE (2012).

3.2.3.3 Providing financial incentives linked to performance indicators

An increase in revenue from tariffs often requires a process of improving the performance and efficiency of service providers in parallel, whereby financial incentives are linked to performance indicators. To ensure that rural and urban drinking-water and sanitation service providers serve the whole community and not just the most convenient and/or wealthy parts of their service areas, a clear long-term mandate needs to be in place (included in concession contracts where applicable). Performance indicators need to be clearly specified and monitored, with incentives and penalties that encourage service delivery and expansion of access to those who are harder to reach.

For service providers with low levels of efficiency, extensive guidance and examples of how to improve this are available.

- The World Bank recently produced the Water Utility Turnaround Framework 2018 (Soppe et al., 2018), which provides practical guidance on how to improve efficiency, with initiatives for non-revenue water reduction, energy efficiency, business and asset planning and financial planning. Some improvements can be achieved quickly, but achieving and maintaining overall efficiency can take time and efforts for improvement need to be sustained.
- The International Benchmarking Network for Water and Sanitation Utilities (IBNET, 2017) is the world's largest database for drinking-water and sanitation utility performance data. It supports and promotes good benchmarking practices among water and sanitation services by providing guidance on indicators and definitions; facilitating the establishment of national or regional benchmarking schemes; and undertaking peer group performance comparisons. It includes

performance data and benchmarks from more than 200 countries. These performance standards can immediately help service providers compare themselves across a global spectrum of peers.

- The International Water Association co-developed AquaRating (IWA, 2019), a system based on an international standard for evaluation and improvement of drinking-water and sanitation utilities. It measures technical performance as well as financial, environmental and operational performance and corporate governance. While not specifically designed to do so, it can be used to develop shadow credit ratings in lieu of official ones to assess utility creditworthiness. More than 60 drinking-water and sanitation companies across the world now use AquaRating to improve their performance and efficiency in water resource management, ahead of applying for loans.

These global frameworks, benchmarking and rating systems have mostly been developed for large and medium-sized utilities, but many of their underlying principles and indicators can also be used to improve small-scale systems. In addition, the principle of benchmarking and rating performance is used by some regulators in the region to assess how all service providers – including small-scale rural ones – are performing. This in turn can be used to support specific providers in performance improvement. For example, ERSAR, the regulator in Portugal, publishes an annual performance overview of all providers – including the small-scale ones – in the country, rating them on a range of performance indicators.

Water safety plans are an internationally acknowledged approach for providing safe drinking-water services, including for small-scale systems (WHO, 2017b), and the methodology has been applied to the sanitation sector as well, with sanitation safety plans (WHO, 2015). These principles can even be applied to individual supplies, and may be used as a basis for providing financial support. For example, in Scotland (United Kingdom), owners of private supplies are required to have their supplies assessed for risk using the water safety planning method. The results form the basis for an improvement plan. Owners can access small grants from local councils to make such improvements, as explained in section 3.1.3.5.

As with the previous resources, responsibility for these performance improvement processes lies in the first instance with the service providers themselves. National and subnational policy-makers can, however, put in motion the incentives and frameworks through which service providers can embark on such processes.

3.2.3.4 Decreasing costs of capital maintenance by increasing preventive maintenance

Capital maintenance costs are often high because they are incurred after a major piece of infrastructure breaks down. By carrying out adequate preventive maintenance, the frequency of capital maintenance can be reduced and less spent on costly replacements and repairs. Thus, increases in expenditure on expenditure on operation and minor maintenance are made in the short term so that expenditure on capital maintenance expenditure in the longer term is lower. This strategy is one that can only be put in place by utilities themselves. Policy-

makers – and particularly regulators – can, however, demand and ensure that such preventive maintenance is done. For example, having a maintenance and asset management plan can be placed in the regulations or the operating permit; providers would thereby need to report on the existence of and compliance with such a plan. For example, in France, an asset management plan is one of the key indicators on which service providers are assessed.

Reducing the costs for capital maintenance by increasing preventive maintenance can be done where small-scale service providers already have a reasonable level of performance, and where there is more regularity in the maintenance of water and sanitation schemes. To make this happen, it is essential to look into approaches for increasing economies of scale. For example, small providers could join forces with neighbouring municipalities and communities or with bigger utilities. In such arrangements, capacities and efficiency increase as a result of extended human, technical and financial resources. Costs can be shared, with increased flexibility in applying funds if several municipalities contribute and agree jointly on priorities for their use. See more details in section 3.1.3.3.

Various guidelines for preventive maintenance programmes are available, specifically geared towards small-scale systems. Good examples have been developed by the EU-funded PREPARED project (Rosa et al., 2014) and Washington State Department of Health (2017).

3.3 Expenditure on direct support and expenditure on indirect support

3.3.1 Sources of finance

Expenditure on direct support and expenditure on indirect support are usually paid for through taxes. Most of the costs related to direct and indirect support are the salaries of (local) government staff tasked with providing technical support, monitoring, surveillance and supervision tasks (direct support), as well as with policy formulation, macro-level planning and legislation tasks (indirect costs). These kinds of salary costs are usually assumed by (local) governments through their own budgets, and hence fall under the category of taxes.

In practice, some funds from transfers also cover these costs – for example, where NGOs provide technical assistance or carry out a monitoring programme, or where a donor-funded programme undertakes a specific support programme, like a hygiene promotion or water quality testing campaign. But such funds – by definition – are temporary in nature, and often relatively small.

It is rare that direct support costs are covered through tariffs – i.e. whereby the service provider assumes these costs based on the tariffs received. One exception are the costs of drinking-water quality surveillance. In a survey on small-scale water supplies in European countries, Rickert et al. (2016b) found that in 48% of cases, the service authority paid such costs (presumably out of taxes); in 33% the service provider paid (via tariffs); and in 18% the authority and the provider shared payments. Another possibility is taxes levied

on a utility by local government (for example, for the use of streets and other properties), which the utility covers from tariffs.

3.3.2 Financial gap and challenges

If there is a finance gap in this cost category, it implies that (local) governments spend too few financial and human resources to fulfil their roles of direct and indirect support adequately. As a result, certain tasks are not carried out at all, or are performed too infrequently. For example, water quality testing and surveillance may be done infrequently; technical support to small-scale service providers may be provided not in a proactive manner but only when problems arise; and small-scale systems may not be visited by local government staff regularly enough.

Such underfunding is visible not only in the form of too low a dedication of staff time; many staff supporting small-scale systems also work with public entities that are constrained by civil service pay scales and may not have capacity for performance-based incentives. Further, it may be difficult to attract staff to work in remote rural areas. This can have a significant impact on the ability of the service provider to reward and retain good staff and to deliver the level of service required.

Another common financial gap is related to funds for transport and other expenses. Local governments may pay the salaries of the technical staff but then not have sufficient resources for these staff to visit and monitor small-scale systems, or for other necessary expenses, such as water quality testing kits. This means that staff are largely office-bound and inefficient use is made of their skills.

The extent to which this gap is present will differ from one country to another. Smits et al. (2011) found in a review of 11 countries across the globe (although not in Europe) that some were providing adequate financial and human resources, but the majority were not. They found that a level of spending of at least US$ 1–2 per person served per year was needed to provide a reasonable level of support. It is likely that a similar amount would be needed in countries in the pan-European region, and probably even more, since salaries – which form the main cost components – tend to be higher in the region.

Very few studies have been done in the region on this topic, as demonstrated in a systematic review by Miller et al. (2019), let alone on the extent to which direct support functions are adequately resourced. In addition, the few data sources available provide a mixed picture. Based on survey data, Rickert et al. (2016b) found that most EU countries were able to provide information about the frequency of analyses, the parameters analysed and the level of compliance for public small-scale water supplies, as this is a requirement of the European Commission. On the other hand, the GLAAS survey (WHO, 2019) indicates, for example, that only three out of the 14 participating countries had sufficient human resources to carry out surveillance of rural sanitation services.

3.3.3 Options for reducing the financial gap

For this cost category, few options are available. The main ones concern increasing one of the sources of funding (taxes) and reducing costs by greater efficiency through economies of scale. A third option refers to gearing the type of support more towards increasing efficiency.

- advocating increased public expenditure, based on evidence;
- increasing efficiency by collaboration and cooperation;
- increasing capacity at the local level.

3.3.3.1 Advocating increased public expenditure, based on evidence

Realistically, the only source of funding that can be increased for this cost category is taxes, as it essentially concerns public expenditure. Given the problems indicated with tariffs in section 3.2.2, it is not likely that tariffs can become a significant source of finance for direct support.

Obtaining increased levels of public funding for direct support is likely to require evidence-based advocacy, mostly from technical policy-makers to those politically elected, potentially supported by consumer groups or other civil society organizations. Such evidence should focus on the extent to which the providers of direct support are able to fulfil all their tasks with existing budgets, and what budgets are needed to do this adequately. In addition, proposals should clarify how the provision of direct support plays a role in preventive maintenance and ensuring adequate service delivery, and how much larger future costs of replacement can thereby be avoided. Examples from other countries and regions could also be used to get reference values for a reasonable level of public expenditure on expenditure on direct support.

3.3.3.2 Increasing efficiency by collaboration and cooperation

A second strategy is to look for efficiencies in current expenditure on direct support. In many countries, each local government is expected to fulfil a wide range of support tasks. Some of these could be executed better at a higher level of administration (like a province), or resources could be shared through intermunicipal cooperation. There will be a limit to the extent to which economies of scale can be obtained in relation to small-scale drinking-water and sanitation systems, but some gains could be made as described in the options for intermunicipal cooperation in section 3.1.3.3.

3.3.3.3 Increasing capacity at the local level

Staff of small-scale service providers typically face two types of limitation: too few qualified staff are available and their skills are often limited to the technical domain. Sometimes, staff even have limited knowledge of water and sanitation systems. Rickert et al. (2016b) found that 48% of the survey respondents indicated that there was no minimum qualification for staff working in small-scale public water supplies. Moreover, financial planning and business skillsets of staff are rarely predominant, as those functions are traditionally managed more centrally or simply not needed. However, much direct support is geared towards addressing technical issues as well as basic administration; less is geared towards supporting small-scale service providers to run as a (public) enterprise.

At the same time – as explained in the previous sections – there is ample need for such support. To connect new customers and service areas, service providers need to demonstrate that the service they offer is superior to their current one and worth the extra cost. This requires strategic planning and means that the provider must behave like a public enterprise – demanding a skillset that public service providers have not traditionally focused on. Also, strong financial management and client connection plans

are critical foundations for a service provider to operate with self-sufficiency. Business planning, asset management planning and determining optimal cash flows all feed into these plans and serve as the components for a strong project preparation plan to provide to a commercial investor.

Focusing on these aspects of direct support may not reduce the financial gap for that support itself, but it will make a critical contribution to a more efficient rural drinking-water and sanitation sector.

3.4 Towards an overall finance strategy

The previous sections set out current practices in financing the most critical life-cycle costs for small-scale drinking-water and sanitation systems and considered further options to reduce the financial gap. These are summarized in Table 2.

Many of these options are complementary. For efficient (and equitable) financial planning, the right mix of sources of finance – particularly tariffs and taxes – is important. For example, for a small-scale service provider to be able to attract repayable finance, it first

Table 2. Overview of current sources of finance and options to reduce financial gaps

Cost category	Current sources of finance	Options to reduce financial gaps
Capital expenditure	• Taxes • Transfers in some countries • Tariffs in the form of investments made directly by households	• Increasing the tax base for allocation to small-scale systems • Creating challenge funds for small-scale systems • Access long-term loans through aggregation and intermunicipal cooperation • Using MDFs • Providing incentives for household investments
Expenditure on operation and minor maintenance and capital maintenance expenditure	• Tariffs to cover expenditure on operation and minor maintenance and (part of) capital maintenance expenditure, ideally • Where insufficient, taxes to fill the gap	• Clarifying tariff policies, legislation and regulation • Increasing revenue from tariffs, within affordability parameters • Providing financial incentives linked to performance indicators • Decreasing costs of capital maintenance by increasing preventive maintenance
Expenditure on direct support and expenditure on indirect support	• Mainly taxes	• Advocating increased public expenditure, based on evidence • Increasing efficiency by collaboration and cooperation • Increasing capacity at the local level

needs to focus on improving operational efficiency, for which it may need more direct support. It may also need to form part of a larger intermunicipal cooperation or other entity at a higher level, and will require public finance to do so.

Therefore, national policy-makers should develop an overarching finance strategy that can be translated practically into the realities of small-scale systems, so that the relationships between the specific options can be clarified and sequenced. Such a strategy should cover:

- assessment of the current costs and sources of financing of drinking-water and sanitation services;
- analysis of the gap;
- identification of specific options to reduce the financial gap;
- sequencing and clarifying relationships between the specific options, and identifying the upfront investments required to reach them;
- responsibilities and commitments for implementation.

Ideally, this should be undertaken not solely for small-scale systems but for the drinking-water and sanitation sector as a whole. Nevertheless, small-scale drinking-water and sanitation systems should be an explicit part of a broader sector strategy, because the way larger-scale systems are financed also affects small-scale systems.

In many places, it is common that taxes are channelled to large utilities so that these can cover some of their expenditure on operation and minor maintenance and capital maintenance expenditure needs and keep tariffs low. As a result, utilities are not incentivized to perform more efficiently. Taxes are thus used to "subsidize" the recurrent costs of water provision for the urban – often better-off – segments of the population, at the expense of extending services to people who do not have access at all. It would often be more equitable, and financially more efficient, for larger utilities to expand services through repayable finance, and use taxes and transfers for investments in small-scale drinking-water and sanitation services. Thus, increasing access to finance for small-scale systems cannot be done without looking into the way larger urban utilities are financed.

These larger utilities also provide opportunities. By collaborating with them, small-scale service providers may achieve further economies of scale – for example, by sharing technical resources or laboratory space and, most importantly, by acquiring skills to manage small utilities efficiently.

4. Conclusions

Provision of small-scale drinking-water supply and sanitation services in the pan-European region faces a range of financial challenges. These include a financial gap between what is required and what is available to reach universal access and to move towards safely managed services; and often insufficiency in ability to cover all recurrent costs of provision of services.

The root causes of these challenges lie in the low economies of scale inherent to small-scale drinking-water supplies and sanitation, the high degree of fragmentation and dispersion of this sector, and the lower financial priority given to these types of system compared to larger utilities. This lower priority is also one of the main reasons the institutional, regulatory and financial framework that governs these systems tends to be less well developed.

To address these challenges, this publication presents a framework to guide national and subnational policy-makers in defining strategies for financing of small-scale drinking-water supply and sanitation systems. The framework in essence aims to achieve financial balance for a particular geographical area, identifying any possible gap between the six life-cycle costs and the three sources of financing. Three groups of strategies can be defined to reduce the identified gaps: reducing costs by lowering spending and improving efficiency; increasing one or more of the sources of finance; and using repayable finance.

To arrive at a balance, national and subnational policy-makers should lead regular assessments to quantify the six life-cycle costs and three sources of finance, using a suitable approach such as the TrackFin methodology developed by WHO. For each of the costs, current financing practice can be described and quantified; in this way, the gap can be established. Once gaps are quantified, specific options can be defined under each of the three groups of strategies.

The authors of this guidance note recommend developing comprehensive finance strategies that allow identification of the various strategies in an integrated manner. Such strategies would further facilitate identification of potential trade-offs and synergies between the larger utility subsector and the small-scale drinking-water and sanitation subsector. In this way, a more holistic response can be formulated for the range of financial challenges facing small-scale drinking-water and sanitation service provision in Europe.

References

EurEau (2016). Making the human right to water and sanitation a reality in Europe: the role of affordability mechanisms. Brussels: The European Federation of National Associations of Water Services (http://www.eureau.org/resources/position-papers/99-making-the-right-to-water-and-sanitation-reality-europe-september2016/file, accessed 11 November 2019).

EurEau (2018). The governance of water services in Europe. Brussels: The European Federation of National Associations of Water Services (http://www.eureau.org/resources/news/1-the-governance-of-water-services-in-europe, accessed 11 November 2019).

European Commission (2015). Blending in the water and sanitation sector. Brussels: European Commission (Tools and Methods Series, Reference Document No 21; https://europa.eu/capacity4dev/t-and-m-series/document/blending-water-and-sanitation-sector, accessed 11 November 2019).

European Microfinance Network, ADA (2014). European good practices in rural microfinance. Brussels: European Microfinance Network (https://www.european-microfinance.org/publication/european-good-practices-rural-microfinance, accessed 11 November 2019).

EU Water Initiative, OECD (2012). Enhancing inter-municipal cooperation for water supply and sanitation. Paris: OECD Publishing (https://www.oecd.org/env/outreach/UKR%20IMC_intern%20exp.pdf, accessed 11 November 2019).

FLAG (2016). Fund for local authorities and governments (FLAG) [website]. Sofia: Fund for local authorities and governments (FLAG) (http://www.flag-bg.com/?l=2, accessed 11 November 2019).

Fonseca C, Franceys R, Batchelor C, McIntyre P, Klutse A, Komives K et al. (2011). Life-cycle costs approach: costing sustainable services. The Hague: IRC (WASHCost briefing note 1A; https://www.ircwash.org/resources/briefing-note-1a-life-cycle-costs-approach-costing-sustainable-service, accessed 5 November 2019).

Fonseca C, Smits S, Nyarko K, Naafs A, Franceys R (2013). Financing capital maintenance of rural water supply systems: current practices and future options. The Hague: IRC (WASHCost working paper 9; https://www.ircwash.org/resources/financing-capital-maintenance-rural-water-supply-systems-current-practices-and-future, accessed 8 November 2019).

Franceys R, Pezon C (2010). Services are forever: the importance of capital maintenance (CapManEx) in ensuring sustainable WASH services. The Hague: IRC (WASHCost briefing note 1b; https://www.ircwash.org/resources/services-are-forever-importance-capital-maintenance-capmanex-ensuring-sustainable-wash, accessed 8 November 2019).

Franceys R, Naafs A, Pezon C, Fonseca C (2011). The cost of capital: costs of financing capital expenditure for water and sanitation. The Hague: IRC (WASHCost briefing note 1c; https://www.ircwash.org/resources/cost-capital-costs-financing-capital-expenditure-water-and-sanitation, accessed 8 November 2019).

Government of Scotland (2018). Private water supplies: information on how to look after your domestic or commercial private water supply [online information portal]. Edinburgh: Government of Scotland (https://www.mygov.scot/housing-local-services/water-supplies-sewerage/private-water-supplies/, accessed 11 November 2019).

Hutton G, Varughese M (2016). The costs of meeting the 2030 Sustainable Development Goal targets on drinking water, sanitation, and hygiene. Washington DC: World Bank (https://www.worldbank.org/en/topic/water/publication/the-costs-of-meeting-the-2030-sustainable-development-goal-targets-on-drinking-water-sanitation-and-hygiene, accessed 8 November 2019).

IBNET (2017). About benchmarking. In: IBNET: The International Benchmarking Network [website]. Washington DC: World Bank (https://www.ib-net.org/toolkit/ibnet-tools/about-benchmarking/, accessed 11 November 2019).

IRC (2017). Costing and budgeting tools [website]. The Hague: IRC (https://www.ircwash.org/tools/irc-costing-and-budgeting-tools, accessed 8 November 2019).

IWA (2019). AquaRating. In: IWA [website]. London: International Water Association (https://iwa-network.org/projects/aquarating/, accessed 11 November 2019).

Jaćimović R, Fonseca C (2012). Briefing note on budget tracking approaches in the WASH sector: methods, applicability and examples. The Hague: IRC (http://www.ircwash.org/resources/briefing-note-budget-tracking-approaches-wash-sector-methods-applicability-and-examples, accessed 8 November 2019).

Jones S (2015). Adapting the life-cycle costs approach for rural water supply in DRC through the DRC WASH consortium. In: Shaw RJ, editor. Water, sanitation and hygiene services beyond 2015 – improving access and sustainability: proceedings of the 38th WEDC International Conference, Loughborough, United Kingdom, 27–31 July 2015. Loughborough: Loughborough University (https://repository.lboro.ac.uk/articles/Adapting_the_life-cycle_costs_approach_for_rural_water_supply_in_DRC_through_the_DRC_WASH_Consortium/9586640/1, accessed 8 November 2019).

Kalcheva D (2013). Organisational structure options for municipal development funds, their implementation and management in Bulgaria. Paper presented at Fifth National Conference for PhD students, Sofia, Bulgaria, 5 December 2013. Sofia: University of National and World Economy (https://www.researchgate.net/publication/310766719_Organizational_structure_options_for_Municipal_Development_Funds_their_implementation_and_management_in_Bulgaria, accessed 11 November 2019).

Koziol M, Tolmie C (2010). Using public expenditure tracking surveys to monitor projects and small-scale programs: a guidebook. Washington DC: World Bank (http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-8519-7, accessed 8 November 2019).

McIntyre P, Casella D, Fonseca C, Burr P (2014). Priceless! Uncovering the real costs of water and sanitation. The Hague: IRC (https://www.ircwash.org/resources/priceless-uncovering-real-costs-water-and-sanitation, accessed 8 November 2019).

Miller M, Cronk R, Klug T, Kelly E, Behnke N, Bartram J (2019). External support programs to improve rural drinking water service sustainability: a systematic review. Sci Total Environ. 670:717–31.

Mumssen Y, Saltiel G, Kingdom B (2018). Aligning institutions and incentives for sustainable water supply and sanitation services. Washington DC: World Bank (http://documents.worldbank.org/curated/en/271871525756383450/Aligning-institutions-and-incentives-for-sustainable-water-supply-and-sanitation-services, accessed 11 November 2019).

OECD (2009). Managing water for all: an OECD perspective on pricing and financing. Paris: OECD Publishing (https://www.oecd.org/env/resources/managingwaterforallanoecdperspectiveonpricingandfinancing.htm, accessed 8 November 2019).

OECD (2019). Technical guide to the DAC statistics database [website]. Paris: OECD Publications (https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/dacguide.htm, accessed 13 November 2019).

Pezon C, Bostoen K, Carrasco M, Jaćimović R (2015). Costing water services in refugee camps. The Hague: IRC (https://www.ircwash.org/resources/costing-water-services-refugee-camps-camp-bambasi-ethiopia-and-camp-kounoungou-chad, accessed 8 November 2019).

Results for Development Institute (2017). Challenge funds and innovation in the water sector: a report to the High Level Panel on Water. Washington DC: Results for Development Institute (https://sustainabledevelopment.un.org/content/documents/153732._HLPW_Final_Report_pdf_3.pdf, accessed 11 November 2019).

Rickert B, Samwel M, Shinee E, Kozisek F, Schmoll O (2016a). Status of small-scale water supplies in the WHO European Region: results of a survey conducted under the Protocol on Water and Health. Copenhagen: WHO Regional Office for Europe (http://www.euro.who.int/en/publications/abstracts/status-of-small-scale-water-supplies-in-the-who-european-region.-results-of-a-survey-conducted-under-the-protocol-on-water-and-health-2016, accessed 4 November 2019).

Rickert B, Barrenberg E, Schmoll O, editors (2016b). Taking policy action to improve small-scale water supply and sanitation systems: tools and good practices from the pan-European region.

Copenhagen: WHO Regional Office for Europe (http://www.euro.who.int/en/publications/abstracts/taking-policy-action-to-improve-small-scale-water-supply-and-sanitation-systems.-tools-and-good-practices-from-the-pan-european-region-2016, accessed 4 November 2019).

Rosa MJ, Menaia J, Poças A, Bruaset S (2014). Guidelines for improved operation of drinking water treatment plants and maintenance of water supply and sanitation networks. Nieuwegein: PREPARED (http://www.prepared-fp7.eu/viewer/file.aspx?FileInfoID=560, accessed 11 November 2019).

Sida (2013). Guidelines: challenge funds – a guide based on Sida's and other actors work using challenge funds in development assistance/as a method for development. Stockholm: Swedish International Development Cooperation Agency (https://www.sida.se/English/publications/110217/guidelines---challenge-funds/, accessed 11 November 2019).

Sida (2018). Evaluation of Sida's global challenge funds: lessons from a decade long journey. Stockholm: Swedish International Development Cooperation Agency (https://www.sida.se/English/publications/160980/evaluation-of-sidas-global-challenge-funds/, accessed 11 November 2019).

Smithers B (2018). Improving information and signposting for users and managers of private water supplies and private sewerage facilities. Edinburgh: Citizens Advice Scotland (https://www.cas.org.uk/system/files/publications/technical_report_-_improving_information_for_users_managers_of_private_water_supplies_sewerage_facilities.pdf, accessed 11 November 2019).

Smits S, Verhoeven J, Moriarty P, Fonseca C, Lockwood H (2011). Arrangements and cost of providing support to rural water service providers. The Hague: IRC (WASHCost working paper 5; https://www.ircwash.org/resources/arrangements-and-cost-providing-support-rural-water-service-providers, accessed 8 November 2019).

Snehalatha M, Fonseca C, Rahman M, Uddin R, Ahmed M, Sharif AJ (2015). School WASH programmes in Bangladesh: how much does it cost? Applying the life-cycle costs approach in selected upazilas. The Hague: IRC (https://www.ircwash.org/resources/school-wash-programmes-bangaldesh-how-much-does-it-cost-applying-life-cycle-costs-approach, accessed 8 November 2019).

Soppe G, Janson N, Piantini S (2018). Water Utility Turnaround Framework: a guide for improving performance (vol. 2). Washington DC: World Bank (http://documents.worldbank.org/curated/en/515931542315166330/Water-Utility-Turnaround-Framework-A-Guide-for-Improving-Performance, accessed 11 November 2019).

Trémolet S (2012). Small-scale finance for water and sanitation. Stockholm: EU Water Initiative – Finance Working Group (https://www.gov.uk/dfid-research-outputs/small-scale-finance-for-water-and-sanitation, accessed 11 November 2019).

UNECE (2012). No one left behind: good practices to ensure equitable access to water and sanitation in the pan-European region. Geneva: United Nations Economic Commission for Europe (https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=799&menu=1515, accessed 8 November 2019).

UNICEF (2018). Fiscal space for children and human capital in eastern and southern Africa: options and strategic entry points to address investment gaps in 16 countries. Nairobi: UNICEF ESARO (https://www.unicef.org/esa/reports/fiscal-space-children-and-human-capital-eastern-and-southern-africa, accessed 11 November 2019).

UN-Water, WHO (2014). WASH accounts in Brazil: overview and next steps. TrackFin initiative. Geneva: World Health Organization (https://www.slideshare.net/TrackFin/brazil-10-pager-english-final, accessed 8 November 2019).

Veenkant M, Fonseca C (2019). Collecting life-cycle cost data for WASH services: a guide for practitioners. Addis Ababa: IRC Ethiopia (https://www.ircwash.org/resources/collecting-life-cycle-cost-data-wash-services-guide-practitioners, accessed 5 November 2019).

Washington State Department of Health (2017). Preventive maintenance program: guide for small public water systems using groundwater. Tumwater, WA: Washington State Department of Health (https://www.doh.wa.gov/portals/1/documents/pubs/331-351.pdf, accessed 11 November 2019).

WHO (2015). Sanitation safety planning: manual for safe use and disposal of wastewater, greywater and excreta. Geneva: World Health Organization (https://www.who.int/water_sanitation_health/publications/ssp-manual/en/, accessed 13 November 2019).

WHO (2017a). UN-Water GLAAS TrackFin Initiative: tracking financing to sanitation, hygiene and drinking-water at national level. Guidance document. Geneva: World Health Organization (https://www.who.int/water_sanitation_health/publications/trackfin_guidance_document/en/, accessed 8 November 2019).

WHO (2017b). Guidelines for drinking-water quality, fourth edition incorporating the first addendum. Geneva: World Health Organization (http://www.who.int/water_sanitation_health/publications/drinking-water-quality-guidelines-4-including-1st-addendum/en/, accessed 13 November 2019).

WHO (2019). National systems to support drinking-water, sanitation and hygiene: global status report 2019 – UN-Water Global Analysis and Assessment of Sanitation and Drinking-water (GLAAS) 2019 report. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/326444, accessed 5 November 2019).

WHO, UNICEF (2017a). Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/258617, accessed 14 November 2019).

WHO, UNICEF (2017b). Safely managed drinking water – thematic report on drinking water 2017. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/325897, accessed 4 November 2019).

WHO, UNICEF (2019). Progress on household drinking water, sanitation and hygiene 2000–2017: special focus on inequalities. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/329370, accessed 4 November 2019).

WHO Regional Office for Europe (2011). Small-scale water supplies in the pan-European region: background, challenges, improvements. Copenhagen: WHO Regional Office for Europe (http://www.euro.who.int/en/health-topics/environment-and-health/water-and-sanitation/publications/2011/small-scale-water-supplies-in-the-pan-european-region.-background.-challenges.-improvements, accessed 4 November 2019).

Zachariadis I (2018). Investment in infrastructure in the EU: gaps, challenges and opportunities. Luxembourg: European Parliament (https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2018)628245, accessed 4 November 2019).

Small-scale water supply and sanitation systems form an essential part of the provision of services in the pan-European region, particularly in rural areas, and sufficient financial means are required to enable their safe operation and safeguard public health. Challenges for these systems include a large financial gap between what is required and what is available to reach universal and equitable access and to move towards safely managed services, as stipulated by the Sustainable Development Goals, and insufficiency in ability to cover all recurrent costs. The Protocol on Water and Health recognizes the financing of small-scale water supply and sanitation service provision as a particular area of attention.

Low economies of scale are inherent to small-scale water supplies and sanitation systems, and lower policy attention and financial priority given to these types of systems. This publication guides national and subnational policy-makers responsible for water and sanitation interventions in defining strategies for sustainable financing of service provision through small-scale water supply and sanitation systems. It proposes a framework, consisting of the life-cycle costs that need to be taken into consideration and sources of funds to pay for these. It offers suggestions on how to collect the costs and how to track the sources of funds available in order to contribute to public health by providing safe drinking-water and sanitation services to all, including those in rural areas.

World Health Organization
Regional Office for Europe
UN City, Marmorvej 51
DK-2100 Copenhagen Ø
Denmark
Tel.: +45 45 33 70 00
Fax: +45 45 33 70 01
Email: eurocontact@who.int
Website: www.euro.who.int

ISBN 9789289054973