



UNDP-World Bank  
**Water and  
Sanitation  
Program**

## **Considerations for Regulating Water Services<sup>1</sup> While Reinforcing Social Interests**

**by Vivien Foster**

The purpose of the Working Paper Series is to share information in order to stimulate discussion, broaden thinking within the sector, and encourage dialogue among our clients in developing countries. These papers have not been formally published and your comments and feedback are welcome. Please send to: Water and Sanitation Program, World Bank, 1818 H Street, NW, Washington, DC 20433, or via email to: [info@wsp.org](mailto:info@wsp.org). Copies of these papers are also available in French and Spanish and all versions are available on the Program website: [www.wsp.org](http://www.wsp.org).

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<sup>1</sup> Some of the material for these case studies were taken from internal World Bank memos (Back to Office Reports) rather than formally published sources, and are consequently not referenced in this paper.

## Forward

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It is widely believed that improvements in the supply of water and sanitation can play a major role in improving the lives of the poor in developing countries. In recent years, the potential value of privatization and better regulation of water companies have also been widely recognized. But exactly what policies governments should introduce in the water sector—and precisely what rules they should impose on private water companies—to help the poor remains controversial. Vivien Foster’s “Considerations for Regulating Water Services while Reinforcing Social Interests”, the first version of which was prepared for a training program offered by the Private Sector Development of the World Bank, addresses this controversy.

Many governments aim to help the poor by imposing higher prices on middle-class customers of water companies in order to cross-subsidize the poor (in the jargon) and by requiring newly privatized water companies to quickly provide more poor customers with high-quality water-and-sanitation services. Some governments also prevent water companies from disconnecting poor customers when they fail to pay their bills. As Foster’s paper notes, the strategy can be counter-productive. Subsidies frequently fail to reach the poorest since they remain unconnected to the main network, even after its expansion. The extension of high-quality services is sometimes too expensive to be justified. And prohibitions on disconnections encourage customers not to pay, lessening the water company incentives and financial ability to reach out to new, poorer customers. What would work better than the traditional approach? Among other things, Foster argues for more-sophisticated approaches to subsidies, referring

to a promising Chilean approach, and for greater sensitivity to the demands of poor customers. She cites evidence that the best use of extra resources in developing countries is usually to increase the availability of basic water and, especially, sanitation services, rather than to increase their quality. The case of condominium sewers in Brazil illustrates this approach. But *a priori* judgments about appropriate quality need to be avoided: sometimes, as in the East Javan case, the poor may be willing to pay for higher quality services than initially believed.

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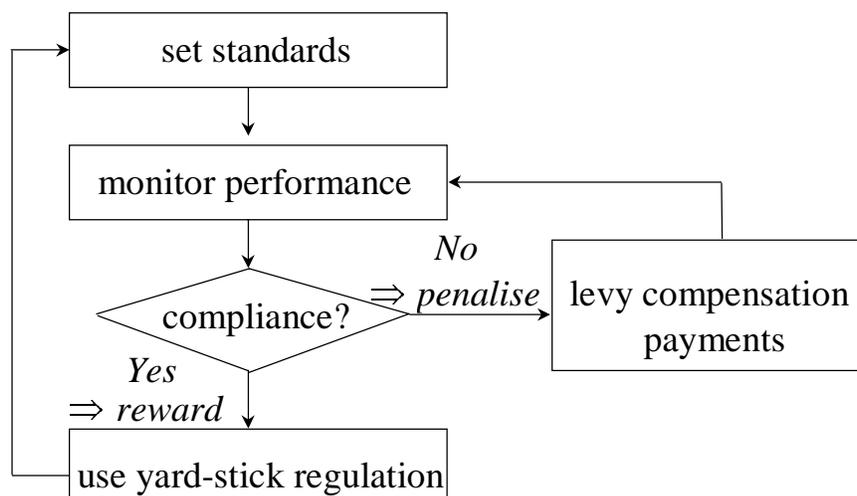
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## 1. Introduction

Increasingly governments are moving away from the role of provider of urban services into a new role as regulator of private service delivery companies. In the case of water, developing countries are now learning the ropes of regulation, usually by reviewing costs and prices. However, it is the task of the regulator, not only to ensure that prices reflect efficient production costs, but also to determine the appropriate level of quality to be delivered to the customer. These 'non-price aspects' of regulation encompass a wide range of considerations including securing quality standards and promoting universal access to the network, and also encompass a wide range of considerations including securing quality standards and promoting universal access to the network, as delivery companies. In the case of water, developing countries are now learning the ropes of regulation, usually by review incentives for utility companies to go beyond the minimum levels of service which have been required.

### Quality-of-Service Regulation



This paper provides a selection of brief case studies which illustrate how regulators can protect the

interests of low-income groups through a variety of non-price mechanisms.

## 2. Setting Quality and Output Targets

There is a tendency for non-price regulation to focus on the delivery and quality of water, without always paying a great deal of attention to the issue of how targets for coverage and quality should be determined. From an economic standpoint, it is important to consider the costs and benefits of particular targets. However, in practice, the setting of goals is often rather arbitrary and driven by political considerations.

The following examples illustrate the importance of:

- considering the balance between costs and benefits when determining the appropriate quality of service level for low-income customers; and
- considering the effective demand for any planned improvement in service quality.

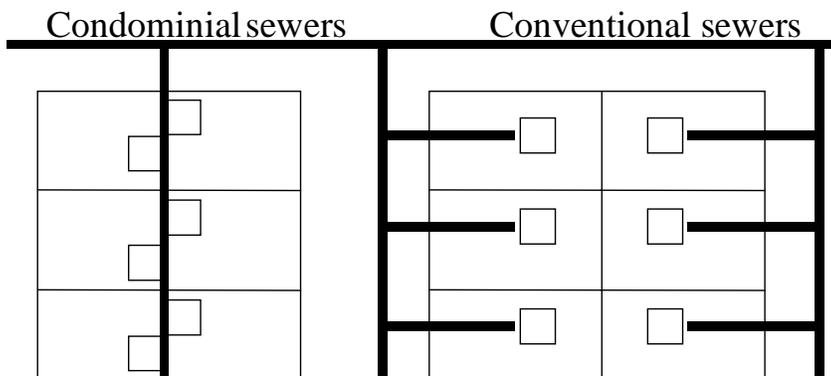
### Brazil: the condominial sewer

Experience from Brazil suggests that it may sometimes be helpful to provide a range of quality of service levels for different consumer groups, rather than aim for a universal quality standard. The extension of urban wastewater systems to shanty towns in Brazil has, in the past, been impeded by the relatively high cost of conventional sewerage systems. This led to the development of an innovative low-cost approach, known as condominial sewers, which have been implemented in a number of Brazilian cities.

Condominial sewers have the following distinguishing features, which contrast them from conventional sewerage, as illustrated in Figure 2.

- Sewers are laid through the backyards of houses instead of down the middle of streets.
- Each household has a single point of direct outdoor access to the sewer, as opposed to pipes going into each house.
- Households are required to maintain their own section of the sewer to ensure that blockages are avoided.

### Brazilian Condominial Sewers



- innovative engineering
- community involvement

These specific design features have the effect of significantly lowering the cost of providing sanitation. The reason for this is that they:

- reduce the length of pipework required to complete the system;
- enable sewers not to be buried so deep;
- reduce the need to rely on remote maintenance by the operator.

This comes at the expense of reducing the quality of service that is offered, given that household connections are no longer interior to the household, and that consumer participation in infrastructure maintenance is necessitated.

Consequently, a system of this nature can only function if there is adequate community support from the outset of the project. Extensive experience in mobilizing community participation in the design and implementation of water and wastewater systems in shanty towns has accumulated under the auspices of the PROSANEAR project in Brazil, which was co-financed by the World Bank.

From this experience, it is known that the process of obtaining community participation for a sanitation project entails:

- allowing a period of 2-4 months (between the initial project assessment and the commencement of construction works) for the purposes of disseminating information to the community and organizing public meetings to reach community consensus on the desired project design;

- engaging a team of social workers and sociologists responsible for managing the community participation process, as a complement to the conventional engineering skills involved in designing a project of this nature;
- establishing contact with community leaders as a point of entry into the local area, and organizing subsequent meetings at the level of relatively small neighborhood groups of up to 50 families as a means of promoting discussion;
- not proceeding with the construction phase of the work until the selected project has received the endorsement of 70–80% of the local community, whether through personal signatures or the agreement of community representatives.

The advantage of this approach is that it ensures that the selected technology meets the needs of the inhabitants, and that they will cooperate in its subsequent maintenance. Moreover, it is often possible to incorporate hygiene education events with the community participation process, or to link the sanitation project to wider social improvements.

The disadvantage of this approach is the additional cost implied by orchestrating the community participation. In most of the cases studied in Brazil, this cost was kept well below \$20/capita. One danger that has been noted is that of construction delays which may undermine the initial community support for the project. It is therefore important to ensure that community expectations are kept in line with a realistic construction schedule.

Table 1: Results of the East Java water survey

	<b>Options for water services</b>	
	<b>Public taps</b>	<b>Private connections</b>
<b>Rural views</b>	Low level of interest, given presence of alternatives, unless within 20–30m radius	Noticeable willingness to pay (over 70% in some areas)
<b>Urban views</b>	Very low level of interest	High level of demand (75% willing to pay)

### East Java water supply

In East Java, a survey of 1,500 households in two large towns and eight villages was carried out in 1985, as part of the East Java Water Tariff Study, to determine willingness to pay for improvements in the standards of water supply, achievable by the

construction of piped water systems with public taps. Table 1 summarizes the main results of the survey.

The survey showed that public demand in rural areas for these improvements was low, given that most of the rural households relied on satisfactory alternative methods to obtain domestic water supply, mainly

through skillfully constructed shallow wells. In particular, households stated that they would not make use of public taps unless they were located within a 20–30m radius, which was unlikely to be the case given the design standard. Moreover, the proposed piped water scheme was not thought to be likely to contribute to significant improvements in public health, given that most people already boiled their drinking water. Finally, a significant proportion of rural households (over 70% in some areas) expressed the willingness to pay for private connections as opposed to the cheaper public taps.

Similarly, in urban areas, fewer than 10% of the population wanted public taps. However, about 75% expressed a desire for a private connection, signaling a widespread willingness to pay for a more expensive service, of a better quality. This is in spite of the fact that the cost of private connections exceeded the usual cut-off threshold of 3–5% of household income.

The survey showed that the proposed piped water project was ultimately flawed, given the lack of adequate demand among both rural and urban households for the service improvements it would have produced. Moreover the survey indicated that there appeared to be a substantive willingness to pay for a service quality higher than that which had originally been considered viable by the project designers namely, private household connections.

This example from East Java shows that careful economic analysis of infrastructure projects, in general and of projects relating to the quality of service in particular, can lead to improved decisions, on the part of the planning authorities, in their choice of the appropriate level of quality at which to provide new public services.

### 3. Determining Service Priorities

Quality of service is not a one-dimensional parameter, but covers a variety of aspects. The most basic issue is whether the customer is connected to the service at all. Once access has been provided, there are a number of ways in which service could be improved in terms of reliability, quality and customer interface.

Where urban services are characterized by low coverage rates and poor overall quality of service, the presence of capital constraints means that it is impossible to achieve everything at once.

Consequently, the authorities must set priorities both between system expansion and improvement of service to existing users, and between the different ways in which existing services might be improved.

#### WASH study of urban water services

A study by Water for Sanitation and Health (WASH—now renamed Environmental Health Project (EHP)) provides some insight into the prioritization of different water services for the urban poor.

The WASH report considers three distinct ways in which the water services to the urban poor might be improved:

- provision of a plentiful and reliable water supply;
- improvements in the quality of drinking water;
- provision of basic sanitation facilities.

In order to produce a prioritization ranking between these three investment options, the study reviewed over 100 pieces of research which study the causal link between the availability of these different services and incidence of the following six major water-borne diseases:

- diarrhoea;
- ascariasis;
- trachoma;
- hookworm;
- schistosomiasis;
- Guinea worm.

The main findings of the study were that:

- provision of basic sanitation was the most effective intervention as far as health improvements were concerned;
- the next-best step was to increase the *quantity* of water available for household hygiene, as opposed to increasing its *quality*.

The authors note that this is somewhat at odds with conventional practice of prioritizing water supply over sanitation. The study is interesting in that it underlines the importance of understanding the relationship between particular policy interventions and ultimate social goals, as part of the process of prioritizing output targets.

## 4. Monitoring the Delivery Outputs

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Once targets have been determined, the regulator must establish a system for ensuring that these are delivered. This will generally involve the collection and monitoring of information on quality standards, as well as the provision of operator incentives for compliance.

### Chilean water sector

The Chilean water sector falls under the jurisdiction of a central regulatory agency: the Superintendencia de Servicios Sanitarios (SSS). The agency is made up of three departments, one of which has overall responsibility for setting and enforcing quality standards. Following the lessons of experience that moral suasion is not enough to make regulation work, the Chilean SSS has been studying the need to introduce fines. At present regulation of service quality is limited in scope and currently comprises the following elements.

- With regard to clean water, drinking water quality is the primary regulatory focus. Each operator is required to submit a monthly report and outside laboratories are contracted to provide spot checks. Although contracting laboratory services allows the agency to have fewer staff, experience suggests that the supervision of outside contracts can itself be a drain on staff time. A major issue is that of penalties for non-compliance. There has recently been a move away from moral persuasion towards the imposition of fines, where non-compliance can be directly attributed to negligence on the part of the operator.
- With regard to waste water, companies are required to submit data on a quarterly basis. However, only 10% of wastewater is currently treated and no verification procedures are used.
- As far as quality of customer service is concerned, there is no regular reporting mechanism, although companies are required to notify the regulator in the event of interruptions to service. Investment plans include provision to improve the continuity and pressure of the water

service. Thus, the resulting quality level is largely predetermined by the investment levels allowed in tariff-setting negotiations. At present, the regulatory agency has no direct interaction with consumers, except in the event of disputes when it is required to act as arbitrator.

Although this focus on the regulation of drinking water quality was undoubtedly an important starting point for quality of service regulation in Chile, the Superintendencia is now concerned to expand the scope of quality of service regulation to include other aspects of quality, and in particular to ensure that companies are giving adequate attention to consumer complaints. Possible means of strengthening quality of service regulation are therefore being studied in the run-up to privatization.

## 5. Subsidizing Low-Income Consumers

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In most countries, part of the ideological legacy of public-sector provision of infrastructure has been an enduring social understanding of the role of public services. This involves a more or less explicit social obligation towards low-income groups, which is often reflected in the existence of subsidy or cross-subsidy systems aimed at certain categories of the domestic customer base.

However, such subsidy systems are not necessarily socially benign. On the contrary, there is evidence to suggest that the structure of subsidies is often highly regressive, with substantial benefits going to middle- and higher-income groups. This inequity is exacerbated by the fact that the lowest-income groups will frequently lack access to the services altogether. This means that, not only will they fail to benefit from the subsidy scheme, but they will also have to purchase the service from private vendors, often paying prices well in excess of those associated with supply from the public network.

Two of the best examples of well-functioning, but highly contrasting, subsidy schemes in the water sector are those provided by Chile and Colombia. The first represents a system of direct subsidies, while the second consists of an explicit and highly transparent cross-subsidy built into the water tariff structure.

### Chilean direct subsidies

In 1990 Chile replaced its cross-subsidy system with a comprehensive direct subsidy scheme for low-income households, which assists with the purchase of a variety of public services. Subsidies are financed by central government but administered through the municipalities. The scheme is 'direct' in as much as the government makes a direct financial contribution towards the water bills of low income households.

The subsidy law states that the scheme can cover up to 85% of the charges for up to a maximum of 20 cubic meters of consumption. In practice, in recent years subsidies have been given for a maximum of 15 cubic meters of consumption. The goal of the scheme is to ensure that water and sanitation services do not take up more than 5% of household income. There are multiple criteria for eligibility including:

- region;
- average cost of water;
- household income and wealth;
- family size.

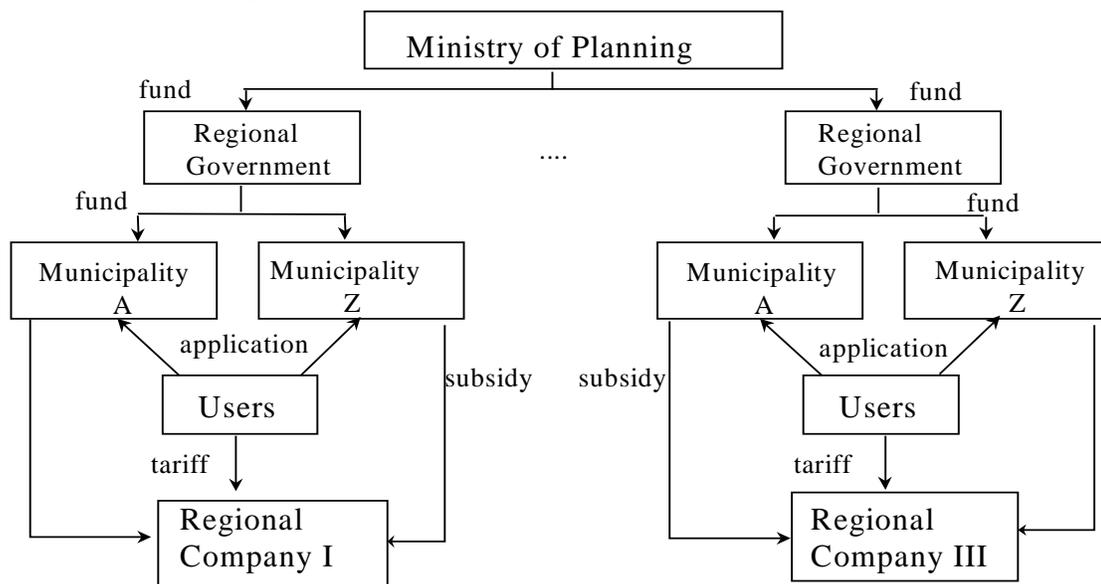
Eligibility is reassessed every three years. Moreover, households failing to pay their own 15% share of the bill have their subsidy suspended.

Initially, the onus of proof was laid on low-income households to come forward and claim the subsidy. However, low take-up rates prompted the collaboration of the water companies in identifying needy customers by examining tariff payment records. It is now believed that all eligible households in urban areas are covered by the scheme, that is to say some 20% of the population.

The administrative organization of the scheme is illustrated in Figure 3, which indicates that the budgetary allocation is determined nationally by the Ministry of Planning, but that funds are subsequently allocated down to the municipalities, which act as the local agents to determine the eligibility of specific households.

The Chilean scheme provides an example of how subsidies can be effectively targeted at essential consumption by low-income groups, if adequate consideration is given to the design and administration of the system.

## Chilean Direct Subsidies



## Colombian cross-subsidies

The new Colombian constitution promulgated in 1991 confirmed a long-standing national commitment to the principle of social solidarity in utility tariff structures, effectively requiring the incorporation of cross-subsidies.

This commitment goes back to the late 1960s, when a customer-class tariff system was developed in order to implement this objective. An initial property value based tariff encountered problems because of the obsolescence of the data on which it was based. Consequently, in the 1980s there was a move towards developing an alternative property-based indicator for wealth. A six-band nationwide classification of all neighborhoods was finally adopted, according to the predominant physical characteristics of the properties in the area (construction materials used for walls and the roof, number of floors, and so forth) and the neighborhood itself (condition of roads, presence of garages, lighting, public gardens and other local amenities). The new taxonomy has operated successfully since 1983.

The property-based indicator was ratified by the Public Services Law passed in 1994, which required the cross-subsidy element of the tariff to be clearly identified in water bills and also set explicit ceilings for the magnitudes of the cross-subsidies to be applied to each of the six strata. These new ceilings represent a significant reduction in the scale of cross-subsidies relative to what has been countenanced historically in the country. They will be phased in gradually over a period of five years and imply a period of substantial tariff rebalancing between socio-economic groups.

<b>Strata</b>	<b>Legal limit</b>
1	maximum subsidy of 50%
2	maximum subsidy of 40%
3	maximum subsidy of 15%
4–6	maximum surcharge of 20%
Commercial	maximum surcharge of 20%

It is worth noting that these cross-subsidies are applied at the level of each individual company, with no cross-subsidies being permitted between regions. Consequently, the approach adopted by most companies is to set the surcharges at the 20% limit,

and then determine what percentage of subsidy can be afforded on the basis of the total funds collected. This

system of subsidies and surcharges is combined with a rising-block measured tariff structure, although meter coverage is not yet universal.

## 6. Connections

An important objective associated with privatization of public services is that of increasing connections rates. However, this raises an important equity issue with regard to financing. This is because those who do not have access to infrastructure networks are typically those who are least able to pay for the connection to be made. This means that connection subsidies or credit schemes may be required.

During the early 1970s, the Ivory Coast government launched an ambitious national water program aimed at the refurbishment and expansion of the existing network in urban areas, as well as the installation of boreholes to service rural communities. This program was financed by cross-subsidies on urban consumers which were recycled through the National Hydraulic Fund to provide free connections for poor urban neighborhoods, and subsidies for rural supply.

The scheme was successful in bringing about a major expansion in connections, which grew from 50,000 to 140,000 over the period 1973–80. However, it came under increasing financial pressure during the economic crisis of the 1980s. By 1984 a few hundred industrial customers were funding 70% of the cross-subsidy for social connection. The high resulting bills led to a substantial decline in industrial water demand, partly as a result of industrial customers choosing to self-supply to avoid the high bills charged for public water supply. Since the late 1980s connections are no longer provided free of charge. Indeed, the cost of a connection rose to a point where it was equivalent to half the minimum monthly wage.

The Ivory Coast case illustrates the tensions involved in funding social connections from surcharges on urban domestic and industrial consumers.

## 7. Disconnections

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Once poor customers have been connected to the network, there is still the problem that they may end-up being disconnected for non-payment. Countries differ widely in their social attitude to the legitimacy of disconnecting households from public services in retaliation for non-payment. Two give two contrasting examples:

- Chilean law includes an explicit commitment to the notion that water cannot be regarded as a free good, thereby legitimizing disconnection of the service;
- Mexican law explicitly prohibits the disconnection of water supplies from bad debtors.

From the perspective of the private operator, disconnection constitutes an important sanction for non-payment. The Mexico City water franchises provide an interesting example of a mechanism for harmonizing social commitments with private-sector provision. When the operators eventually take on full provision of the water service, their contract allows for bills to be covered by the regulatory commission in event of non-payment by the customer. The government is therefore effectively assuming collection risk on behalf of the private operator. Since the regulatory commission is financially dependent on water tariffs, it retains an incentive to ensure that bad debts are ultimately paid. Whether this will prove possible without recourse to the sanction of disconnection remains to be seen.

Despite social views, the change to a private-sector operator will inevitably bring about a shift in the culture of public-service provision. In Guinea, following the introduction of private-water concessions, consumers had major problems in managing their consumption of water. Metering and billing levels had been so low under public provision that water was not regarded as an economic resource. A number of educational campaigns were conducted, but these proved relatively unsuccessful. Eventually, the private operator, SEEG, was forced to rely increasingly on the ultimate sanction of disconnection.

Finally, it should be noted that bad debtors are not always necessarily low-income consumers. In the Ivory Coast, the government failed to pay its water bills over the period 1990–94. In neighboring Guinea, special care was taken to pre-empt such a situation: the terms of the private operator's recently awarded contract explicitly empower the contractee to disconnect government agencies. However, this safeguard has not proved to be adequate in practice.

## 8. Tariff Structures

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A traditional approach to incorporating social considerations in public-service tariff structures has been to rely on rising block tariffs. Such tariffs apply an increasing unit charge to successive blocks of consumption. Their purpose is to ensure that a basic level of consumption is affordable to all consumers, while providing stronger incentives for conservation at high levels of discretionary use. As such, they constitute a relatively simple and attractive basis for cross-subsidy to low-income customers.

A recent field study in Ghana suggests that the conventional wisdom about rising block tariffs may be flawed in some instances. This is because rising block tariffs are based on the assumption that each household has its own metered connection. In the case of low-income consumers in shanty towns, this assumption may sometimes be fallacious. The reason is that such households may either:

- live as tenants in larger housing units, sharing a single metered connection with a number of other families;
- (in the case of water) lack a connection altogether and purchase a supply from neighbors.

In both these situations, the effect of the rising block tariff is to increase the average cost of supply to low-income households. In theory, this problem could be remedied by applying adjustment formula to connections serving multiple dwellings. However, in practice, such a system might prove too complicated to implement.

## 9. Lessons

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From this brief survey of examples covering the non-price aspects of regulation, a number of lessons can be drawn out.

- The setting of quality and output targets often lacks a grounding in cost–benefit analysis.
- A universal quality standard is unlikely to make sense where wide socio-economic disparities exist between customer groups.

Given the wide range of problems competing for investment funds, it is important for the regulator to set priorities.

- In particular, the relative importance of expanding coverage and raising existing service levels needs to be assessed.
- Subsidy systems should be designed to ensure that they genuinely target low-income households and avoid the creation of economic distortions.
- Policy on connections, disconnections and tariff structures has important social implications in the context of public-service provision.

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