SUPPLYING PIPED WATER SERVICES
IN SMALL TOWNS IN DEVELOPING COUNTRIES

REGULATING AND MONITORING THE TECHNICAL & FINANCIAL PERFORMANCE OF SMALL SYSTEMS

SUPPLYING PIPED WATER
SERVICES IN SMALL TOWNS
IN DEVELOPING COUNTRIES

REGULATING AND MONITORING THE TECHNICAL & FINANCIAL PERFORMANCE OF SMALL SYSTEMS

Understanding, implementing and applying monitoring mechanisms to improve the quality and support the regulation of water services

—

Daniel Faggianelli, Acqua-OING
Denis Desille, programme Solidarité Eau

Steering Committee:

- French Development Agency: **Aymeric Blanc, Janique Etienne, Alain Rotbardt**
- Seine Normandie Water Basin Agency: **Anne Belbéoc'h**
- Gret: **Frédéric Naulet**
- Syndicat des Eaux d'Ile de France: **Marc Vézina**

We would like to thank the following contributors to this document for their reviews and feedback:

- French Development Agency: **Bertrand Clochard, Karine Frouin, Stéphanie Oudot, Lionel Goujon**
- Seine Normandie Water Basin Agency: **Liliane Chauffrey**
- Gret: **Jacques Monvois**
- Programme Solidarité Eau: **Christophe Le Jallé**

We would also like to thank the following contributors for sharing their experiences and vision of water supply services:

The **300 members of the Community of Practice on the monitoring of water supply services** - reseaux-aep.org – who participated in the three e-conferences held in March, May and September 2011, as well as the **150 participants of the workshops** conducted in 2011 in Benin, Burkina Faso, Mali, Mauritania and Chad.

Translation from French to English:

Nicola Brodrick

Reviewed by:

David Schaub-Jones

Photos:

- Cover page and page 43: G. Aubourg
- Page 4: V. Dussaux

Preface

In small towns in developing countries, those responsible for the day-to-day management of drinking water schemes have a range of challenges to address, such as ensuring the smooth running and sustainability of facilities and equipment, ensuring the financial stability of the water schemes, meeting social and environmental requirements and ensuring the transparency of the service. As a result, the lifespan of these systems can be exceedingly short (from a few weeks to around ten years).

Although local operators have the skills and expertise required to manage water schemes, technical and financial monitoring mechanisms have proven effective in helping both to improve the quality and to extend the lifespan of these water services. These mechanisms thus play an important role in increasing aid effectiveness.

The aim of this document, born out of ongoing discussions between practitioners from around fifteen different countries, is to share learning from the different monitoring mechanisms currently in use. Analysis focuses on how monitoring can both support regulation and help improve the performance of water schemes. This document also provides guidelines for decision-makers interested in putting a similar mechanism in place.

This publication is the culmination of a fruitful collaboration between the French Development Agency and a range of different actors, who are using their experience to help develop the water sector in a number of emerging and developing countries.

Jean-Yves Grosclaude
Director of Technical Operations
French Development Agency

Table of Contents

Introduction

In the small towns (or rural areas) of developing countries, the quality of any piped drinking water service offered to users is often unsatisfactory and the lifespan of these services, in particular, can be exceedingly short (from a few weeks to around ten years). These shortcomings are caused by a number of institutional, technical, financial and organizational challenges.

With a view to improving the quality and sustainability of water services, a number of monitoring mechanisms have been piloted, some of which have produced highly positive results. Today, there is a wide range of monitoring experience to be found in several countries. In 2011, this experience was shared and discussed during three e-conferences (involving 300 participants from 15 countries), as well as in national workshops held in five African countries (Benin, Burkina Faso, Mali, Mauritania and Chad) and attended by 150 water supply practitioners. The contributions of these e-conference and workshop participants have informed the drafting of this document, which is divided into six chapters:

'Piped water services in small towns' provides an overview of the water services environment, describing the local sector stakeholders and outlining the typical challenges encountered in management of the service.
'Monitoring mechanisms' explains the aim of monitoring, how it is applied and associated challenges around effectiveness, financing and sustainability.
'Understanding and using monitoring indicators' lists the monitoring indicators required to oversee the management of a small-piped water supply network and details how these indicators can be used by local stakeholders to improve the quality of the service.
'How monitoring supports regulation' provides a definition of regulation and analyzes the extent to which monitoring mechanisms can support certain regulatory functions.
'How monitoring supports other functions' sets out to identify other potential benefits of monitoring water services, in addition to improving service quality and assisting with regulation.
Finally, ***'Implementing a monitoring mechanism'*** provides recommendations for implementing a monitoring mechanism for water services in small towns.

This publication is intended not only to provide information on monitoring and its various advantages, but also as a tool for use by sector stakeholders wishing to put such a monitoring mechanism in place.

Piped water services in small towns

THE ACTORS AND THEIR RESPONSIBILITIES

Many countries apply the principle of subsidiarity to water services, meaning that responsibility for the service is assigned as close to the users as possible. The application of this principle usually involves four groups of stakeholders in the management and development of piped water services.

The state: The state is in charge of organizing the sector and defining the rules to be observed by all stakeholders, at the same time as ensuring effective service delivery. Where services have been implemented through national funding, the state may either retain ownership of the infrastructure and transfer responsibility for the service to a political-administrative level closer to the users or also transfer ownership of the infrastructure alongside the responsibility for service provision.

The authority responsible for water services (contracting authority): In many countries, responsibility for water supply is assigned to a devolved political administrative authority. This authority is responsible for outsourcing activities to different actors to ensure the service operates correctly and water coverage targets are achieved. This authority appoints the service operator and sets out the rules for using the service in accordance with the national regulatory framework. It also verifies service quality and undertakes the measures necessary to ensure its viability. In particular, this authority identifies and mobilizes financing for the renewal of infrastructure and for investment in service extension. This authority is hereafter referred to as the 'Water Services Authority' (WSA).

The water service operator: The authority ultimately responsible for service delivery (WSA) can delegate management of water services to a third party (public or private company, small entrepreneur, association, etc.). This authority may also decide to manage the service in-house through its technical and administrative teams.

The users: The users are the beneficiaries of the service. In return for this service, they pay a set amount (the water tariff) which goes towards recovering operating costs and any costs associated with water scheme renewal. In most cases, the price of water is proportional to the volume of water consumed; although, in some rare instances, this can also be a fixed amount. Users must adhere to the rules for using the service and, in exchange, have the right to receive information regarding management of the service.

CHALLENGES

The aim of a water service is to sustainably distribute water to users in sufficient quantities to meet their needs and to do so in an environmentally responsible manner. As water services frequently encounter challenges, this public service objective is a long way from being systematically achieved, particularly in small towns. There are two types of challenges that can arise.

On the one hand, the service has to deal with **issues around infrastructure design and construction quality**. Decisions taken during the design phase of a water supply project can impact on both the operation of the service and its costs. For instance, over-sizing generally leads to higher operating costs; this will also increase the cost of hydraulic or electromechanical infrastructure, which will not be optimized to meet users' actual needs. In addition, the choice of service level (standpipes or private connections, water treatment or not, etc.) impacts the volumes consumed and hence the production cost of water.

On the other hand, the service is also often faced with **governance issues**. Even where a water service has been designed and constructed by qualified professionals and satisfies user demand at an affordable tariff, the sustainability of the service is regularly put at risk. The issues most commonly encountered are as follows:

- The actors lack the necessary skills or capacities (the operator is unprofessional, the contracting authority is incapable of fulfilling its role, users are unaware of their rights and responsibilities, etc.).
- The way in which the service is organized is unsuitable or inadequate (the contractual framework is non-existent, poorly understood or lacks balance, no control system, etc.).
- Financial aspects are not dealt with satisfactorily (funding required for renewal is not mobilized, reserves are not secured, tariff-setting does not take all service operating costs into account nor does it incorporate equity, there are transparency issues with the way the service account is managed, etc.).

Monitoring mechanisms

THE AIM OF MONITORING

The aim of technical and financial monitoring is to improve the quality and sustainability of piped water services in small towns. Monitoring is conducted by an actor (or actors) not involved in the day-to-day management of the water service. Their role consists of (i) collecting management-related data, (ii) analyzing this data to produce objective and robust service performance indicators, (iii) reporting the results obtained and providing recommendations for specific service improvements. Ultimately, the aim of monitoring is to:

- **Assist the Water Services Authority** with service-related decisions and management control.
- **Support the operator** with the technical operation of the network and (commercial and financial) activities relating to management of the service.
- **Provide users with information** on the quality of the service they receive in exchange for paying the water tariff.

MONITORING ACTIVITIES

Many of the large-scale monitoring mechanisms that have been implemented (notably, in West and Central Africa) involve the following activities:

1. A **technical inspection** that consists of visiting a given site to assess the condition of the various pieces of electromechanical equipment and hydraulic infrastructure used in water production and distribution.
2. A **financial analysis** of the accounts, including (or not) publication of accounting statements.
3. A **management assessment** using objective performance indicators.
4. A **presentation of findings**, in the field if possible, to all water service stakeholders in a format adapted to the characteristics of the service being provided.
5. A **report**, for the period under consideration, which provides a financial and technical assessment of how the service is being managed, with a detailed breakdown and statistical analysis of the indicators.
6. Continuously available and telecommunications-based **back-up support** to provide assistance to the different actors upon request.

These activities are undertaken on a regular basis, usually every six months (a detailed description of these activities and associated resource requirements is provided in the Annex).

THE IMPACT OF MONITORING ON THE QUALITY OF WATER SERVICES

Certain countries have now been conducting water service monitoring long enough to enable the advantages of this type of mechanism to be clearly defined (in Mali, monitoring activities were first initiated at the beginning of the 1990s).

The main advantage of monitoring is that it helps **significantly reduce the number and duration of service interruptions**. As a result of the recommendations received from technical audits, preventive maintenance undertaken by operators is improved. In the event of a breakdown, the monitoring body is the key contact immediately contacted, either to conduct remote diagnostics or to facilitate and expedite the delivery of spare parts.

Monitoring has the further advantage of being able to **improve the financial stability of the service**, both by reducing operating costs and by improving the collection rate of user charges. The monitoring of water services in small towns is a systematically profitable investment that saves more than it costs.

In rural areas, where local authorities have limited fiscal capacity, the water network is often the only market activity that generates substantial financial resources. Small-piped networks' reserves for equipment renewal can soon become both highly coveted and the source of tension. In these situations, monitoring helps to **increase and secure reserves** held in bank accounts, which often require multiple signatures: such as those of the WSA, operator and users' association.

Monitoring is also a powerful tool for providing **information on the water service**: by presenting information, in the appropriate format, to the different stakeholders, it improves understanding of the water service and the challenges faced. In particular, as far as the users are concerned, it provides a regular reminder of the need to pay for water consumption at a fair price; it explains how money received from the users is subsequently used (to finance operating and renewal costs) and facilitates the acceptance of any price increases.

Whilst monitoring can help improve understanding of the issues associated with the service, it can also particularly **empower the users** not only to voice their expectations with regard to service improvements, but also to discuss any breakdowns or abusive practices on the part of the operator with the WSA.

Lastly, monitoring is a tool that assists with **transparency and conflict resolution**. Public reporting serves to remind each actor of their respective responsibilities and obligations and the resulting dialogue is based on indisputable performance indicators, helping to streamline and focus the inevitable debates.

In the challenging environment of developing-country small towns, monitoring helps strengthen the capacities of all water service stakeholders: the operator's knowledge and skills are progressively improved; the local authority's understanding of the performance indicators is enhanced, enabling them to detect service failures and impose sanctions; finally, those paying to use the service are more aware of the viability of the service they receive.

MONITORING MECHANISM EFFECTIVENESS AND SUSTAINABILITY

Monitoring is only effective if there is rigorous data collection and analysis and if the monitoring body's recommendations are fully taken on board by the service operator and Water Services Authority (WSA). To ensure the effectiveness of monitoring, there are a minimum of three conditions that must be met.

- **Ensure the monitoring body has the requisite skills and experience.** Monitoring activities require a broad range of expertise: technical, financial, communication and intermediation, in particular. The monitoring body appointed thus needs to be highly versatile.
- **Guarantee the legitimacy of the monitoring body.** The monitoring body reports on the quality of services and provides recommendations that should be recognized as fair and not challenged. The monitoring body therefore needs to have indisputable legitimacy. In order to further enhance this legitimacy, the monitoring body should be appointed by a (national or regional) authority that is itself legitimate (i.e. the reliability of this monitoring body needs to be unanimously recognized by all actors).
- **Ensure consultation forms part of monitoring activities.** It is essential that monitoring results are presented and discussed with the different local stakeholders involved in service delivery (users, contracting authority and service operator). When conducted regularly, such consultation can help improve understanding of service-related issues, remind each stakeholder of their responsibilities and resolve conflict and misunderstandings.

In addition to being effective, a monitoring mechanism also needs to be sustainable. To this end, there are two vital aspects to be considered.

- **Share monitoring costs.** When the cost of monitoring has to be met in full, even occasionally, by a single small town, this can prove prohibitive. To optimize monitoring costs and arrive at an acceptable cost for each water service, pooling financial resources to share the cost of monitoring between several small towns within the same region is one of the keys to ensuring financial viability of the monitoring service, regardless of how it is funded.
- **Encourage cross-subsidies between large and small-scale services.** Where monitoring is funded through the water tariff, it is necessary to ensure that

the amount paid to cover the cost of the monitoring body's remuneration is in proportion to the size of the water scheme making the payment. In this way, larger schemes bear part of the monitoring cost for small schemes that would be unable to afford all the associated charges on their own.

FINANCING THE COST OF MONITORING

In 2011, in the small towns of the Sahel (in particular in Mali, Chad and Niger), water service monitoring cost between €0.03 and €0.09 per m^3 of water sold, or between 4 and 12% of the price of water. This cost varies in accordance with the type of activities the monitoring body is required to undertake and with local geographic conditions. There are different possible financing options available to recover the cost of monitoring:

- A surcharge added to the water price (users).
- A national water fund.
- The contracting authority's budget (raised from local taxation).
- The state budget.
- A surcharge added to other public services (energy, telecommunications, etc.).
- Etc.

Financing monitoring costs through the state or WSA budget may not always prove to be sustainable. For practical reasons, many actors consider that the cost of monitoring should be added to the water tariff and thus borne by users. However, this solution is only sustainable if, for example, a system of cross-subsidy between small and large-scale services is put in place. This is in keeping with the fact that urban water services are already frequently called upon to support rural services (thus reducing the difference in tariff levels between the two types of service).

Monitoring is a profitable investment. The, initially additional, cost of monitoring almost always translates into a long-term saving for users: regular audits of the water supply service means that back-up support is provided that helps optimize operating costs. In Chad, a number of communes in the region of Moundou dismissed the monitoring body in order to save costs. However, they were soon faced with uncontrolled operating costs that, in turn, caused production costs to soar. Certain communes thus voluntarily requested that the monitoring body return. The monitoring body has since assisted these communes to first stabilize and then reduce the cost of their services.

Understanding and using monitoring indicators

A Water Services Authority is in charge of checking the quality and sustainability of the service on behalf of citizens. In order to fulfill this responsibility, there are various decisions it has to make. In particular, the WSA is responsible for setting the price of water, taking into account both the social situation of the households and the technical and financial characteristics of the service. By defining objective indicators and observing their evolution over time, monitoring enables the WSA to assess how well the water supply system is operating, inform the users and make decisions that will ensure the sustainability of a quality service based on reliable and objective information.

Note: The indicators listed below are not intended to be exhaustive. They do, however, create a coherent set of data that can be used for detailed reporting on the quality and sustainability of a water supply network.

ACCESS INDICATORS

» *Number of water points*

What do we measure?

The number of water points is determined by identifying all working taps: standpipes, private household and administrative connections (those in administrative offices, schools, places of worship, etc.).

How to use this indicator

Tracking the evolution of private connections makes it possible to assess the extent to which users are interested in connecting to the service. This indicator informs improvement plans and enables various price-setting scenarios to be tested. Whilst standalone water points such as wells or handpumps are separate from small-piped networks, it is also useful to take a regular inventory of these to provide a comprehensive overview of the different levels of service that co-exist within the same area.

» *Population coverage*

What do we measure?

Coverage is an indication of the number of people using the service. This indicator is obtained by identifying all those households with access to the network, whether through a private connection or standpipe.

How to use this indicator

Expressed as a percentage of the total population, this indicator enables network

development needs to be assessed so as to extend the service to those who are without access. Most small towns are experiencing rapid population growth, which often means that the proportion of households with access is decreasing over time. In such contexts, the WSA needs to regularly invest in extending the network and increasing production capacity.

CONSUMPTION INDICATORS

» *Meter readings*

What do we measure?

Meter reading involves collecting and reporting the data provided by meters situated throughout the water network. The data to be recorded includes: the volume of raw water extracted from the water resource (borehole meter), the volumes of drinking water consumed by each type of user (meters for private connections, administrative connections, standpipes), the running time of electro-mechanical equipment, electricity meter readings, etc.

How to use these indicators

Regular network meter readings are not only used for billing purposes, but also for establishing the utilization rate of the various items of equipment over a given period of time (vital for managing funds for equipment renewal). It is very difficult to manage a water supply service without the data these different meters provide. Should a meter break down, it needs to be rapidly replaced to ensure the reliability and continuity of data.

» *Average consumption*

What do we measure?

Average consumption is the average volume of water consumed each day by each user. This is expressed in liters per user per day and is estimated by dividing the average daily network consumption by the number of users the network supplies.

How to use this indicator

This indicator is particularly important for forecasting and carrying out needs assessments for future projects. For example, in the Sahel, average consumption on new networks is around 8 liters per user per day, rising to 12 liters per user per day after 2 to 3 years; the target for average consumption is 20 liters per user per day.

USER QUALITY OF SERVICE INDICATORS

» *Water quality*

What do we measure?

A basic measure of water quality is obtained by analyzing the levels of residual chlorine in water delivered by the piped network. The characteristics of raw water and any water treatments applied can also be assessed (along with any additional analysis conducted on the pH and conductivity of the water or on the presence of certain elements, such as fluorine, iron and manganese).

How to use this indicator

Sufficient quantities of chlorine mean the water contains no pathogenic bacteria.

» *Continuity of service*

What do we measure?

Continuity of service is measured both by the pressure available to the end-user (> 0.5 kg/cm^2) and by the number and length of service interruptions over a given period.

How to use this indicator

Continuity of service is an indication of the network's capacity to provide water, without interruption, every day of the year. It is necessary to distinguish between long service interruptions (several days) and smaller, regular service interruptions (a few hours a day): the former means users are compelled to look for other (often unsafe) sources of supply; when the latter occurs, users may only be able to use the network for a limited number of hours per day, but they do still have access.

TECHNICAL INDICATORS

» *Condition of the infrastructure*

What do we measure?

Essentially measured through visual inspections, this indicator is used to establish the remaining lifespan of infrastructure and whether this is being properly utilized.

How to use this indicator

Repairs can be scheduled as soon as a fault is observed. Through this indicator, it is also possible to optimize the preventive replacement of equipment that is nearing the end of its useful life. For instance, it is possible to prevent service outage by scheduling the sale of an electricity generator that is reaching the end of its life (between 8,000 and 10,000 hours of operation for a small model) and the procurement of a new generator. In the same way, forward planning could also include procurement of a new pump, of a new chlorination system, etc.

» *Network efficiency*

What do we measure?

Network efficiency is calculated by dividing the volume of water billed by the volume of water produced.

How to use this indicator

This indicator is related to network maintenance and helps identify leaks or previously undocumented connections. Network efficiency is over 95% on new networks. However, this can fall over time and leak detection is recommended should it drop below 90%.

Over the period you pumped:	23 005 m^3 of water
Over the period you sold:	19 757 m^3 of water
Distribution losses for the period are:	3 248 m^3 of water
Efficiency of volumes pumped and sold is:	85.88%
Our recommendation: Check for possible leaks on the network	

Extract from the 2AEP consulting firm monitoring report for Yélimané, Mali, December 2008

ECONOMIC AND FINANCIAL INDICATORS

» *Energy costs*

What do we measure?

This indicator provides the costs of energy consumption through the use of equipment. This includes, for instance, the cost of diesel used by a generator (or the electricity bill, if the service is connected to the electricity grid, etc).

How to use this indicator

This indicator is important as energy costs often account for a significant portion of the overall service management costs. Energy costs also provide a good indication of the state of equipment and its operating conditions. For example, if a generator's energy consumption is higher than the level estimated by the manufacturer when operating at full capacity, the generator is either not working properly or fuel is being misappropriated. It is also possible that it is not working at optimal capacity or that the initial output of the pump it is driving has dropped. A review of the pumping system, energy production and maintenance procedures may help resolve this type of issue.

» *Lifespan of infrastructure and equipment*

What do we measure?

The lifespan indicates the number of years (or hours of operation) the infrastructure or equipment is designed to last. When an item reaches the end of its lifespan it becomes obsolete and has to be replaced.

How to use this indicator

Monitoring lifespan enables the WSA to plan investment in accordance with financing, supply and construction programs. It also makes it possible to define the most relevant financial strategies (reserves, loans, donor subsidies, etc.). By way of example, the lifespan of the most commonly used equipment is as follows:

- Lifespan of 7 years: pumps; DC to AC converters (solar).
- Lifespan of 15 years: standpipe equipment and administrative connections.
- Lifespan of 20 years: solar panels.
- Lifespan of 20 to 50 years: major infrastructure, in particular water tanks and primary network.
- Lifespan proportional to the runtime: electricity generators, the lifespan of which is usually estimated to be 10,000 hours.

» *Renewal fund*

What do we measure?

This is a bank account into which funds are deposited on a regular basis to ensure that the necessary financial resources are available for replacing equipment once it has reached the end of its useful life. These funds do not necessarily have to be restricted only to renewal, however, and may also be used to finance future network extensions.

How to use this indicator

The sustainability of the service is directly linked to the management of the infrastructure renewal fund. These funds can vary from 30 to 70% of the sale price of water, depending on the type of infrastructure and the form of energy used (solar, wind or thermal). Thus, very large amounts need to be managed each year. Decisions made with regard to management of this fund can have a significant impact on the sustainability of the service and price of the water. Regardless of the how the fund is managed (by the operator or WSA), and given the importance of these resources, there are some simple precautions worth taking, such as requiring two signatures for any withdrawals made from the renewal fund, consultation with users' associations, etc.

In some cases, the state may cover part of the renewal costs. For instance, in Chad and Mali, the state finances equipment with a lifespan of over twenty years (with the exception of solar panels); however, these financial resources are not always available when required.

» *Costs*

What do we measure?

Costs cover all the expenses required to run the service on an ongoing basis. They are divided into separate 'categories' and include: salaries, management expenses, fuel, consumable items (filters, oil), the costs of water treatment and quality analysis, maintenance costs, losses, renewal funds and funds to cover unpaid debt.

How to use this indicator

The evolution of costs over time is an indicator of sustainability. Any increase in spending should result either from a conscious management decision or a rise in the cost of raw materials. This increase can lead to tariff adjustments or to the development of a new investment strategy (for example: switching to thermal or solar energy). Moreover, the cost structure can vary significantly depending on the type of energy used. Similarly, monitoring costs can also vary depending on the number of services monitored and their geographical dispersion (travel expenses for attending public reporting meetings).

» Production cost per m^3

What do we measure?

The production cost per m^3 is determined by dividing the total costs in the operating account by the total number of m^3 sold.

How to use this indicator

This indicator is used to calculate the service tariff charged to users. The production cost of water varies in accordance with the type of infrastructure used and, in particular, in accordance with the decisions made during the network design phase and the type of energy chosen to harness the water resources. In the example of Yélimané, Mali (see box), the service is fundamentally profitable, thus its sustainability is ensured.

Water Scheme:	**Yélimané**
Operating assessment	*For the period: 01/07/2008 to 30/12/2008*
Your total operating expenses:	6 058 296 F
Your infrastructure renewal costs:	1 440 849 F
Your total costs:	**7 499 145 F**
Your turnover:	**10 775 160 F**
Your profit:	**3 276 016 F**
Over the period, one m^3 of water cost you:	**380 F**
Average sale price at the meter was:	**545 F**
For every m^3 sold, you earned:	**166 F**

Extract from the 2AEP monitoring report for Yélimané, Mali, December 2008

» Revenue

What do we measure?

Revenue refers to all the financial resources generated by the service. These include: the sum of bill and invoice payments received over the period broken down by invoice type, subsidies received, interest on investment, exceptional income.

How to use this indicator

Comparing revenue and costs makes it possible to assess the overall financial stability of the service.

» Inventory statement

What do we measure?

Compiling an inventory statement consists of estimating the financial value of products held in stock: fuel, materials purchased in advance, materials for infrastructure construction, etc.

How to use this indicator

Drawn up at the end of each accounting period, the inventory statement is used to make corrective adjustments to the operating accounts and to prepare annual accounting statements.

» Available cash flow

What do we measure?

At the closing of accounts at the end of any given accounting period, the amount of financial resources available (total of funds in the bank and cash in hand) is calculated; this sum is the available cash flow.

How to use this indicator

Although cash flow provides an indication of financing capacities at a given moment in time, it cannot be used to assess the service's self-financing capacity, which has to be reviewed in more detail.

» Self-financing capacity

What do we measure?

To calculate this indicator, extraordinary income is added to the net operating results (profit or loss) and exceptional costs are subtracted.

How to use this indicator

Self-financing capacity provides an indication of the service's potential to generate internal financial resources over a given period of time.

PRICING INDICATORS

» *Tariffs*

What do we measure?

The tariff is the price at which water is sold to the user. This tariff is often made up of a number of cost components: the sale price of water by volume per type of user; any water meter standing charges, fees, taxes, etc.

How to use this indicator

The price at which water is sold to the user is calculated on the basis of the costs of water production and distribution, to which monitoring costs and any taxes are also added. It is also necessary to include funds for infrastructure extension and renewal or for the repayment of any loans taken out to finance the initial investment.

When setting the tariffs, the WSA needs to find the best compromise between two seemingly contradictory aims: (1) ensuring the financial stability of the service and (2) providing users with the greatest possible access to the service. However, one requirement always remains the same: total service expenditure (including extension and renewal funds) must never exceed total income.

Tariff-setting practices should also take into account the principle of equity between different types of user. For example, tariffs for standpipe users should be lower than the tariffs charged to users with private connections. As these users receive different levels of service, the principle of equity needs to be applied.

Tariff-setting also enables the WSA to demonstrate its commitment to pro-poor pricing measures. The ability of each user to access the service should be tailored to their specific needs, regardless of their social situation or revenue. Contributions paid by the richest households should be used to reduce the cost of the service for the poorest, not the other way round.

» *Average bill collection period*

What do we measure?

This indicator shows the average time taken by users to pay their water bill. The bill collection period is the number of days between the date the bill is issued and the date payment is received.

How to use this indicator

It is generally accepted that the bill collection period should not exceed 30 days.

» *Bill collection rate*

What do we measure?

The bill collection rate is the ratio of bills paid to bills issued. This rate is calculated for each user and for each type of user (private connections, administrative connections, etc.).

How to use this indicator

Analysis of the proportion of bills outstanding enables the operator and others to identify the categories of user least able (or willing) to pay and to then implement suitable corrective measures.

How monitoring supports regulation

Note: The task descriptions listed in the four tables within this chapter are based on those developed by Trémolet, S. and Binder, D. (2010), The Regulation of Water and Sanitation Services in DCs, French Development Agency, Paris.

THE REGULATION OF WATER SUPPLY SERVICES

Regulation is ***"the permanent and careful control conducted by a public entity on activities that have a value for the community[1]."*** Water supply tends to be a captive market, where competition is only relevant at the beginning or end of periods where the management of services is contracted out. Furthermore, water services have a range of impacts – social and economic, in particular. As such, the aim of regulation is to 'control' different elements of the service, notably:

1. The tariffs charged.
2. The quality of the service provided to users.
3. Means of competition.
4. Consumer protection.

To effectively control each of these elements, regulation can be broken down into 4 tasks:

1. Collect information and data.
2. Control the application of existing rules.
3. Define new rules.
4. Ensure rules are applied and resolve conflicts.

Regulation, therefore, focuses on a number of different issues, the nature and detail of which can vary depending on the country and national strategy. Regulating, itself, involves a variety of tasks, most of which require the input and cooperation of a number of different actors:

- At the local level – for instance for collecting and submitting the water services-related data required by the regulator.
- At one or several higher levels (regional, national, etc.) – for instance for analyzing service performance so as to compare operators, initiate corrective measures, impose penalties, define new rules, etc.

1. OGUS, A. (1994), Regulation: Legal Form and Economic Theory, Oxford University Press, Oxford.

There are, in fact, different levels of regulation: local regulation, national regulation, etc. With regard to small towns specifically, regulation, where it exists, is often poorly structured and based on unclear objectives. Furthermore, those actors expected to contribute to this process usually lack the tools required to do so effectively.

MONITORING, A TOOL USED FOR REGULATION

Regulation of water supply services requires information that is both relevant (i.e. clear and useful to the person for whom it is intended) and regularly updated. **In small towns, the challenge lies in ensuring sufficient capacity is in place to collect and analyze relevant and reliable data on the management of water services so that this is then forwarded to the different regulatory actors involved.** In this respect, the advantages of having monitoring mechanisms for small town water services are twofold:

- They directly provide local actors with both reports and a detailed understanding of how services are operating. This enables local regulation as the WSA is able to control the quality of services provided.
- The reliable and regularly updated information that monitoring produces also enables a regulator (located at either regional or national level) to produce status reports on the level of compliance with sector rules and strategies.

TARIFF REGULATION

The aim of tariff regulation is to find a compromise between the financial stability of the service and the price users are willing to pay. Any tariff regulation must also comply with obligations set out in the existing rules. This therefore means ensuring non-discrimination and equity between users that pay for the service, whilst also ensuring there is proper cost recovery and fair remuneration for the operator.
The table below shows how monitoring is able to perform some of the tasks required for effective tariff regulation:

- Collecting information and controlling the application of existing tariff rules are an integral part of monitoring.
- The monitoring body alone is unable to define new rules or apply penalties as these tasks are typically neither within its scope nor authority. Nevertheless, the monitoring data it produces provides an objective and detailed overview, which can in turn be used to inform decisions.
- Certain tariff adjustments and innovative risk-sharing measures (such as the pooling of the renewal funds of several water schemes) could be undertaken with the support of the monitoring body; however, this would require prior agreement and willingness on the part of the WSAs.

TASKS REQUIRED FOR TARIFF REGULATION...		...ARE THEY PERFORMED BY MONITORING?
Collect information and data	Obtain data on current and future costs and revenues	**Yes**
	Obtain information on the willingness and capacity to pay for different service levels	**Yes**
Control the application of existing rules	Verify that authorized tariffs are applied	**Yes**
Define new rules	Modify tariff levels	**In part** Monitoring recommends, but does not impose, tariff modifications
	Modify rules on tariff structures and payment methods	**No** But the monitoring data can be used by the regulatory body to take appropriate decisions and action
Ensure rules are applied and resolve conflicts	Apply penalties in case of non-application of tariffs in force	
	Maintain financial equilibrium in the sector by tariff adjustments or innovate risk-sharing measures	**In part** Certain corrective and innovative measures can be proposed and coordinated by the monitoring body

SERVICE QUALITY REGULATION

In addition to regulating tariffs, it is also essential to regulate the quality of the service. This regulation needs to address not just the service provided to the users, but also the work undertaken to maintain and preserve infrastructure and equipment. Monitoring provides a number of indicators (for instance, average consumption, energy expenditure per m^3, fuel consumption per m^3 pumped, etc.) that can be compared to the prevailing standards. Thus, the two tasks to 'obtain data on current levels of service' and 'ensure service quality standards are applied', are systematically included as part of monitoring activities.

TASKS REQUIRED FOR SERVICE QUALITY REGULATION ...		... ARE THEY PERFORMED BY MONITORING?
Collect information and data	Obtain data on current levels of service	**Yes**
	Compare operator performances (benchmarking)	**Depends** On the scope of the monitoring activity: monitoring can be used to compare operators' performance
	Conduct technical audits	**Yes**
Control the application of existing rules	Ensure that service quality standards are applied	**Yes**
	Verify that coverage targets are met	**Depends** On the scope of the monitoring activity
Define new rules	Define or review quality standards	**No** But monitoring data can be used by the regulatory body to take appropriate decisions and action
	Adapt existing rules to needs	
Ensure rules are applied and resolve conflicts	Apply penalties in case of quality targets not being met	**In part** Should monitoring reveal that an operator has failed to meet his targets, the monitoring body can recommend penalties or specific demands for improvement (as described and authorized in the legal rules). These would then be applied by the WSA. If it is the WSA itself which is at fault, this can only be resolved by the regulatory body.
	Demand quality improvements to ensure targets are met	
	Redefine quality targets where required	**No** But monitoring data can be used by the regulatory body to take appropriate decisions and action

Furthermore, whilst monitoring does not directly focus on comparing operator performance or on verifying whether coverage targets are met, these two tasks could be performed by monitoring if the 'basic scope' of the monitoring activity were to be expanded.
Lastly, although redefining targets for service quality is inevitably the remit of the regulatory body, monitoring can assist with the task of applying penalties and corrective measures by recommending and helping to implement appropriate action.

COMPETITION REGULATION

Competition regulation aims to reduce the risk of monopoly and associated abusive practices. Although there would appear to be little competition in the water sector (given that it is only introduced periodically should operators bid for contracts), it can be major issue in developing countries, especially for informal operators who sometimes cover large parts of the water supply service market. This is particularly the case in large urban centers, but can also affect operators in small towns.
Regulation of competition, therefore, focuses on two types of actors: a) the manager in charge of operating the water service and b) any informal operators (particularly water resellers) who mainly operate outside the service perimeter of formal water supply, in unplanned settlements and neighborhoods. As a result, monitoring is limited in its ability to assist with competition regulation. Monitoring is designed to audit the quality of an existing service, inside the service perimeter, and not informal service offers (and related practices) outside of this perimeter. Thus, monitoring is able to contribute little to the regulation of competition, as it is restricted to collecting information from the formal service operator only.

TASKS REQUIRED FOR COMPETITION REGULATION...		... ARE THEY PERFORMED BY MONITORING?
Collect information and data	Obtain information on illegal conduct and monopolistic behavior	**Yes** For operators during technical audits and audits of operating accounts **No** For informal operators as this would require studies of areas outside the service operator's perimeter
	Obtain information on the number of operators and their methods of access to resources	
Control the application of existing rules	Conduct enquiries on monopolistic abuses and predation practices	**No** This type of enquiry is costly and falls outside the scope of monitoring activities
Define new rules	Organize bid invitations	**Depends** Some operators or contracting authorities use a monitoring consultant for this type of activity, although it falls outside the initial scope of monitoring activities
	Approve contracts for bulk purchase by the operator	
	Approve, or not, consolidation among several sector actors	**No** But the monitoring data can be used by the regulatory body to take appropriate decisions and action (these two issues rarely need to be addressed in small towns)
Ensure rules are applied and resolve conflicts	Resolve conflicts between operators in a situation of competition	

CONSUMER PROTECTION

Consumer protection is a function that can be (but is not always) included in regulatory objectives and which focuses on resolving customer complaints.

Monitoring mechanisms are not designed to collect and handle complaints. Nevertheless, customer feedback can be collated during the public reporting of monitoring results, as long as meetings are held on-site and attended by users of the water service.

TASKS REQUIRED FOR CONSUMER PROTECTION...		... ARE THEY PERFORMED BY MONITORING?
Collect information and data	Organize consumer surveys	**In part** Satisfaction surveys do not form part of monitoring activities. Nevertheless, user feedback and complaints are collected through the public reporting of monitoring results.
Control the application of existing rules	Audit systems and procedures in order to educate consumers and share information	**In part** Most small-piped water supply operators do not have the financial resources to fund consumer education programs. However, the public reporting of monitoring results greatly assists with this.
Define new rules	Define customer service standards	**No** But monitoring data enables the regulator to review these standards using regularly updated field data.
Ensure rules are applied and resolve conflicts	Ensure customer service standards are applied	**In part** Monitoring recommends, rather than imposes, the application of standards. The authority responsible is in charge of ensuring these standards are applied.
	Resolve conflicts between consumers and regulated companies	**In part** The public reporting of monitoring results provides an opportunity for discussion which can facilitate the resolution of conflicts.

How monitoring supports other functions

CONTRIBUTING TO THE MANAGEMENT OF THE WATER SERVICES SECTOR

Centralized, consolidated and processed at the regional or national level, monitoring information about water services can be fed into various databases for use by the sector, in particular to improve knowledge and understanding of small-piped networks and to update sector standards and benchmarks.

» Improve knowledge and understanding of small-piped networks

By analyzing the evolution of monitoring indicators, either over time or within a given geographical area, it is possible to gain a better understanding of the actual challenges facing small-piped networks. These could relate, for instance, to: actual user consumption; technical issues faced by the operators (such as the viability and lifespan of equipment); services' financial issues (capacity to self-finance, tariff increases, late payment and outstanding bills per category of user, pricing structure, etc.). Cross-analyses can also be useful, such as for example, analyzing tariff increases and pricing structures for services within the same region that use different types of energy source.

The scope for analyzing aggregated monitoring data is vast and can arguably meet the needs of all actors working within the sector: consulting engineers for conducting feasibility studies, detailed technical studies and feasibility reports; socio-economists for validating the relative value of preliminary field survey and study data (such as 'willingness-to-pay' surveys); governments wanting to determine the exact volumes extracted from the water resource, etc.

The fact that most small towns are experiencing rapid population growth, along with changes in practices and increases in user demand, makes it all the more important to ensure monitoring data is regularly aggregated and analyzed at regional or national level.

» Update sector standards and benchmarks

The refined and regularly updated data that monitoring provides on small-piped networks constitutes an unprecedented source of information for governments eager to ensure their strategic frameworks and sector planning are aligned to the field realities. For instance, an average consumption of 4 to 6 liters per user per day is inconsistent with national strategies based on a consumption rate of 20 liters per inhabitant per day. Using the data provided by monitoring, overly theoretical or obsolete national frameworks can be identified and discarded. Regularly updating

sector frameworks – with the help of monitoring – makes it possible to establish, amongst others: installation design and sizing rules that are based on realistic needs assessments for different timeframes; adapted design standards that maximize the profitability of equipment; proven and sustainable mechanisms for financing future extensions.

To be effective, it is important that monitoring data is accumulated over a period of several years. However, maintaining a centralized database requires strong, long-term commitment at national level to provide the necessary human and financial resources required.

FACILITATING THE MOBILIZATION OF FINANCE

» *Facilitating access to bank loans*

There are currently very few banks interested in the water sector in small towns: visibility of the sector is low and the creditworthiness of small-piped network operators has not been definitively proven. Local stakeholders involved in water services (the WSA and operators) rarely approach such financial institutions as they have no or little experience of requesting bank loans. However, monitoring data can be used to help them gain access to this type of credit. The monitoring mechanism can provide proof of a water service's financial viability, thus making banks more inclined to grant loans to water infrastructure managers. Examples of this have notably been seen in Laos, Cambodia, Kenya, Burkina Faso and Niger.

» *Encourage the private sector to invest in water services*

For a private operator, whose role is limited to managing the water service, financing equipment and infrastructure is often considered too great a risk. The private sector's willingness to take on this type of risk reasonably depends on the return on investment that can be made. Monitoring data enables a potential investor to assess the potential viability of the service: if the level of risk is acceptable, the operator will be more inclined to invest in service infrastructure. Financial viability assessments are based not only on financial information held in the monitoring database, but also on the quality of infrastructure design.

» *Build a relationship of trust with development partners (donors)*

Sustainability is a common requirement of those development partners (donors) that support the water sector. As a result, these partners tend to focus their support on developing water services whose future viability can be guaranteed. Where new services are to be developed, monitoring provides assurances that the future water service will be properly supervised and that there will be regular reporting on its sustainability through objective and robust indicators. Where

the aim is to improve existing services, the WSA and service operator can utilize the monitoring data to obtain detailed information on the quality and sustainability of the services under their charge. This can then enable them to better convince donors to support investment in network extensions or for pump station improvements, for example.

Certain donors only provide assistance to projects in countries where participation in a monitoring mechanism is required by the national strategy and, notably, in regions where there is already such a monitoring mechanism in place. These donors pay close attention to the design of facilities and have been known to refuse to provide support to projects deemed to be incorrectly sized (where based on overly high forecasts of average consumption, for example). Similarly, certain donors refuse to help fund water supply network extensions if the monitoring report shows there is a high level of unpaid bills, inadequate pricing or poor governance. In general, therefore, as development partners are held accountable for the use of public funds given as aid to developing countries, they need to know that water services are capable of reporting their management results.

POOLING THE RESOURCES OF SEVERAL WATER SCHEMES

There are a number of advantages to pooling financial resources and, in particular, to pooling the savings accounts (reserved for facility and equipment renewal or network extension) of several different water schemes. By pooling resources, a water scheme can significantly increase its investment capacity without impacting on its ability to finance equipment renewal as and when required. It also ensures funds are not left dormant in different accounts or losing value through inflation or changes in the exchange rate.

In order for such pooling of resources to work, both a coherent and transparent set of rules and coordinated decision-making are required. In particular, robust and precise records need to be kept of the payments made by each service to be able to identify who owns what within the common fund at any given time. As monitoring regularly produces reports on the financial status of each service, it is a vital tool for the management of such pooled funds.

The pooling of resources can extend beyond financial resources and also apply to the pooling of stocks of spare parts or using the same maintenance operator, etc. As a general rule, for the anticipated economies of scale to be achieved, the pooling of several water schemes' resources requires stringent accounting of the contributions and efforts of each. Monitoring is vital in helping to achieve this.

Implementing a monitoring mechanism

In order to implement a monitoring mechanism, it is important that the essential service management and organization components are in place:

- The WSA and the operator possess a detailed inventory of all equipment and infrastructure that includes: technical characteristics, date of entry into service, condition of materials, suppliers of spare parts, a list – including the physical location – of all connections installed, plans and descriptions of facilities, etc.
- The actors' rights and responsibilities are clearly allocated between the WSA, the operator and the users.
- The piped water service is equipped with all the tools and equipment required for collecting monitoring data (e.g. volumetric meters, meters recording the runtime of generators, a customer billing system, etc.).

In addition, it is also worth noting that strong political will to support any monitoring mechanism is essential. The viability of a monitoring mechanism depends on it being properly incorporated into the legal and institutional environment. Depending on the policies and strategies of a given country, specific regulatory tools may be required, notably to ensure monitoring is properly recognized and financially viable. As a general rule, the monitoring body should be acknowledged through an approval process to be conducted by the ministry responsible for water services.

PRELIMINARY ACTIVITIES TO BE CONDUCTED

» Define the activities of the monitoring body

The activities that should, as a minimum, be assigned to the monitoring body are described in the section on 'Monitoring Activities' above. The details of each of these activities need to be adapted to the local context. In particular, the scope of any back-up support activity will vary in accordance with the skills and knowledge of the service operator and the WSA. Similarly, for services where there are disagreements between local actors, more time will need to be spent on public reporting meetings and on mediation, in particular, in order to defuse any tension.

The frequency with which monitoring activities are undertaken can also vary. For example, for particularly remote areas, which are expensive for the monitoring body to visit and have a record of satisfactory management, monitoring may take place only once or twice a year.

It is also necessary to highlight the importance of reporting and back-up support. These activities foster local acceptance of monitoring by encouraging local actors to view monitoring as more than just a simple control mechanism. However, it is important to bear in mind that the aim of the monitoring body providing this back-up support is solely to assist – they should never 'take over' the duties of those providing the services.
Lastly, where areas of 'service exclusivity' exist (see below), the monitoring conducted across that area needs to be standardized, regardless of the status of the operator (association or company). Each type of operator should be required to fulfill the same standards of professionalism and be subject to the same controls.

» *Define the method of remuneration*

The choice of remuneration method (whether a fixed amount for all services within the contract scope, a fixed amount per service or a payment per m^3 sold or payment per m^3 produced) determines the financial considerations in any monitoring contract. Experience has shown that the most sustainable option is a payment per m^3 (sold or produced) with this charge being included in the tariff paid by users. The fact that this remuneration is proportional to consumption also acts as an incentive to the operator to provide a fully functional service.

» *Define the scope of monitoring activities*

Theoretically, it is possible to set up individual monitoring contracts for each scheme and thus to invoice each service for the actual cost of the monitoring activities performed. However, this would make it extremely difficult to monitor the smallest schemes due to the monitoring cost involved (which, in Mali in 2010, was estimated to be an average of 600 euros per year per network). This would prove too expensive for many of the smallest towns. The cost of monitoring for small schemes can be financed through a system of cross-subsidies, whereby the larger schemes partly subsidize the monitoring costs of smaller schemes. This approach is particularly suited to methods of remuneration that are proportional to consumption: each service pays a monitoring fee that is linked to the volume of water sold and is thus aligned to its level of income. In order to employ such a cross-subsidy approach, it is necessary to estimate the cost of monitoring for all the water supply schemes within a given area. Administrative boundaries are not always the most useful for establishing areas for cross-subsidy, however, and, where services are very spread out, such an area can cover several administrative regions. It is advisable, therefore, to establish whether the monitoring cost is financially and physically viable for each of the areas under consideration.
When the monitoring body is located in close proximity to the schemes it oversees and when these services supply a sufficiently large population (with high consumption levels and thus the resources to cover monitoring costs), the area of exclusivity

for such monitoring services can be reduced. This principle of defining a reduced area for a given service provider, yet one that remains financially viable for monitoring, is also worth considering in countries which have not yet used such a mechanism and are interested in piloting this on a small-scale.

» *Choose the institution that will select the monitoring body*

The institution chosen to select the monitoring body should be independent from both the actors involved in local water supply and, in particular, the operator and contracting authority (WSA). It is important to avoid conflicts of interest and to ensure the monitoring body is able to freely carry out its activities and make recommendations. It is therefore necessary to choose an institution from an administrative level higher than that of the contracting authority. A number of different types of institution could be chosen:

- The technical department of the Ministry of Water.
- The regulatory agency.
- A federation of users' associations.
- A federation or group of contracting authorities (for example a national or regional association of mayors), supported by state departments. This option is, however, restrictive as consultation between all contracting authorities is required each time the contract of the body charged with monitoring expires.

» *Select the monitoring bodies*

Monitoring bodies should be selected on the strength of their administrative, financial, accounting, sociological and technical skills. However, it is not always easy to find entities with such a wide range of expertise. Ideally, monitoring bodies should be recruited through a call for tenders, in which a shortlist of potential monitoring bodies is drawn up based on their skill-sets.

» *Facilitate acceptance by local actors of the monitoring process*

Implementing a monitoring mechanism through a project that is constructing new infrastructure is generally easier than introducing monitoring to existing networks. On existing networks, putting a monitoring system in place involves tackling a number of well-established practices and challenges (such as a water price that has been 'frozen' for several years, ingrained power balances or hidden profits). However, when users are made aware of the rules regarding water supply and sensitive communications campaigns are put in place (particularly in those countries where water is not yet charged for volumetrically) monitoring and its associated costs are usually well-accepted. Regardless of whether a project involves constructing new networks or rehabilitating existing water supply services, it is important to ensure that there is a participatory approach in place that provides detailed information to both users and other stakeholders from the very outset of the project. Users are generally will-

ing to finance a monitoring mechanism if it ensures the tariffs they pay for water will not be misappropriated.

» *Support deployment of the monitoring bodies*

Support can be provided to monitoring bodies before they begin their activities. For example, the monitoring body may be provided with training and appropriate financial analysis tools that are consistent with those used by other monitoring agencies. In order to make sure these new monitoring bodies are effective, they need to work within an agreed framework to ensure that the information they provide is properly formatted, can be utilized at national level and enables comparison between different water schemes and monitoring areas. To this end, national government agencies may provide monitoring bodies with software to assist with data processing and the collection and calculation of indicators.

» *Ensure the legitimacy of the monitoring body*

The legitimacy of the monitoring body is dependent on the way in which it was appointed and whether it is recognized by the state. If the monitoring body obtains official legitimacy through ministerial approval, it is important that steps are taken to further reinforce this. For instance, it can be particularly useful to inform the users, the operator and, especially, WSAs that an external actor will soon start work in any given location. In addition, the monitoring body can be accompanied (at least on initial field visits) by representatives of the regional body with responsibility for water supply and any associated local technical departments.

MONITORING RESOURCES REQUIRED

» *Human resources*

In order to ensure monitoring activities are carried out successfully, the monitoring body needs to have the following knowledge and skills in place:

- Technical skills (electro-mechanics, hydraulics, hydrogeology, plumbing, etc.).
- Financial skills (accounting, analysis of accounting data).
- Communication skills (report writing, organizing and facilitating meetings of users).
- Intermediation skills (facilitation in the event of misunderstandings between local actors, assistance with conflict management, mediation).
- Knowledge of legal, regulatory and contractual policies and documents pertaining to the water sector in general and water services in particular.

» *Monitoring tools*

The monitoring mechanism should ideally employ standardized tools to collect data during inspections, calculate performance indicators and conduct analyses. Monitoring tools are used to provide the WSA and service operators with dashboards on service quality, as well as to inform reporting between stakeholders. These standardized tools notably include:

- Technical monitoring tools: methodologies for verification, multi-meters, kits for physicochemical and residual chlorine analysis, water level measurement probes, stopwatches, etc.
- Financial monitoring tools: accounting software, software for financial analysis, etc.
- Communication tools: for disseminating the results of monitoring to the government, WSAs, service operators and customers.

The tools required for each monitoring activity are listed in the Annex. These can not only be adapted to the specific activities put in place for each type of service, but also be used alongside the monitoring body's own methodologies.

» *Material resources*

This includes a 4x4 vehicle, which is the largest expenditure item but is also often required for carrying out monitoring visits to very remote areas. For areas that are easier to access, this can be replaced by smaller vehicles or even by motorbikes, especially where services are situated in close proximity to each other. Office and computer equipment and other resources (photocopier, computer, printer and internet access) should be determined in accordance with the specific monitoring requirements.

THE MONITORING CONTRACT

» *Length of contract*

The length of the contract is dependent on the financial investment that needs to be made by the monitoring body. Ideally, the cost of this investment should be amortized by the end of the contract; hence, an appropriate contract length is considered to be between 7 to 10 years, with a minimum duration of 5 years. This may also involve a trial period, at the end of which the monitoring body is confirmed in its role and can thus invest in the various resources (office and IT equipment, means of transport) required to cover the duration of the contract.

» *Data collection, technical and financial analyses*

The monitoring contract should include a detailed description of the data collection methodology. In particular, it should list the data required to characterize each

scheme, as well as the frequency with which this data is to be collected. It should also specify which indicators and technical and financial ratios should be calculated in order to assess the quality and sustainability of services.

» On-site reporting

The on-site reporting of any observations made during monitoring inspections and the presentation of the monitoring body's recommendations are both very important activities and should thus be identified as such in the contract.

» The role of monitoring in 'information support'

Part of the monitoring body's role is to support the service operator and respond to the operator's questions to the best of its ability. This 'information support' role, generally much appreciated by local service stakeholders, is often conducted informally. It is, however, possible to include a specific clause in the contract requiring the monitoring body to be available to respond to queries and requests from local actors.

» Other activities

A monitoring mechanism can also be utilized to support activities not strictly related to monitoring (see the 'How monitoring supports other functions' chapter). Some of these activities could potentially be included in the monitoring contract, but would require specific funding.

» Monitoring reports

The format of the report that the monitoring body is to submit to the different service stakeholders can be stipulated in the monitoring contract. This report should ideally include:

- Figures on technical monitoring undertaken, including water quality analysis.
- Figures on financial monitoring, including accounting and financial analysis.
- Recommendations for the WSA and service operator.
- The progress against objectives of the monitoring body itself.
- Challenges encountered.
- Tasks carried out by monitoring body staff.

» Monitoring body staff

The list of monitoring body staff is approved by the signatory of the contract, who reserves the right to request the recall or replacement of any staff member whose work is not up to standard.

Should a monitoring body employee be absent on sick leave for more than one month, this employee is to be replaced by another member of staff in accordance with the employment legislation in force. This replacement should be at least as

equally qualified as the person being replaced. Professional staff may not be replaced without prior approval. If, over the course of the contract, the monitoring body has to recall or replace a member of its staff, the monitoring body is to bear all associated costs.

EVALUATION OF THE MONITORING BODY'S ACTIVITIES

The monitoring body's work is to be regularly assessed. Evaluation should be conducted by either the state or the signatory of the contract and be based on objective indicators, such as:

- The timely submission of documents.
- The relevance of the recommendations provided to the WSA and to the service operator.
- The availability of the monitoring body to respond to stakeholder queries and requests between site visits (e.g. from the WSA, customers, the service operator and from any relevant water authorities).
- Tests carried out on the potability of water.
- Relationship with other actors.

Conclusion

Regulation is essential as a means of assessing both the quality of water services and the accessibility of this service at a price affordable for all. This is particularly true in small towns where the capacity required to ensure the effective delivery of water services (whether at the level of the contracting authority or the service operator) is not always available.

Regulation encompasses a range of functions (which vary depending on the country and national strategy), is often conducted on different levels (from local to national) and requires the input and cooperation of a number of different entities (notably to collect and submit water supply service data, analyze service performance, compare service operators, apply corrective measures, impose sanctions, etc). Regulation thus involves a wide range of actors: the WSA, the service operator, any devolved technical departments, national water authorities, etc. To coordinate all these actors and ensure all necessary skills and appropriate tools are available, it is therefore essential that there is a clear institutional framework in place.

The monitoring of water services (including technical inspections, financial analyses of the service, management assessments, on-site reporting, reports and back-up support for local stakeholders) has four main benefits.

Firstly, monitoring helps to **significantly improve the quality and sustainability of service:** through both the indicators provided and recommendations made it provides professional support to stakeholders involved in water services, enabling them to build upon and further develop their existing capacity. This support may, for example, contribute to reducing the number and duration of service interruptions, to optimizing operating costs, to improving the financial stability of the service and to increasing and securing the system's financial savings and reserves (which are there to finance equipment renewal, in particular). Monitoring can also serve as a tool for increasing the transparency of water governance: the public reporting meetings held with all local actors provide a regular reminder not only of their respective roles and responsibilities but also of the need to pay a fair price for water consumed; they also help explain how this money is subsequently used and help gain public acceptance for any future price increases.

Secondly, monitoring is a **particularly useful tool for strengthening the regulation** of water services in small towns. Monitoring data, once properly analyzed, consti-

tutes a reliable and regularly updated source of information that both enables the authorities responsible for service delivery to effectively control the service, as well as informing any regular regional or national reporting on compliance with sector rules and strategies.

Thirdly, monitoring on its own **performs certain regulatory functions.** In particular, monitoring checks that tariffs comply with any national rules on pricing and are aligned to actual operating costs, and that service quality standards are being met. It also informs and instructs customers on the performance and pricing of the services they receive, helps oversee the quality of water distributed and reports on the volumes of water extracted from the water resource.

Lastly, in addition to supporting improvements in the regulation and quality of service of piped water schemes, monitoring also **helps reinforce management within the sector, optimize the mobilization of finance and oversee any initiatives to pool the financial resources that support water services.**

Above all, a monitoring mechanism produces and disseminates information. Under no circumstances should a monitoring body be directly involved in the organization or management of water services, nor should a monitoring mechanism seek to define or impose rules and regulations. These activities are typically the remit of the regulatory agencies and not the monitoring body, which does not have the authority to impose action, demand changes in management or apply penalties if rules are not being respected.

In conclusion, monitoring appears to be an extremely appropriate tool for addressing many of the structural weaknesses in the management of water services in small towns. The monitoring and regulation of water services should be designed and implemented at the same time, as these are two mutually reinforcing mechanisms.

Annex: details of monitoring activities in Mali

ACTIVITY DESCRIPTION	ACTOR INVOLVED	ACTIVITY DETAILS
Activity 1: Technical inspection		
Assess the working condition of equipment and infrastructure	Contracting authority	Site visit to assess the condition of hydraulic and electromechanical equipment, read the meters (raw water, generators, dosing pumps, etc.), conduct physicochemical analyses, record production incidents.
Activity 2: Financial analysis		
Provide accounting assistance to associations	Water service operator	Report on accounting records. Compare cash book entries, bank records, supporting documents and how accounts are accessed and signed off.
Record income and expenditure		Check all information to be provided by the water service operator, as specified in the contract.

RESOURCES REQUIRED	FREQUENCY	DATA TO BE COLLECTED	DATA COLLECTION TOOLS
Electro-mechanic (Advanced technician with 2 yrs of higher education or Engineer)	Monthly for some activities (quantities of water pumped and sold, pumping duration, etc.). Every six months for the other activities.	• Readings of production and distribution meters. • Energy consumption. • Water analyses (color, PH, conductivity, iron, Ni, Cl, etc.). • State of the environment. • Groundwater level.	• Multimeter. • Chlorine analysis kit. • Water level measurement probe. • Pressure measurement device. • Stopwatch.
Accountant (2 yrs of higher education)	Every six months.	• Cash book. • Bank books. • Supplier invoices. • Client invoices.	• Half-yearly visits to the monitoring body's offices by accountants to present accounting documents. • Data entry.
Accountant (2 yrs of higher education)	Every six months.	• Client invoices. • Information on the breakdown of expenditure by expense type (salaries, energy, repairs, maintenance, etc.).	• Data entry.

ACTIVITY DESCRIPTION	ACTOR INVOLVED	ACTIVITY DETAILS
Activity 3: Management assessment		
Check operator's compliance with obligations	Contracting authority and operators	If applicable, compare the record of service delivery against any specifications in the operator's contract (rights and responsibilities of the contracting authority and the operator) and check administrative documents.
Management assessment	Operators	Compare technical and accounting data.
Activity 4: Reports		
Mid-term report 1	Contracting authority, operators, users and the state	Mid-term report (half way through the financial year) that includes: the operating account and management assessment.
Mid-term report 2		Annual report that includes: operating accounts; management assessment; depreciation calculations; stock values; information on other operations and an overall review.
Activity 5: Presentation of findings on site		
General meeting in each village	Contracting authority and users, attended by the state	On-site presentation of management results.
Activity 6: Back-up support		
Assistance upon request	Contracting authority, operators, users and the state	Assistance provided to different actors (WSA, operator, users) to resolve specific issues. If travel is required, these additional expenses will be invoiced to the actor that made the request.
Optional Activity		
Monthly monitoring	Operators	Send a series of service operation indicators (e.g. production, water sales, presence of chlorine, etc.).

RESOURCES REQUIRED	FREQUENCY	DATA TO BE COLLECTED	DATA COLLECTION TOOLS
Economist (4 yrs of higher education), but may also be delegated by the monitoring body.	Every six months.	• Pertinent details of any contracts nearing expiry.	• Updated administrative schedule.
Economist (4 yrs of higher education)	Every six months.		• Financial analysis software.
Electro-mechanic Economist	Every six months.	• Mid-term report.	• Computer.
	Every six months.	• End-of-year report.	
Economist (4 yrs of higher education)	Every six months.	• Presentation of the assessment of management performance to all actors.	• Site visit (vehicle).
All monitoring body staff	Upon request.		• Telephone
	Monthly or quarterly.		

In small towns in developing countries, the management of drinking water supply networks is regularly faced with issues that undermine both the quality and sustainability of services. To address these issues, several countries have introduced technical and financial monitoring mechanisms to measure the quality of services and thus improve governance and performance of water services.

This document describes the technical and financial monitoring mechanisms currently in use in these countries. It also provides a detailed understanding of the indicators used and outlines the advantages of monitoring, such as improvements to service quality and support to regulation. This publication also includes recommendations on how to put such mechanisms in place.

Intended for national decision-makers, water services authorities, operators and stakeholders, the aim of this publication is to promote a more in-depth understanding of technical and financial monitoring. More than just a supervisory and support tool for small piped water schemes, technical and financial monitoring is key for developing and driving the sector.