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"PRICE OF WATER"

Working paper on Water Costs, Tariffs and Subsidies

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Concept and realisation
François Münger (SDC) and Roger Schmid (Skat)

Contributions
Bernard Collignon (Hydroconseil), François Münger (SDC) and Roger Schmid (Skat) based on various selected publications

Peer review
Peter Beez (SDC), Adrian Maître (SDC), Agnès Montangéro (Skat), Manuel Thurnhofer (SDC) and Thomas Zeller (SDC)

This document can be obtained through
Swiss Agency for Development and Cooperation (SDC), SoDev, Freiburgstr. 130, CH-3003 Bern, Switzerland
Information: francois.muenger@deza.admin.ch
www.deza.ch

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Acronyms and Abbreviations

AFD ..... Agence Française de Développement
Aguas Arg..... Aguas Argentinas
ANEPA ..... Agence Nationale d'Eau Potable et d'Assainissement (Mauritania)
BPD ..... Building Partnerships for Development
DBL ..... Design-Build-Lease (arrangement)
DC ..... Domestic Connection
DDC..... Dar es Salaam City Commission
DSSD ..... Dar es Salaam Sanitation Department
EDF ..... European Development Fund
EDM ..... Energie du Mali
ESSBIO ..... Empresa de Servicios Sanitarios del Bio-Bio (Chile)
FDE ..... Fonds de Développement de l'Eau (Ivory Coast)
HC ..... House Connection
HDPE ..... High Density Polyethylene
HP ..... Hand pump
KfW..... Kreditanstalt für Wiederaufbau
l/d.c..... Litre/day per capita
LYDEC ..... Lyonnaise des Eaux de Casablanca (Morocco)
MDG ..... Millennium Development Goal
NGO ..... Non-Governmental Organisation
O&M ..... Operation and Maintenance
OBA..... Output-Based Aid
ONEA ..... Office National de l'Eau et de l'Assainissement (Burkina Faso)
ONEP ..... Office National de l'Eau Potable (Morocco)
POP..... Pequeno Operador Privado
PVC ..... Polyvinyl Chloride
REGIDESO ... Régie de Distribution d'Eau (République Démocratique du Congo)
SADC ..... Swiss Agency for Development and Cooperation
SNDE ..... Société Nationale Des Eaux (Mauritania)
SODECI..... Société de Distribution d'Eau de la Côte d'Ivoire
SP..... Stand Post (water kiosk)
SSIP ..... Small Scale Independent Provider
TMH..... Total Manometric Head
TSh..... Tanzania Shillings
UNDP ..... United Nations Development Program
WHO..... World Health Organization
WSP ..... Water and Sanitation Program
WSS ..... Water Supply and Sanitation

Foreword

Water is the pivotal element around which societies are organized and it is one of the most precious good that people have to share with others; water is essential for all forms of life and access to sufficient drinking water to live (20-100 litres/capita) is a human right.

On the one hand water is a common good that cannot be treated as a commercial product like any other, but on the other hand water supply service provision needs large investments and generates significant operation and maintenance costs, which have to be paid for. But, how to calculate the adequate tariff? What is the most appropriate tariff structure? What tariff is affordable for the poor? These questions have been largely addressed and documented for urban areas mainly, and to some extent for small towns (World Bank Small Town Initiative), but very little only has been thematized for the case of rural areas.

In response to a demand of the Central American division of the Swiss Agency for Development and Cooperation (SDC), the agency's water desk has directed the realisation of the present working paper aimed at giving an overview of existing tariff systems worldwide and describing their contexts and applications. The paper will serve initially as a base for the discussions that our SDC colleagues will have with their partners on water costs and tariffs in the Central America region. In a second step, and based on the outcomes of the above-mentioned work, the document will be improved for becoming a practical tool guiding SDC's interventions in the sector.

Preliminarily we would like to remind the reader that tariff setting and pricing of water are not simple technical issues and that they can be tackled from different angles depending on the economic, environmental or social point viewpoints and their reconciliation. In most cases, tariffication is furthermore a political issue, which requires a sound implementation strategy. After all, tariffs in rural areas need to be transparently discussed with the communities before project implementation. In a demand responsive approach, where the financial participation of the population is proportional to the level and quality of the services to be provided, it's the responsibility of the project designers to offer options (with their respective financial implications) to the community and to be assured about the people's willingness and capacity to pay for the option chosen by the population.

We would also like to highlight here that, as a development agency which recognizes water as a human right, we have to pay special attention to ensure that the entire population has affordable access to the services we support - even the poorest and marginalized groups. But as it's perhaps not always possible to achieve this reality through appropriate tariffication, the implementation of subsidy schemes and special financial mechanisms may be necessary.

Pleasant reading.

François Münger
Senor Water Advisor, SDC

Executive summary

To reach the water related millennium development goal (MDG) requires increasing the performance of the water sector as well as of the investments made in this sector. An important aspect of high performance is the sustainable management of the services, which have to be at the same time available for all the population as one of the most important human right.

A performing financing of the systems taking into account all costs and revenues as well as the ability and willingness to pay of the consumers is key to long-term sustainability. Governments, development agencies and communities in many parts of the world are struggling with the financing issue and few countries only have realistic policies, strategies or plans for cost recovery and sustainable financing for increased service coverage, particularly for the poor.

The present document provides an overview of the current state-of-the-debate and trends regarding the issue of "water costs, tariffs and subsidies", shows evidence from several practical cases, highlights open (unsolved) issues and gives guidance for choosing promising approaches to the problem in various contexts. The key aspects addressed in the document are summarized below.

Water cost and water tariff

Water production and distribution costs vary very much according to local conditions. The concept of a universal water cost is an absurdity. Each community or municipality needs to evaluate specifically the costs of providing the water services it wants to develop. Water service cost analysis needs to be done very carefully, with reliable local data. It is recommended to distinguish upfront investment costs, running costs and expansion costs. For this, the document presents the main cost components for various technical options.

The water tariff should reflect the water costs in order to achieve coverage (most customers having access to proper water services) and to guarantee service reliability. Nevertheless, the water tariff is not equal to the water costs, as it takes into account subsidies as well as profits and losses. Indeed, if private sector skills are to be mobilized to improve the service delivery, then profit must be accepted as part of the equation. The document presents the main tariff structures encountered in the sector, altogether with their respective pros and cons, whilst highlighting those that appear to be more suitable for rural water supply systems.

Subsidies and cross-subsidies

Subsidies can support the difference between water cost and water tariff for some time. This is a commonly encountered situation during the first investment phase of rural water supply schemes. Nevertheless, as it is difficult to secure subsidies on the long term, the running costs must be fully supported by the tariff and eventual cross-subsidy mechanisms.

Cross-subsidies are a powerful tool to enlarge service coverage to low-income and rural areas. They were e.g. a key factor for successful service expansion in rural Ivory Coast and Morocco. However, any kind of subsidy needs to be very carefully designed and monitored in order to really benefit the poor.

"Water for free for the poor" is a promising concept in rich countries where the percentage of poor people is low. The concept is however more questionable in poor developing countries where water system coverage is still low. Poor rural communities are ready to pay for water and this willingness-to-pay is a key factor of success to develop effectively and sustainably rural water supply. Each community is entitled to decide the level of service it can afford now and in the future.

Cross-subsidies can also be implemented between water and sanitation services. Pricing sanitation alone is difficult and cost recovery through the water bill makes much sense when the same operator provides both services. It is easy to set up such cross-subsidy mechanisms with sewerage services, but it is also possible to do so with on-site sanitation systems (as e.g. ONEA did it in Burkina Faso).

Some successes and failures

The chapter on successes and failures presents some exemplary cases where water tariff policy played a major role in water service provision enhancement or deterioration. Namely in:

- Ivory Coast, were cross-subsidies have been very effective in facilitating urban poor and rural communities to access modern water supply services. This tariff policy was supported by specific financial tools (Fonds National de l'Eau) facilitating cross-subsidy mechanism implementation;
- Mauritania, where the national agency supporting water supply for rural towns has been hampered by government refusal to fix sound tariffs. Water utilities relying on subsidies to survive are in fact very sensitive to the politicians' goodwill;
- Chile, where direct subsidies are an efficient and cost-effective way to facilitate access to water for the poor. Such subsidy schemes need however to be designed very carefully and can take advantage from aggregation with other direct subsidies to the poor such as for electricity, school and health;
- Paraguay, where the competition amongst different "aguateros" for capturing new customers has proven to be very effective in regulating the tariff. The water service delivery is not a natural monopoly and communities can benefit from some level of sound competition between service providers.

A. Introduction

Water supply and sanitation (WSS) services are known to provide economic benefits to communities in the form of health, opportunities for women and poverty reduction. Given the overall societal gains that can be achieved, it is widely accepted that access to water and sanitation services are a basic human need and right and must hence be improved, especially for the poor, who are the most likely to lack access to these services.

Increasing access to WSS services for communities in the developing world is one of the major challenges in today's global development agenda. To reach the water related millennium development goals (MDG) for water and sanitation requires increasing the performance of the sector as well as of the investments made in it. But it is not just a question of building and expanding new infrastructure to unserved areas. An important aspect of high performance is the sustainable management of the services, which have to be at the same time available for all the population of today and in the future. Hence, there is a need to maintain and rehabilitate existing networks, to improve the service quality and to protect the natural resources.

Construction, operation and maintenance of a water system involve huge costs. Sharing fairly these costs among all system customers is a prerequisite to the sustainability of the system and to the quality of the service. The legitimate costs of water services must be covered either by users through water charges or by direct government subsidies from the tax base. Ultimately someone (user, citizen) has to pay to ensure service provision; otherwise the water system will quickly fall into disrepair. The design of sound cost recovery mechanisms requires a clear understanding of the different options and their impacts on the customers on one side, and the service providers on the other. From these different options, some are more efficient than others as some ensure more solidarity towards poor families.

A performing financing of the systems taking into account all costs and revenues as well as the ability and willingness to pay of the consumers is key to long-term sustainability. Governments, development agencies and communities in many parts of the world are struggling with the financing issue and few countries only have realistic policies, strategies or plans for cost recovery and sustainable financing for increased service coverage, particularly for the poor. Community organisations, municipalities and small service providers are often failing to generate the revenues needed and all are in need of guidance and support in the form of policy and institutional models based on real experience, to develop appropriate financing and cost recovery mechanisms. In particular there is a need to shift the focus from models that look at the financing of individual systems to those that deal with service provision to entire populations – otherwise the necessary support structures are left out of the picture and hence become a potential source of failure.

In rural and low-income urban areas user-based cost recovery strategies are crucial, as local governments and communities are progressively made responsible for the financial management of their system. However, to date, such responsibility has too often been limited to the funding of system management as well as organisational and short-term maintenance costs with, in some cases, a minor contribution to capital costs and without other mechanisms to assure a healthy model of financing on the long term.

Against this backdrop, the present working paper addresses the aspects of water costs, tariffs and subsidies in the context of developing countries. It provides an overview on the current state-of-the-debate and trends regarding the issue of "Price of Water", shows evidence from several practical cases, highlights open (unsolved) issues and gives guidance for choosing promising approaches to the problem in various contexts. The document pays a special attention to poor rural localities, where cost recovery is not easy to achieve and where, for this reason, the attainment of the MDGs requires specific efforts and tools.

B. State-of-the-debate

B.1. Different services - different costs

There exist various options for rural water supply such as traditional hand dug wells, modern wells, boreholes with various pump models, piped water distribution systems flowing with gravity or with pumps, etc. Investment as well as operation and maintenance (O&M) costs vary widely from option to option. It is not always legitimate to compare so different technological options, as they do not provide the same service (the error is to compare pears and apples) and as the selected option depends on the physical situation (altitude of the source and the settlement, groundwater depth and quality, etc.).

Nevertheless, costs have been documented in various environments for each of these technological options and cost analysis for each one is a relevant contribution to decision makers, when it comes to:

(a) Cost national or local investment plans;

(b) Define national policies on cost recovery;

(c) Design a local water system on the most cost effective way;

(d) Provide the community with the financial information necessary to set a water tariff;

(e) Fulfil controlling functions on different levels regarding efficiency and transparency.

B.2. Water service cost analysis

A community, a municipality or a water utility (public or private) has to look at water service costs at different stages of a project:

- Before engaging in the first investment, when the owner has to decide if the funds are to be used for water supply or another public service;
- When it comes to run the system;
- When it comes to consider systems aggregation;
- When it comes to expand the service to reach new customers.

B.2.1. Upfront investment

a) The main components

Cost analysis have been published for many rural water systems built during the last ten years and it constitutes a sound basis to estimate the investments necessary to provide water to a small community.

The table on the following page illustrates this cost analysis for various technical options. It shows that:

- Per capita investment for small communities ranges from 20 to 50 US$;
- Network development is the main cost component, but house connection costs should not be neglected, especially if they are metered;
- Water source mobilization is the major cost component only in the case of borehole and hand pump systems.

Investment costs (US $)	3 dug wells + hand pumps	2 boreholes + hand pumps	gravity flow system + 3 SP	Diesel genset + 3 SP
Water source	12 000	16 000	20 000	25 000
Pumping	4 000	4 000	*none*	10 000
Storage	*none*	*none*	3 600	3 600
Network	*none*	*none*	7 500	7 500
Standpipes	*none*	*none*	3 000	3 000
Total (US$)	**16 000**	**20 000**	**34 100**	**49 100**
Per capita investment	***16***	***20***	***34***	***49***

Hypothesis:

- *Ground water source (= chlorination is the only water treatment)*
- *1,000 inhabitants community*
- *Storage = 20 l/d.capita*
- *Network: 3 standpipes + 750 meters (250 ml/SP)*
- *Procurement through a competitive public bidding process*

Table 1: Typical investment costs for a rural water supply system

b) So many options

It is not reliable to fix something like a universal standard water cost (or even a regional or a national standard), as production costs significantly vary according to local conditions (altitude, slope, geological settings) and the technical options. For this reason, it is difficult to compare water costs from operator to operator, if they do not use the same equipment standards (see table below) and if they are not bound by the same constraints.

Diameter	PVC (PN 16)	PEHD (PN 12,5	Ductile Iron	Galvanised iron
40	4	6		10
50	5	12		13
63 / 60	7	15		16
75 / 80	11	20	25	30
90 / 200	15	30	30	
125	22	40	40	
150 / 160	30	50	60	

Table 2: Different pipe unit costs (US$/ml)

c) Public and private investors do not choose the same options

Many private investors tend to select the cheapest technical option, as they feel very concerned about the investment risks - their contract with the municipality can be cancelled. An efficient way to reduce their investment risk is to invest step by step, depending on the sales increase.

In Maputo (Mozambique), some 400 small private operators (Pequeno Operador Privado - POP) have invested in their own water supply systems and distribute water to 30% of the capital city population. They do not invest in large storage tanks, but buy small HDPE tanks instead. Whenever their customer basis increases, they just add a new tank. From a financial long-term perspective, this may not be the best option, but it has proven to be an efficient way of risks management.

On the other hand, public investors, benefiting from cheap loans or grants, tend to select expensive options, as they are less concerned about the investment costs (government will pay for it) and they are more concerned about the running costs.

Local versus national procurement in Vietnam

In rural areas, local water service providers invest in small water systems in a very cost effective way, as they bear the whole investment burden. Typical investment ratios range from 10 to 30 US$ per capita.

In the same country, procurement of rural water systems by the Central government, through international bidding processes, is much more expensive. Typical investment ratios range from 20 to 60 US$ per capita.

Photo 1: Private storage tanks in Maputo (Mozambique)

d) Local and private procurement is often cost effective

Investing in a water system is not only about paying pipes and pumps. There are huge additional costs that can make the investment very expensive (controlling works, opening trenches, securing access to land, etc.). For this reason, local procurement is often cost effective, because local entrepreneurs are efficient in managing labour and land issues.

e) Self-supply

A large number of rural householders and small groups invest to provide convenient water supplies, which they manage and maintain themselves. Self supply is a demand-driven approach, driven by the owner's willingness to invest in improved water supply and its management. It presents a low-cost alternative to conventional communal supplies and their associated high-cost technologies, and offers a more sustainable solution among small communities and scattered households. It includes improved availability of water from an increased number of supplies (such as traditional sources and rainwater harvesting); improved water quality (source protection, improved water collection and storage practices, and household water treatment); and, improved water lifting. Self supply offers choice of technology, progressive upgrading, and replicability with little (if any) dependence on outside funds.

The enthusiastic grass-roots response in several countries suggests that it is an approach that deserves wider application, and is capable of bringing about rapid and widespread change among the most remote of rural communities and, if recognised as a legitimate source of supply, could make a substantial difference to meeting the MDGs. However, policymakers tend to regard them as a liability to be replaced rather than improved or augmented, and rural water supply strategies continue to concentrate on communal supplies for groups of 200 to 500 people.

B.2.2. Running the system

When it comes to run a water system on a reliable way, the operator has to bear the running costs. According to the options selected during the investment phase, the operator will have very different O&M costs as enumerated below:

- **Power** costs make the big difference between gravity flow (no power) and other systems. The power source is also a major discrimination criterion. Fuel represents generally 10-25% of the running cost for a diesel powered system. Whenever a power grid is available and reliable, it is by far the most cost effective option (see table 3).

- **Staff** costs depend on system complexity (with or without generator) and the customer service (standpipe (SP) distribution is very expensive per m^3, because a SP attendant cannot sell more than a few m^3/day). Some communities try to manage the system without professional staff, in order to save staff costs. This option is only feasible for very simple systems (dug well, hand pumps, gravity flow systems without house connections) because for more sophisticated systems, a professional operator is the most cost effective option (in order to improve efficiency, maintenance and system lifespan).

- **Repairing** pumps and generators is one of the most sensitive cost components. A breakdown has to be repaired very quickly, as it stops immediately service provision.

- **Repairing the network** constitutes a key factor for reducing leakage and extending system lifespan. For this reason, expenses for network maintenance should not be restricted, as they are very cost-effective (less than 1%/year of the network value).

- **Water treatment / chemicals.** Here the water source makes the difference: groundwater treatment is rather inexpensive (a simple chlorination is generally enough, costing ~1 US cent/m^3), surface water requires a more sophisticated treatment (10-20 US cent/m^3) and seawater desalination requires a 100-200 US cent/m^3 treatment; hence seawater treatment is almost unaffordable for poor communities.

- **Renewing pumping equipment** is one of the most challenging cost for a small water system operator, as it is, to some extent, unpredictable (e.g. generator breakdown, solar panels stolen).

- **Renewing pipes and storage tank** is generally not a tremendous issue. Pipes are replaced piece by piece every month, according to network leakages (it can be included in repairing costs) and good storage tanks last for many decades.

- **Managing the water utility** requires specific costs (renting an office, buying computers, hiring good managers). Some communities try to avoid these costs by using a simple community based management option where the general assembly decides everything. This is rather a political but barely an economic choice, since making savings on the cost of a proper system management is never a cost effective solution as often system efficiency and lifespan are reduced through this.

- **Taxes / duties**. Water is a basic public service, but that does not mean that it should be exempted from any duties. As it is easier to recover taxes from water customers than from public light customers, it makes sense to use the water bills as taxation basis. Claiming for “no taxes on water” just obliges the government to collect money somewhere else.

All these costs depend on the water source, system complexity, network extension and power source. As an illustration, the table on the following page details water production costs with various production devices. As can be seen, production costs vary widely according to the physical context (a gravity flow distribution is 10-20 times cheaper than pumping), but also according to technical option chosen (e.g. solar power is three times more expensive than grid power).

Water production costs (US cent/m^3)	Gravity flow	Solar pumping	Diesel genset	Electrical grid
Power	0	0	4 ~ 8	2 ~ 4
Staff	1 ~ 2	1 ~ 2	2 ~ 4	1 ~ 2
Repairing pumps	0	1 ~ 2	3 ~ 6	1 ~ 2
Chemical (chlorination)	1			
Renewing pump and genset	0	20 ~ 40	3 ~ 6	1 ~ 2
Renewing boreholes/catchment	0,5 ~ 1	2 ~ 4		
Total	3 ~ 6	25 ~ 49	13 ~ 29	8 ~ 15

Hypothesis:

- *Ground water source (= chlorination is the only water treatment)*
- *5,000 inhabitants community supplied from a single water source*
- *Daily consumption = 30 l/d.c*
- *Fuel price = 0,8 $/l*
- *TMH = 50 m*
- *excluding long life span facilities amortizing (storage, pipes)*

Table 3: Groundwater production costs (in US cent/m^3)

B.2.3. Aggregation

"Aggregation" is defined as the grouping of several municipalities / utilities into a single structure for the provision of a particular service. The main driver for aggregation is usually the potential to realize economies of scale by providing services to a larger customer base and therefore to render services more efficiently and at a lower cost. Despite the case for aggregation being easy to construct, aggregation does not take place as often as one may think, and it has a relatively high risk of failure because political will is lacking, the potential benefits are not clearly understood, or the aggregation process is perceived as too complex.

However, multi-villages schemes aiming at improved services at reduced costs (economies of scale) have been put in place in various contexts ranging from 200–2'000'000 inhabitants. Very positive experiences with multi-villages schemes have been reported from Senegal where aggregations from 500–600 inhabitants yielded effectively in significant economic advantages. The biggest challenges observed with these schemes are the social and political issues however (2002, WSP).

B.2.4. Expansion

a) Financing profitable expansion

Expanding an existing system is often a cost–effective solution to supply water to additional customers. Economies of scale can be achieved at the production level e.g. by using the same borehole with a more powerful pump or by exploiting the same treatment plant. O&M costs can be reduced with specialized teams dedicated to specific tasks (running pumping station, leakage detection, etc.). Most operators in such a situation try to expand the system by themselves, as it is a profitable operation. They use the revenue of the existing water system to invest in network expansion.

b) Financing unprofitable expansion

More difficult are situations where expansion is unprofitable. It is a frequent situation in rural areas, when a system is extended from a dense customer area (where the original system has been build) to reach more remote villages or districts.

The marginal cost to reach the "last" customers increases with system expansion and there exists always a threshold where system expansion is not anymore economically possible[1]. How to finance expansion in such a situation? Often it is necessary to increase the water tariff for existing customers, in order to make additional funds available to connect new settlements and villages.

In Morocco, the ONEP is facing such a situation. This national public utility has pretty well managed for a while large water system across the country. It provides water to one million households, most of them living in 400 small rural municipalities and in about 5'000 villages. Since 2002, the government has requested ONEP to expand the service coverage to 8'000 more villages, most of them isolated in remote mountain areas. The challenge is exiting, but such a service area extension is unprofitable and cannot be achieved without a tariff increase in the existing service area.

B.3. Cost and tariff

B.3.1. Does the water tariff bear the water cost?

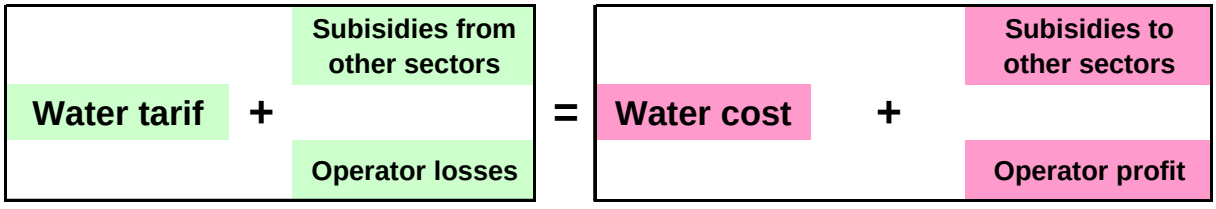
The water tariff is never exactly equal to the water cost. But the difference between costs and tariff can make the whole system unsustainable on the long run. For this reason, the difference needs to be calculated and discussed with all stakeholders in order to organise cost recovery and to guarantee service reliability on the long-term. Causes for differences between costs and tariff are numerous:

- The tariff (water sales) is not the only source of income for a water utility. Subsidies coming either from the central government, the local government or international funding agencies are very common in the water sector.

- The water business requires long-term investments, as it is impossible to recover the investments made in a single year. But the tariff cannot be adjusted every year according to the investments made during the year. For this reason, water operators are not looking for a profit every year, but rather for an average profit margin. 30-years concession holders generally consider that they have to bear losses during the first 5-8 years before reaching the profitability breaking point.

- Water services are often financially connected to other public services. Profit on water sales can e.g. be used to finance sanitation. Some multi-utilities manage also power supply, where profit margins can be higher and allow for cross-subsidies on water.

For all these reasons, the water tariff is never exactly equal to the water cost. It reflects also the level of subsidies provided to the water sector (or the subsidies provided by the water sector to another, as sanitation) and operator profit (or losses). The most common relationship between water tariff and cost includes subsidies as well as profit / losses as displayed in the equation below.



[1] *Such a threshold has been modelled e.g. in Senegal for multi-village systems (WSP, 2002).*

B.3.2. Subsidies

For a century, the water supply sector has been benefiting from public subsidies in many countries[2]. Subsidisation has become so common that many water utilities rely on public subsidies to finance most of their investments and even to cover some running costs. Through this they are addicted to subsidies and unable to finance by themselves network renewal and moreover expansion.

a) Subsidies for initial investments

Strong arguments advocate for financing main water assets with public money:

- Water resources are considered as a public good in most countries and cultures and it makes therefore sense to develop them with public money (for dams, boreholes, etc.).
- As water supply systems have a very long lifespan, private investors ask for long duration contracts (typical duration is 30-50 years for concessions). But which government in a developing country can guarantee contract stability for such a long period? It therefore makes sense for governments to finance the main system components (production facilities, storage, primary network) and to contract a private operator under a lease agreement.
- In order to reach the MDGs, it will be necessary to invest US$ 100 billions in water supply services development during the next 8 years. Customers and private investors will not pay for the whole bill, hence public money from national governments and international agencies will be necessary.

During the coming years, most large investments in water systems in developing countries will benefit from some level of subsidy. There is a general consensus that even if public money is not always the most efficient way to expand service provision (because it depends on the politicians' goodwill), it has to be considered as a key tool to reach the MDGs in the poorest countries. When using subsidies, potential drawbacks should be kept in mind (2007, SDC):

- Dependencies: this is a frequent situation for poor communities benefiting from an expensive water system and then being unable to bear the O&M costs and moreover the renewal costs (e.g. photovoltaic panel for solar pumping);
- Market distortions: a community getting a borehole for free will refuse afterwards to pay the fair price of a simple dug well.

b) Subsidies to run the system

Subsidies to run water systems are criticized with strong arguments by most experts, and this for the following major reasons:

- As public money is linked to political goodwill, the water utility can suffer and even collapse whenever the money flow stops. This has been the case in many central Asia countries during the nineties.
- When the system operator gets most of his income from the government, then he has fewer incentives to reduce running costs than when he has to struggle to recover cost from the customer base.

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[2] It has been a common public policy during the last century to subsidise water services in order to improve public health. But it has not been like that forever. The main WSS of London and Paris have been developed some 150 years ago by private investors, using bonds to finance system construction.

Whereas most experts agree that running costs should be supported by customers and not by subsidies, many public water utilities still rely strongly on subsidies to run their systems. There are many ways to subsidise operating costs:

- Direct subsidies to the utility - a frequent situation when the water service is completely incorporated in the global municipal activity, without specific financial management;
- Direct subsidies to the households (as it has been developed in Chile – see D.3);
- Fuel subsidy - an important water cost reduction factor in oil producing countries such as Venezuela and Indonesia;
- Government-paid civil servants working for the water utility;
- Grants provided to the operator to encourage him connecting new customers (e.g. social connections programs or Output Based Aid funds for new connections).

From a very global point of view, subsidising some of the running costs of a water utility makes sense when a government wants to develop rapidly the water service coverage in order to improve hygiene, public health or urban sanitation. Such subsidies also make sense for sustaining improved water supply in isolated rural communities, who can hardly benefit from cross subsidies from other communities (whereas the urban poor can benefit from cross subsidization by richer urban customers). Nevertheless, field experience shows that many water utilities relying on subsidies to cover their running costs do not provide a good and reliable service on the long-term to all citizens:

- They are often poorly managed and do not struggle efficiently to improve their performance;
- They are not prepared to survive on their own when there is a breakdown.

Further, when the subsidies are insufficient to supply water to all citizens, the poor are generally the last ones to be supplied (inefficiently targeted), because they do not have the political linkage with the utility to attract investments in their neighbourhood: e.g. EDM, the water utility in Mali, provides very cheap subsidized water (0.2 US$/m^3) to only 5% of the households.

c) Direct subsidies to poor people

Economic theory (and practice) has a preference for subsidies to subjects (e.g. poor people) instead of objects (water price), as the latter means usually low efficiencies and distortions (subsidy to the wrong people). Administratively this can be challenging for developing countries. Direct subsidies to households are therefore not very common in rural WSS, whereas they are more common in the urban context (e.g. Chile, Colombia). In general it can be said that access for poor people can be assured through intelligent, targeted, non-discriminatory and transparent subsidies in the tariff (e.g. cross-subsidies from other consumer groups), or through direct subsidies (from the tax base). In water supply, subsidising connections rather than consumption might be more effective. Another important aspect is that differentiated service levels can give consumers a better choice.

National and/or local governments often introduce subsidies at various stages of the service delivery:

- Supporting financial costs (if the government supports the burden of debts);
- Energy costs, through a fuel subsidy;
- Services provided for free by local government civil servants (pumps replacement, spring catchments repair, etc.).

These subsidies account for an important part of the O&M costs in many rural WSS projects, but they are barely accounted for or even documented. They are not regarded by the water operator and/or the community as a direct subsidy, but somehow as an externality ("*the government has always paid for such investments and is supposed to do it forever*"). This conclusion is misleading, as the general financial equilibrium of the water sector depends on a clear understanding of "who pays for what".

B.3.3. What is the tariff due to cover?

In most countries, water companies have been benefiting from public subsidies for a while. Nevertheless, subsidies should never fund all water company costs, as it provides no incentive for performances.

There is a general agreement that the tariff should cover all running costs, as it is a crucial condition for the good maintenance of the system and the efficient management of the service. Concerning investment costs, policies differ from country to country, according to the government financial policy. In the same country, the policy can also vary with time, according to the public awareness and the customers' capacity-to-pay[3].

The table below illustrates the capacity of various water utilities to bear their costs through the tariff. Whenever a cost component is not fully financed, the company has to be subsidized by the government. As public subsidies always come to an end[4], the companies depending from such subsidies cannot implement a proper investment policy, or a good customer service.

Increasing important component of service sustainability	SNDE Mauritania	REGIDESO Congo	ONEA Burkina	ANEPA Mauritania	ONEP Morocco	ESSBIO Chile	Aguas Arg Argentina	SODECI Ivory Coast	Aguateros PARAGUAY	LYDEC Morocco
running cost (staff, power, chemical)										
production maintenance										
network maintenance										
customer connection										
investment in network										
investment in production										
investment for expanding system										
cross subsidy to low income areas										

fully funded by the tariff
partially funded by the tarif (government provides subsidy)
mostly large cities with poor suburbs
large cities and small towns
rural localities and villages

Table 4: What the water tariff funds varies from utility to utility

Further, at least in rural areas, identification of demands/projects is sometimes time consuming and demanding in terms of quality (feasibility, sound social basis for the project, do no harm socially / ecologically). This pre-investment phase, as well as the costs for follow-up

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[3] *"Peruvian legislation is particularly lucid in defining three stages of tariff convergence. In the first 18 months following the legislation, described as the 'etapa preparatoria', tariffs must cover operating expenditures while water companies work on defining their investment plans. There follows a five-year 'etapa de mejoramiento', during which tariffs should rise progressively to the level of long-run marginal cost, where they remain in the 'etapa definitiva'." (quoted from Foster, 2005).*

[4] *Most water companies in Central Asia suffer a strong decline after CEI collapse and public subsidies reduction.*

and audits should be included in the analysis of the full costs of a sector program / service delivery and the clients as well as local governments should make a contribution to this phase.

B.3.4. Profit and losses

Profit and losses are at the very heart of entrepreneurship. It does not make sense to request the private sector to invest in an unprofitable water operation. But profit in the water sector is often considered as illegitimate, because access to water is a basic human need and human right. Opposing profit making to providing good public services is meaningless! Nobody would criticize a farmer to make profit with his crop, although he supports obviously a basic human need and right.

As the MDGs are a difficult challenge, all service providers able to contribute positively to water service delivery should be welcome. And if they are professional private providers, then they will be looking for profit. We must accept this, as it is a precondition to attract in the water sectors some of the most efficient private operators. Here, a competent and respected regulatory authority can set the right incentives for private sector providers (competition for the market, benchmarking, performance objectives, etc.) whilst upholding the best interest of the public. Effective regulation is however required independent of the legal status of the provider (public / private / informal) and should be implemented by objectives and output (e.g. quality and quantity of the services) and not by process prescriptions and input requirements (e.g. fixed amount of yearly investment in piping).

B.4. Main tariff structures

B.4.1. Objectives of the tariff structure

Any water operator has to recover his costs, but according to the way he organises cost recovery, the impact on the customers and the water resources will differ. For this reason, and before drafting a tariff structure, the key stakeholders (water system operator, regulatory body, civil society) have to define their priorities, being e.g.:

- Guaranteeing service sustainability (a universal objective);
- Financing system expansion (whenever necessary because of insufficient coverage or population growth);
- Saving water (an important priority in water scarcity contexts);
- Serving the poor (whenever low income groups do not have access to a proper water services);
- Securing the customer basis (when excessive rates encourage industrial customers to produce their own water);
- Increasing the profit margin (when an operator is about to quit a non profitable business).

B.4.2. Different tariff structures

Water operators bill the customers according to various tariff structures. There does not exist a “perfect” universal tariff structure. Each one is designed to help the operator to reach specific objectives, agreed by the regulatory body (running cost recovery, improving service to the poor, sustainable system management, etc.).

- **Payment "when necessary":** the user community collects money when there is a need (e.g. a breakdown). This payment system is not a true tariff system, but it is an important second best option when a community has not secured a proper billing system.

- **Flat rate per container** (per bucket, per gallon, etc.): this is a very common system for urban water supply in low-income districts (standpipes, water kiosks). This payment system is always rather expensive, as a standpipe attendant wage has to be paid for.

- **Flat rate, per period of time** (e.g. 1 $/month, 20 $/year, etc.): this tariff structure is rather frequent for rural water supply systems (gravity flow system, dug well, hand pump), where metering would create high additional costs, without providing much additional benefits. It is also a frequent option for poorly managed water utilities, unable to introduce a proper metering system.

- **Fixed rate** (per m^3): billing per m^3 is the growing trend for urban water supply and even for rural water systems. It requires the operator to manage fair and reliable metering and billing systems and calls for a higher level of professional skills on the provider's side than a flat rate system: Further it discourages customers to waste water.

- **Increasing block tariff**: the tariff set per m^3 increases with the consumption (the more you consume, the more expensive is the m^3). Many water utilities in developing countries use such a tariff structure because it introduces a strong cross-subsidy effect between the rich (who pay more per m^3) and the poor, making through this modern water services more affordable for poor households.

- **Decreasing block tariff** is not very frequent in the water sector, as it is an incentive to use more water, but it is a very common tariff structure for power and it is sometime used for industry water supply, in order to capture profitable large customers.

The table on the next page compares the pros and cons of these different tariff structures and describes in which conditions they can prove to be an efficient tool for cost recovery and customer satisfaction.

Lessons drawn from this chapter:

- ***Water production and distribution costs vary very much according to local conditions. The concept of a universal water cost is an absurdity.***
- ***Water tariff should reflect water cost (but is not necessarily equal to it), in order to achieve coverage (most customers having access to proper water services) and to guarantee service reliability.***
- ***Subsidies can support the gap between water cost and water tariff for some time. But it is difficult to secure subsidies on the long term.***
- ***Access for poor people can be assured through intelligent, targeted, non-discriminatory and transparent subsidies in the tariff or through direct subsidies. Subsidizing connections rather than consumption might be more effective and differentiated service levels can give consumers a better choice.***
- ***If private sector skills are to be used to improve the service, profit must be accepted as part of the equation.***

	Pros	Cons	Successful application
Payment "when necessary"	Demand responsiveness (people pay only when they decide that the water system is a priority) No need of a proper banking system (access to a bank is a major constraint for many villages)	The delay between breakdown and repair is longer, because it requires the community to collect the money Unclear endorsement by the community who often fails to collect the money (some member arguing "the government has to pay")	Hand pumps, dug wells, some gravitational systems
Flat rate per container (e.g. per bucket)	It is the only affordable option for poor customer with irregular revenue (they pay water when they have cash; otherwise, they walk to a water source free of charge) It secures a minimal water service in area where many households are not connected	Huge management costs: standpipe attendant wage alone represents 30 to 60% of customer water tariff Very expensive for the customer, especially the poor (0,5 to 2 $/m^3)	Standpipes, hand pumps, water kiosks
Flat rate, per period of time (per month, year, etc.)	Money collection is cost effective (no need for meters or sophisticated billing system)	No incentive to save water Large and small consumers pay the same amount	Hand pumps, dug wells, most gravity flow systems (when water wastage is not an important risk)
Fixed rate (per m^3)	It is a very simple billing system It looks very fair from the customer's point of view (you pay what you consume) It is an efficient tool to improve water utility performances (reducing leakage, improving customer service)	Metering can be very expensive, especially in areas with low level of consumption	Most water utilities in rich countries Most small scale private operators running water networks More and more water utilities in poor countries
Increasing block tariff	Allowing for strong cross-subsidy between the rich and the poor, small and large cities, industrial and domestic customers	Whenever the poor are not connected, they do not benefit from the cross-subsidy Expensive tariff blocks impact negatively on poor customers buying water from connected neighbours	Many water utilities with a pro-poor policy and a high connection rate (% households connected in the service area)
Decreasing block tariff	Capturing huge (and profitable) consumers	Few incentive for consumption reduction	Water utilities trying to capture huge consumers who intend to become self-producers (industry, hotels, etc.)

Table 5: Pros and cons of various tariff structures.

C. Open issues

C.1. Cross-subsidies in the water sector: pros/cons

Cross-subsidisation is a mechanism through which some customers pay for others. It is a very common financial mechanism and universal in the commercial sector. Any company has customers who are more profitable than others and all of them can't be billed with exactly the same profit margin. In other words, every company has products that are less profitable but that have to be part of its offer; otherwise clients would not buy the profitable ones.

Cross-subsidies are a key financial characteristic of large utilities (water, power, phone, etc.) because they are bound by contracts to propose the same tariff to a large number of customers. The application of a single tariff in a water utility introduces therefore various cross-subsidisation mechanisms:

- Large cities subsidise small towns and rural areas, e.g. through application of a national or a provincial water tariff;
- Down town areas subsidise poor suburbs;
- High consumers subsidise low consumers, e.g. through increasing block tariffs (see B.4.2);
- Connected customers subsidise access for unconnected households (e.g. the 2 US $ fee introduced by "Aguas Argentinas" for all existing customers in Buenos Aires, in order to finance new connections for the poor);
- Water supply subsidises sanitation for most utilities providing both services in urban areas - and there are very good reasons for as wastewater stems from drinking water consumption, the latter being easier to bill); nevertheless, such a cross-subsidisation is much more difficult to organise in rural areas, where on-site sanitation is predominant.

Cross-subsidies are a powerful tool for income redistribution between socio-economic groups and have very deep impact on the affordability of modern water service for the poor. Without such a mechanism, the water tariff would be raised by a factor of 2 or 3 in most small towns in the world. Such tariff mechanisms are very important in low-income countries, where the government has not the capacity to provide direct subsidies to poor households. Nevertheless, it has also negative impacts, which must be carefully assessed, in order to be reduced and to maximise cross-subsidisation benefits (see table below).

Potential negative impact	Remediation	Success story
Poor customers do not benefit from the subsidy if they are not connected. In some countries, the poor pay taxes, used by the government to subsidise the water sector, but only the richest benefit from the service (e.g. in Mali only 5% households have a house connection)[5].	A significant connection rate (e.g. above 50%) is an important condition for cross-subsidies to benefit the poor (would they be directly connected or get water from a neighbour).	SDE (Senegal) SODECI (Ivory Coast) ONEA (Burkina)
If the highest tariff block is very expensive, big clients (industries, hotels, etc.) will produce their own water rather than remaining clients of the water system (Jaglin, 2004.).	The highest rate has to be adjusted to the marginal cost for industry to produce water by their own in the service area.	ONEA (Ouagadougou). Lack of alternative sources helps ONEA to keep industrial customers although tariff is high.

[5] *"On the one hand, the existing cross-subsidies often do more to benefit the middle classes than the poor. For one thing, the poorest families tend to be those that remain unconnected to the network and are hence unable to benefit from cross-subsidies" (quoted from Foster V. 2005).*

Potential negative impact	Remediation	Success story
Very poor customers are not connected and buy water from neighbours. If many poor households use the same connection, they will pay the highest rate (Debomy et al., 2005)	Introducing a special rate for customers reselling water to poor neighbours	SODECI (Ivory Coast) (Hydroconseil. 2004)
If the water operator remuneration is based on water sales, he has no incentive to invest in low income areas, where most customers will be invoiced at the lowest tariff block (unprofitable)	Operator remuneration can be set according to the volume sold, irrespectively of the tariff block	LYDEC (Morocco) AdM (Mozambique)

Table 6: Cross-subsidisation through rising block tariff: conditions for success

C.2. Water as a basic human right does not mean "water for free to all"

Access to drinking water is a basic human right that any government should guarantee to any citizen, whatsoever the citizen's capacity-to-pay and the government's capacity-to-invest (2004, Smets). This policy has been implemented during the last decades in some countries:

- In France and other European countries, water utilities are bound by contract to provide a minimal level of service to any household inside the contract area;
- In South Africa, the main water companies are bound to provide 6 m^3/month for free to any connected household. The poorest citizens, consuming less than 6 m^3/month, get the water for free;
- In Chile, the local government reimburses the companies for the water bill of the poorest households (more than 10% of households).

These three examples come from rich or middle-income countries, where the very poor are a minority and can benefit from efficient cross-subsidisation mechanisms funded by the richest. Obviously, the same arrangement is more difficult to implement in countries or villages where a large percentage of the households are poor and unable to cross-subsidise even poorer people. In most African countries, the majority of the connected customers use less than 6 m^3 per month of water and would get the service for free when applying the South Africa model. With so many non-paying customers, the whole water utility would collapse. In poor countries, the simplistic proposal "Water for free for the poor" just lead to water company collapses and to "No water for all".

Water being a basic human right does not mean that water has to be free for all. Rather water services must be priced so that all people, including the poorest, can afford an adequate supply of safe water:

- Access must be affordable for everyone, which means that those able to pay should do so. A minimum essential amount may have to be provided at a low cost to the poorest users. The need for subsidies may be reduced through the use of low-cost technologies and flexible payment terms for users;
- Where there are insufficient resources for piped water distribution, the right to water may be met through non-piped systems that are safe and in reasonable condition;
- Where the resources are lacking, the government may implement the right to water progressively, but it has to take concrete and expedited steps in this direction;

- The government may delegate its duty of guaranteeing access to water to municipalities, communities or the private sector, but always under government responsibility. However, governments must exercise effective control over the service provider to ensure the implementation of the right to water.

C.3. Quality or affordability?

All human beings have the same basic needs, including access to good quality water. For this reason, it seems reasonable to declare that every citizen of the world should benefit from the same water quality and that every water utility is bound by the same quality standards (e.g. WHO standards). Nevertheless, such a strong statement has dramatic consequences: if water companies had to provide in Bolivia or Peru the same water quality as in Europe or Japan, the water treatment would need to be much more sophisticated and the tariff would become unaffordable for most households. In poor countries, the proposal "Same water quality standard as in Europe" just means "Water will be unaffordable for the poor".

More generally, there does not exist a water quality standard valid everywhere and forever. The standards have to be decided by each community according to the socio-economic conditions in their country and the citizens have to be informed. Standards should be chosen in order to achieve the best water service possible that is affordable for the vast majority of the citizens. If the rich wish to have a higher service level, they will pay by themselves a more expensive water supply (bottled water, self-provision, individual rooftop tank and boosters, etc.).

Photo 2: To be valve attendant is a good business in Port-au-Prince (Haiti).

European customers ask their water utility to check water quality compliance with more than one hundred chemical standards - and they are able and willing to pay for such a sophisticated control. For poor rural communities, it is reasonable to concentrate efforts and money on faecal contamination monitoring and chlorination devices implementation (the most cost effective tool to improve water quality).

C.4. Corruption and what the customer actually pays

Formal tariffs are often designed in order to facilitate the poor to access the service. Nevertheless, additional costs and barriers make access sometimes unaffordable for the low-income households. Petty corruption is e.g. an important cost factor for poor people. Whenever the connection fee is low, they have to pay much more "under the table" for their demand to be accepted. And just being connected is not always sufficient. In cities where water is scarce (e.g. in many Indian cities), the customers have to pay bribes to the staff opening the valves, if they want some water to be diverted into their area.

According to customer surveys, paying bribes is rather common with poorly managed utilities and the resulting financial burden is especially heavy for poor customers who are lacking political support. Assessing these overheads is uneasy, as they are illegal. Nevertheless, it is desirable to achieve more transparency in the financial management of utilities and to introduce strong and accessible customer complaint procedures.

The problems mentioned above can be indeed acute in small towns but to a much lesser degree in rural areas, where social cohesion and control are stronger. Here, however, services contracting processes (e.g. for infrastructure construction) are strongly corruption-prone. In order to combat corruption in those context and circumstances, full transparency and accountability in contracting services has to be fostered and achieved. Multi-actor platforms at local level, involving all stakeholders in decision-making, follow-up and control, have proven to be an efficient means to assure open and transparent processes and to impede corrupt practices.

C.5. Pricing sanitation

In many countries, customers do not pay directly sanitation costs, but they pay communal sanitation services (e.g. sewered systems, sludge management) as an additional line on their water bill. Such a grouping makes sense as the amount of wastewater produced is linked to the use of drinking water and as metering drinking water consumption is easier than wastewater production. Additionally, in many rich countries the same provider provides water and sanitation services. When the same provider invoices both types of services, cross-subsidisation between water and sanitation is easy to organize. As a matter of fact water service revenues have been used extensively to finance sewerage expansion during the last decades in Europe.

Is the same arrangement applicable to rural sanitation in developing countries? Not so easily, because rural sanitation does not yet rely much on public investments, but rather on household investments for on-site sanitation facilities. Water utilities do not provide sanitation services for most of the rural households and they are, for this reason, not in the position to drag money for investments in sanitation services. As most rural household finance their sanitation facilities by themselves, tariff is not the issue here. In rural settings, public funds should be consequently used for hygiene campaigns, sanitation promotion, social marketing and investments with high return (e.g. school sanitation) – hence instituting regulation and incentives (including e.g. voucher schemes for the poor) - and not for largely subsidizing household solutions, as this distorts the market opportunities for innovative entrepreneurs.

Lessons drawn from this chapter:

- ***Cross-subsidisation is a powerful tool to enlarge service coverage to low-income and rural areas. It needs to be very carefully designed and monitored in order to really benefit the poor.***
- ***"Water for free for the poor" is a promising concept in richer countries where the percentage of the poor population is low. The concept is more questionable in poor developing countries where water system have not yet been built.***
- ***There do not exist universal water quality standards. Each community is entitled to decide the level of service it can afford at the moment.***

D. Successes and failures

D.1. Cross-subsidies in Ivory Coast implemented through sophisticated financial tools

SODECI (Société des Eaux de Côte d'Ivoire) is the national water provider since 1956. This private company provides water in most of the cities and rural towns of Ivory Coast, including small communities with populations of 1'000 to 20'000. SODECI works under a concession contract and has developed a very efficient policy to promote house connections. It funds the policy by charging a reduced connection fee to middle- and low-income customers (US$ 40 only). This is much lower than the actual installation costs occurring at SODECI (US$ 150). The difference between the actual costs and the fee is financed by the "Fonds de Développement de l'Eau" (FDE) since 1987.

The FDE is a specific financial mechanism supervised by a government body. The fund makes capital available to SODECI for agreed on and monitored purposes, notably for subsidizing connections. The mechanism is funded through a surtax collected by SODECI from its clients, and thus constitutes a cross-subsidisation between existing customers and future ones. The FDE devotes approximately 30% of its annual budget to network construction and extension into small towns and peri-urban areas. This financial mechanism enables SODECI to implement a dynamic policy of service development in small towns using money raised from large cities, especially Abidjan. SODECI now supplies over 600 small towns, most of them being unprofitable by their own.

D.2. Volatile public subsidies hamper the future of a promising cost recovery strategy in rural Mauritania

Mauritania has set in place a very innovative management model for water supply in rural towns. In each locality, a local entrepreneur is hired by the government under a lease agreement to run the water system and to develop the service coverage. Some 400 of such small-scale independent providers (SSIP) have been recruited and provide modern water supply services (mostly house connections) to about 40% of the rural population in the country. This arrangement has been very successful in encouraging local SSIPs to invest and develop the services.

Some of these SSIPs manage profitable water supply services in small towns, but many of them also run water systems in remote villages, with a handful of standpipes and some dozen of house connections. In such villages, water revenues are sufficient to finance day-to-day operations, but insufficient to finance e.g. generator renewal. For this purpose, the government has instituted a non-governmental body (ANEPA) collecting the lease fees from the SSIPs and financing generator renewal.

The customers ultimately pay the lease fee, as it is an important part of the water tariff (about 30%). This arrangement has successfully supported the very impressive development of water supply in rural Mauritania since 1994. But three years ago, politicians asked for the water tariff to be blocked, although fuel price was rocketing. As a consequence, the SSIPs' business was not anymore profitable and they stopped to pay for the full lease fee. The ANEPA accounts became red and the government was obliged to subsidize this independent body which as a consequence lost its independence and whose mere survival is questionable. Blocking the water tariff has weakened the whole system and hampers now any future development of water services coverage in rural Mauritania.

D.3. Direct subsidies are cost-effective to supply water to the poor in Chile

In many countries, the government has been providing subsidies to water utilities for years (especially in rural areas) whilst keeping the tariff below the water costs. This approach is expensive, as it consumes public money for every customer, even for those who could afford to pay for the full water cost. And whenever the poor are not connected - a frequent situation in rural areas - public money invested does not even benefit those who need it most.

The direct subsidy approach is different however, as the public subsidies are restricted to the very poor customers only. The money is used to pay part of their water bill and encourages the utility to connect the poor as the commercial risk of this undertaking is reduced. This approach has been successfully used in Chile for long and has been replicated in other countries (Argentina, Panama, etc.). Some 17% of the Chilean households (the very poor) benefit from a 40-85% reduction on the amount of their water bill (limited to 15 m^3/month) (2000, Serra). The government pays the difference directly to the water service provider and not to each household, because the latter would introduce excessive transaction costs.

The whole system is rather complex, because it's necessary for each household to make an application, for the administration to check the eligibility criteria and for the utility's accounting system to provide specific data concerning these specific customers. The transaction costs can therefore become very high. For this reason, the system introduced in Chile has not been limited to water supply only, but the same households benefit in the same run also from subsidies for other public services (electricity, health, school, etc.). But as most subsidisation mechanisms, direct subsidies can have negative impacts and these risks need to be carefully addressed (2005, Foster et al).

Issue	How to address the issue
Exclusion error (households needing the subsidy are excluded)	Application rules should be designed specifically for the very poor (illiterate, isolated households, etc.)
Water can be wasted if it is free of charge	The subsidy should be limited to a certain percentage of the water bill
Development of a no-payment culture *("government will pay for")*	Subsidy should be restricted to households having paid their own share of the bill
Ineligible neighbours can try to benefit from the subsidy	Subsidy should be limited to some maximum level of consumption (e.g.10 m^3/month)

Table 7: Success conditions for direct subsidies

D.4. Supporting fair competition is an efficient regulation tool

D.4.1. SSIPs provided cheap water service in Asuncion (Paraguay)

For years, 400 aguateros have provided good water services in main peri-urban areas of Asuncion in a very competitive way. They do not have concession contracts with a protected customer basis, but a simple license to drill a borehole and sell water. In the same city (and sometimes in the same street), many aguateros compete with each other to gain new customers[6]. The tariff is not regulated by a government body, but rather through this strong

[6] *Similar competition is very frequent in Maputo / Matola – Mozambique.*

competition. This regulation proved to be very effective and the aguateros rates are generally below the tariff of the public utilities. Since 2003, the government has developed a strategy to use such competitive small-scale private providers (SSIPs) to develop service coverage in small towns and rural areas. The government contracts these SSIPs under a "design-build-lease" (DBL) arrangement, which means that the same provider is recruited to:

- Assess the demand
- Design a water scheme according to his own demand assessment
- Build the system in the most cost-effective way
- Operate the system under a lease agreement

In order to encourage house connections (especially for the poor households), the government provides the SSIPs with a subsidy calculated as a function of the number of new connections it has built. The subsidy is paid after service completion as an Output Based Aid. The competition for the contracts has been very intense and the tariffs proposed by the SSIPs for the connections where lower than expected by the government and experts.

D.4.2. Competition reduced tariff for pit-emptying services in Dar es Salaam, Tanzania[7]

In 1996, the Dar es Salaam City Commission (DCC), responsible for sanitation in the city, decided to deregulate the pit-emptying services. Until then, the Dar es Salaam Sewerage and Sanitation Department (DSSD) was the only organization permitted to provide such services. However the DSSD was unable to meet the demand from a long waiting list of customers, many of which had paid an advance equal to TSh 20,000 (US$25) per trip in 1995.

The DCC organized a meeting with potential operators and it was agreed that private pit-emptying service providers would be licensed to operate, provided that they comply with a common set of rules and regulations intended to ensure fair pricing and proper handling of waste by all actors. These deliberations led to the establishment of a pit-emptying licence for operators that agreed to the following conditions: (i) to charge a minimum fee of TSh17'000 (US$21) to eliminate price undercutting of public operators; and (ii) to maintain prices within the range affordable for customers (particularly the low-income households).

While at the start of the process there were three known private operators operating without a permit, after deregulating the service in 1999, eight private operators applied for and received permits. The increase clearly shows that the activity is profitable, even in a strongly competitive market. Competition has played a key role in regulating the market. Private operators are now charging less than the initial minimum rate of TSh17'000, as the rates currently range from TSh10'000 (US$12) to TSh15'000 (US$18).

Lessons drawn from this chapter:

- ***Cross-subsidisation is better implemented with specific financial tools.***
- ***Water utilities relying on subsidies to survive are very sensitive to the politicians' goodwill.***
- ***Direct subsidies can be cost-effective to supply water to the poor. They need however to be very carefully designed and can benefit from aggregation with other direct subsidies to the poor (electricity, school, health…).***
- ***Competition is a very effective tariff regulation mechanism. The water service is not a natural monopoly and communities can benefit from some level of sound competition between providers.***

[7] *Source: 2003, Collignon et al.*

E. Conclusions

The MDG concerning water is ambitious: “Halving by 2015 the percentage of households lacking access to proper drinking water services”. Water for free has been proposed as an option to achieve the MDG for poor rural communities, where cost recovery is difficult. Since most attempts to provide water for free were a failure (as in Central Asia during the nineties), cost recovery strategies are necessary.

Water production costs vary much according to the local conditions and also the level of service customers are aiming at. The water tariff has to be set in order to cover most of these costs - as a very minimal, it will cover the running costs. There exist various mechanisms to charge water to customer and to expand water service coverage. None can fit perfectly the needs of all communities, but some of these mechanisms proved to be more “pro-poor” and more efficient in rural water supply:

- Cross-subsidisation between town and villages helps to finance the service for poor communities. This is easier to organize when the same operator is contracted to manage altogether towns and the surrounding rural areas.
- Cross-subsidisation between rich and poor customers is a very powerful tool to facilitate access to the service for the poor. It needs however to be very well designed in order to benefit effectively to them.
- Direct subsidies to the very poor is very efficient, but difficult and costly to implement. It is more cost-effective to develop a direct subsidy scheme not restricted to water, but for a whole range of public services all together (health, education, electricity, etc.).
- Adapting the service standards to the customers’ capacity-to-pay is very important, especially in rural areas were the customers’ capacity and willingness-to-pay are limited. There do not exist universal water service standards, but rather appropriate local standards meeting the local priorities and choices.
- Encouraging private sector involvement and investments is a promising option. The private sector has specific advantages that can support effective water service expansion (efficiency, innovation, capacity-to-invest, etc.). In order to attract these skills, it is necessary however to allow these operators to make a fair profit from their water business.
- Keeping competition among providers is beneficial to the customers. In order to improve the providers’ performances, the best incentive is not to introduce some administrative constraints, but to put them in competition with other providers. Water is not a natural monopoly.

F. Relevant documentation

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