

# Water Supply & Sanitation Working Notes

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## PRO-POOR SUBSIDIES FOR WATER CONNECTIONS IN WEST AFRICA

A PRELIMINARY STUDY

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## EXECUTIVE SUMMARY

The Bank-Netherlands Water Partnership project aims at assessing the subsidy schemes in Senegal and Côte d'Ivoire for providing piped water to the poor. This study was commissioned to make a preliminary evaluation of the schemes in Dakar (in Senegal) and Abidjan (in Côte d'Ivoire). The fieldwork (April 22 through May 5, 2002) was made to explore whether those social connection programs might merit further study for application in other developing countries.

### Objectives and Approach

The objective was to examine how well the schemes in West Africa for making social and ordinary connections are working. A social connection, aimed at the poor, is free, whereas an ordinary connection, aimed at wealthier households, must be paid for. A well-designed subsidy needs to meet four criteria: (a) it must respond to a genuine need, (b) it should serve the poor, (c) it should have low administrative costs, and (d) it should avoid perverse incentives. Study tasks included (a) examining the institutions, policies, and procedures for providing subsidized connections; (b) evaluating how well the schemes meet their objectives; and (c) identifying negative outcomes.

### Criteria for Social Connections

The eligibility criteria for getting a social connection in Senegal are (a) applicants cannot be wealthy; (b) a house must exist on the lot that is to be served by the connection; (c) it must be a residence, not a business; (d) the connection cannot cross private property; (e) the applicant must have title to his house and land; (f) a pipe of the water network must be within 20 meters of where the connection is made to serve a single house, or within 100 meters to serve at least the houses for four applicants; and (g) if approved for a social connection, the applicant must pay a security deposit of CFAF 13,000 (US\$19) against future water consumption charges; no charge, however, is made for the meter and lateral. The criteria for social connections in Côte d'Ivoire are similar. Social and ordinary connections render identical service because they are made with laterals and meters of the same diameter.

Criterion (e) requires applicants to own their house and land, which implies that they may be "relatively" poor, but not "absolutely" poor (because they are property owners).<sup>1</sup> Criterion (e) also implies that their community is "formalized," which typically takes 10 years or more from when it was first established as a *quartier spontané*. Under criterion (f), households that want a social connection must wait until the street main has been extended to their house, but if a water main is farther away than 20 meters, they can pay for its extension plus the full cost of an ordinary connection. It follows that houses that pay for an ordinary connection are "not poor," but it does not necessarily follow that those who wait for a social connection cannot afford to pay for it.

### Water Supply Policy in Dakar

The population of the Dakar region is presently growing by 100,000–120,000 persons per year, mostly migrants who settle informal areas (*quartiers spontanés*) without public services. Government policy is to subsidize water supply for the poor. Water enterprises are required to be financially self-sufficient; hence, a subsidy does not imply a financial gift, but rather a cross-subsidy from larger water users to smaller ones. Government promotes three types of cross-subsidies:

- *Bornes-fontaines* (standposts), aimed at the newest and poorest households in Dakar
- Social connections, for more-established households
- Progressive (lifeline) tariffs, for households with private connections.

*Bornes-fontaines* are intended to meet water needs where pipe networks do not yet exist, and they also provide a choice for poor households that find the cost of connecting to a network too

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<sup>1</sup> It is possible that even if the owner is not "absolutely poor," the house may be occupied by a very poor family. The study collected no income information.

expensive. Senegal provides social connections, using the above criteria only in formal zones, where households have tenure to the land. Lifeline tariffs for all households with connections can buy a basic quantity of water at a subsidized price that is below the average cost of water production (6 cubic meters [m<sup>3</sup>] per month in Côte d'Ivoire and 10 m<sup>3</sup> in Senegal).

## Senegalese Institutions for Making Social Connections

The approach for targeting poor houses for subsidized connections in Senegal and Côte d'Ivoire is to serve the areas where the poor are living. Identification of these regions involves layers of administration. The main institutions concerned with water supply in Dakar are (a) Société Nationale des Eaux du Sénégal (SONES); (b) Sénégalaise des Eaux (SDE); (c) Environnement et Développement du Tiers Monde (ENDA), a nongovernmental organization (NGO); (d) Direction de l'Hydraulique (the Ministry of Water, or Hydraulique); (e) Ministère de l'Urbanisme et de l'Habitat (the Ministry of Urbanism and Housing); and (f) Fondation Droit à la Ville (FDV)<sup>2</sup>, an NGO. SONES is a public asset-holding company that contracts with the Ministry of Water to provide water services. SONES has a 10-year lease-operate contract with SDE, which implements its policies. SONES also contracts with ENDA, whose main work is to assist development of *quartiers spontanés* that lack infrastructure; it helps them identify leaders, elicit preferences for improved water and sanitation, and communicate with SONES and SDE.

From its vantage of working with numerous *quartiers*, ENDA is able to advise SONES on which ones are ready for water improvements; thus, it influences which newly structured *quartiers* get connections. However, before construction of tertiary water pipes is the need to have primary and secondary networks of the water system, which involves decisions about where the main pipes are to be laid. The work of restructuring *quartiers spontanés* to formal status is the responsibility of the Ministry of Urbanism and Housing, which has recently contracted with FDV for assigning priorities for restructuring and extending primary and secondary mains of the water network.

The interactions among the key water institutions in Senegal are shown in Figure 1, page 11. Double-headed arrows indicate contractual arrangements, and single-headed arrows indicate flows of information.

## How Social Connections Are Made in Senegal

SONES and ENDA routinely get requests for providing social connections in different *quartiers*, which are forwarded to SDE. In September each year, SDE prepares a draft capital improvement plan for the next three years that indicates the different improvements that SDE proposes to make. The proposal identifies each project, its estimated cost, and proposed year of implementation. The plan is jointly reviewed by SONES and SDE to decide which projects within the capital budget to implement, after which the plan becomes part of the contract between SDE and SONES for the next year.

Once SDE has a contract, it calls a meeting of the chiefs of the *quartiers* in which social connections are to be made and asks them to inform their constituents of the criteria for eligibility. SDE runs advertisements inviting households to apply for social connections. Applicants in Dakar must go to one of SDE's 10 offices to apply, bringing title to their land and completing an application form with information about their houses.

SDE sends an inspector to the house of each applicant. If the criteria for social connections are satisfied, the inspector is authorized to approve it, and the applicant is instructed to return to an SDE office to pay the deposit against future consumption; however, the inspector often denies the application based on what he finds. Once connections are built, SDE submits invoices for each one to SONES for payment. SONES inspects all ordinary connections plus a sample of social connections before making payment. If social connections fail to meet the criteria, they are disapproved for payment.

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<sup>2</sup> FDV is a foundation established to work on land rights and urban upgrading.

## Differences between Senegal and Côte d'Ivoire

The institutional structure in Côte d'Ivoire is simpler than in Senegal. The Ministry of Economic Infrastructure, which is the counterpart of Hydraulique in Senegal, has a concession contract with the Société de Distribution d'Eau de la Côte d'Ivoire (SODECI), which is similar to SDE in Senegal; there is no asset-holding company like SONES, nor NGOs like ENDA and FDV, nor much oversight from government. Whereas Senegal depends mainly on loan funds for social connections, Côte d'Ivoire applies a surtax to the water tariff that generates revenues for the Water Development Fund (FDE), which is used for making social connections. The FDE is administered by SODECI, which has wide latitude for decisions about social connections. It does not advertise social connections, it does not work with *quartier* leaders to prepare neighborhoods, and it is reimbursed a flat amount for each social connection it makes (without having to submit itemized invoices). Social connections in Côte d'Ivoire seem to be available for almost any house that applies, as long as it does not egregiously violate the criteria.

## Performance of the Social Connection Programs

The populations of Abidjan and greater Dakar are about the same (3 million), and piped water coverage is similar (90 percent). Abidjan privatized its water company, using a lease-operate contract in 1960, and Dakar did so in 1996. During 1996–2001, Abidjan made about 14,600 water connections per year, on average, compared with an average of about 7,800 per year in Dakar; about 90 percent of the connections in Abidjan are social connections, compared with 70 percent in Dakar. Figure 2 on page 15 details water connection in Dakar and Abidjan, 1996–2001.

If the criteria and procedures used for making social connections in Senegal and Côte d'Ivoire were badly flawed, if they did not distinguish the recipients of ordinary and social connections, then we might expect rates of water consumption and the fraction of users that confined their consumption to the social tranche (lifeline block) to be about the same for the two categories of users. If, however, the criteria and procedures are effective, we might expect that social customers would use less water than ordinary customers and that a larger fraction of them would restrict their consumption to the social tranche.

## Côte d'Ivoire

Water billing data were requested for 2001 for residential customers with ordinary and social connections. The data from Côte d'Ivoire cover four billing periods, each of three-months duration, which is the frequency of billing. SODECI provided information on 499 ordinary connections and 1,001 social connections, all located in the same *quartier*. Any customer who did not receive all four bills for the year was removed from the sample, which resulted in 933 social and 460 ordinary customers. Billing amounts were converted to cubic meters (m<sup>3</sup>) of consumption, using the tariff. (Because the samples were not randomly drawn, care is needed in generalizing from this analysis.)

Table 1, which appears on page 2, shows that customers with ordinary connections used larger amounts of water and paid higher bills than those with social connections; their median consumption was 40 percent higher, their bills were nearly 60 percent higher, and (on average) they paid 75 percent more for water than social customers. Social customers were more consistent than ordinary ones in trying to keep their consumption and bills low, as shown by the smaller standard error, and a much higher fraction of them restricted their consumption to the social tranche.

This evidence indicates that the criteria and procedures used in Côte d'Ivoire for making social connections have in fact identified a class of customers different from households with ordinary connections: social customers have the expected characteristics of poor households, especially their frugality in using water.

## Senegal

A similar request was made for water billing data from Senegal, but instead of sending a sample, SDE provided data for about 280,000 customers in 66 different *quartiers*. Unfortunately, the type of connection was not indicated, and thus it is not known which of the customers had ordinary connections and which had social connections. Without information about the type of connection, a

test of the extent to which the social connection program in Senegal meets its goals could not be made.

## **Is There a Need for Social Connections?**

The lives of the targeted beneficiaries of social connections are improved by having subsidized water connections: They avoid spending long hours collecting water from other sources, they lower their water costs, they increase their water consumption, and the quality of their lives improves. But the outcomes are not all positive: Should an individual good like a water connection with modest externalities be subsidized? In the absence of sewerage, house connections produce negative spillovers: Do they outweigh the positive benefits of piping water into the house? Society is not the source of the subsidies for social connections, but rather large water users, many of whom are poor: How does that affect the question of need? House connections are not like schools or highways, which are universally accepted as legitimate, worthy goods. It is up to individual societies, not consultants or donors, to decide which goods and services to treat as worthy goods.<sup>3</sup>

The issue of social connections focuses on water as a social good, whereas making house connections in general is more concerned with water as a commercial good. The financial viability of a water company depends on residential customers having private connections. Households without private connections are not the ones on whom sustainability depends. It follows that impediments to making house connections (for example, high initial cost) should be minimized, but it does not follow that connections should be subsidized.

## **Are the Social Connection Programs Serving the Poor?**

The poorest households in Senegal and Côte d'Ivoire are not being served by social water connections because they are in *quartiers spontanés* and are not eligible. Why are the poorest households precluded from having subsidized water connections? It is because social connections are intended for neighborhoods that are stable, where the residents have established themselves and formed a community that is collectively motivated to improve itself—for which the criterion is land tenure. Thus, social connections are aimed at "stable" and "organized" communities, but not the poorest of the poor. That said, it is likely that some of the residents are renters whose poverty may not be much different from that of squatters in *quartiers spontanés*.

Do the social connection programs in Senegal and Côte d'Ivoire serve the poorest eligible households? Not necessarily. Social connections unquestionably serve households that cannot afford an ordinary connection, but some households that can afford to pay are also served by them. Twenty-five percent of the social connections in the sample from Côte d'Ivoire use more than 500 liters per day, paying more than Communauté Financière Africaine francs (CFAF) 12,000 (U.S. Dollars [US\$] 17) each billing, and 10 percent use more than 800 liters per day, paying more than CFAF 20,000 (US\$29). Households that can pay such large amounts each billing period do not seem poor. The study by Lauria and al. (1998)<sup>4</sup> in Dakar (not Abidjan) found that the poorest 20 percent of homeowners had incomes less than CFAF 25,000 per month.

Nevertheless, the analyses of data indicate that households in Côte d'Ivoire with social connections consume and pay less than those with ordinary connections and have characteristics expected of the poor. The data from Senegal are less definitive, but they suggest something similar. What is unknown in both places is the fraction of wealthy households that is included in the group of social customers and the fraction of poor households that is excluded. Such a finding is impossible without a precise definition and criterion for distinguishing "the poor."

## **Are the Administrative Costs of the Social Connection Programs Low?**

Low compared with what? If connections were allocated by willingness to pay, administrative cost would be minimal. The administrative cost of social connections is much higher than using the market

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<sup>3</sup> A typology of goods and services, including "worthy goods," is presented in Section 3 of the report.

<sup>4</sup> Donald T. Lauria and al, 1998, Willingness to pay study for improved water and sanitation, SONES, Dakar, Senegal.

for making connections, and it is higher in Senegal than in Côte d'Ivoire. The reasons are (a) because preparations and procedures for making social connections there are more thorough than in Côte d'Ivoire, and (b) applicants are scrutinized more heavily. The objectives of the two countries are different: Senegal tries to serve the poor quickly, and it prepares *quartiers* for stability, governance, and self-sufficiency, which increase administration costs. The data suggest that a payoff from this in Senegal may be a higher rate of billing recovery (100 percent in Senegal, compared with 75 percent in Côte d'Ivoire), but the greater frequency of billing in Senegal also plays a role in higher recovery.

If a country were convinced that the benefits of piped water supply to society were enormous, then all households should get subsidized connections, which is an implication in Côte d'Ivoire. Senegal seems to be spending large sums in its effort to target the poor and prepare *quartiers* for piped water, whereas Côte d'Ivoire spends far less, perhaps because it is less concerned about targeting the poor and more content to treat most households as needy, or more convinced that making connections is more important than serving the poor.

Why target the poor? The reason seems to be humanitarian, rather than conviction that households with water connections will be more productive or more stable or better citizens; if that were the case, then there should be less concern about making mistakes by serving the rich with social connections. If piped water supply is mostly an individual good that provides only modest spillovers to society, then it should be asked whether high administrative costs incurred to target the poor are warranted.

The water consumption data provided by Senegal were useful in showing the sharp stratification of *quartiers*. For a random sample of 22 *quartiers*, average household consumption and average annual water bill were calculated for each, and the *quartiers* were sorted (ranked) from lowest consumption to highest, producing the following results (see Figure 4, "Average Household Water Bill in 22 Senegal Quarters", on page 21).

The figure shows that the 18 *quartiers* with lowest average household consumption and water bills did not vary much from one to the other; they are remarkably homogeneous, with few large water users, and with households that are presumably poor). The other four *quartiers* with higher consumption were markedly different: their average household consumption was twice as high. Hence, if Senegal wanted to lower its cost of screening applicants to ensure that rich households do not receive social connections, it could probably do so by identifying entire *quartiers* that were eligible, rather than by checking the eligibility of each applicant. One risk of this would be to exclude poor households in rich neighborhoods.

## **Do Social Connection Programs Produce Perverse Incentives?**

There are least four perverse incentives: (a) subsidized connections constitute a one-time increase in real wealth for the recipient that can easily be converted to cash; (b) negative spillovers from wastewater are not inconsequential; (c) the costs of subsidizing water connections may be borne by some households that are poorer than the recipients; and (d) free water connections provide houses with piped water that is highly sought by the users, but the nature of the good, the technology of its supply, and the method of paying for it all put consumers at risk of using more than they can pay for.

Concerning (a): Worthy goods are typically provided over time, on condition that the recipients maintain their eligibility to receive them. However, such is not the case with social water connections, which are provided at one point in time, without regard to continued eligibility of the recipient.

Concerning (b): Social connections promote the consumption of water and increase production of wastewater. By providing social connections, the negative effects may outweigh the positive.

Concerning (c): Water resellers typically have ordinary connections and face an increasing block tariff; they tend to run several lines off a single meter. Although they serve the poorest households in *quartiers irreguliers*, the large consumption of their meters puts them in the highest blocks of the tariff. Hence, the very poor houses they serve in *quartiers irreguliers* pay a higher price for their water, and their payments subsidize the social connections of owners in formal neighborhoods who are better off. The situation is similar for multiple poor households that are served by a single meter (for example, in apartment houses); they pay a higher price for water, and they cross-subsidize social connections.

Concerning (d): Many houses that get social connections, thinking they can afford to pay their bills, frequently find they cannot, and they are disconnected. Much of this problem is due to the

technology of water supply and the method of rendering bills. It is not easy for homeowners to carefully monitor how much water they use; also, Senegal renders water bills once every two months, and Côte d'Ivoire renders them once every three months, which poses serious cash flow problems for poor households. Hence, social connections encourage poor houses to use a good they desperately want, but they are not given adequate means to monitor their consumption to keep it within affordable limits, and the water companies render bills on an infrequent basis, which presents a cash flow problem.

Beyond these four perverse incentives, there are others. In Côte d'Ivoire, decisions about social connections are left to the concessionaire, but two problems arise: The concessionaire has an incentive to maximize the number of social connections, and he has an incentive to select social connections that have lowest construction costs. The first results because the concessionaire is remunerated for the amount of water sold, and the second because the contractor is reimbursed a flat rate for each connection and does not have to submit itemized invoices.

If a social connection program were very successful, one might expect a large fraction of the households getting them to restrict their consumption to the social tranche, where water is priced below the average cost of production. Hence, a successful program could cause average revenue to decrease and might put the water enterprise at risk.

## Discussion and Recommendations

The issue of subsidized water connections needs to be reexamined because (a) a connection is more like an individual than a public good; (b) the positive externalities from house connections seem only modest; (c) the negative externalities from wastewater can be substantial; (d) the way subsidies are made is flawed—all at one time and without regard for changes in the recipient's economic status; and (e) private connections seldom serve the poorest households. This is not to say that subsidized connections are ill advised, only that governments and donors should be sure of what and whom they want to subsidize and why.

In particular, a reexamination should clarify whether the focus is really on (a) improved water supply for “the poorest”; (b) a higher level of service for the “relatively poor,” who own their houses; or (c) providing private connections to ensure the financial viability of water systems.

## Serving the Poorest

If the objective is to serve the very poorest households with improved water supply, the focus should be on *quartiers spontanés*, not on restructured neighborhoods. Two ways to do it are (a) by subsidizing temporary infrastructure, especially the pipes constructed by water resellers that extend into informal areas, and (b) by accelerating the restructuring of *quartiers spontanés* so that they can qualify sooner for a social connection.

## Serving the Relatively Poor

If the objective is to serve the relatively poor (who own their houses in formal neighborhoods) with a higher level of service, it will not be easy to target them without differentiated water supply technologies or the kind of intensive administrative screening used by Senegal. Low-level technologies for serving individual houses exist (for example, “Fordilla valves,” which were manufactured by the Ford Meter Box Company).<sup>5</sup> An alternative might be shared patio connections between two or more houses. In the absence of differentiated technology, the approach presently used in Senegal for targeting relatively poor homeowners is probably more effective than the system used in Côte d'Ivoire, which in turn is probably more effective than designating eligible neighborhoods. Increasing

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<sup>5</sup> A Fordilla valve attached to a standpipe employed a dashpot that held about 1 liter of water, which was delivered through its faucet by pushing and holding down a button or lever. Once delivered, the button had to be released for the dashpot to refill. The user had to expend some effort and time to collect water, which was clearly a lower technology than a conventional connection of the type used in West Africa; among other things, it prevented waste and high water bills.

effectiveness in targeting the poor, however, incurs increasing cost and begs the question: What are the negative consequences of failing to hit the target?

## **Making Connections**

If the objective is not so much to serve the poor, but to encourage private house connections to ensure financial viability of the water system, what needs to be addressed is the high up-front cost of the connection and security deposit. The solution to this problem probably entails more creative financing options, rescinding prohibitions from selling water to neighbors, and reducing or eliminating *bornes-fontaines*.

Although not a formal component of this study, it is pertinent to comment on subsidies for connections versus those for consumption. It is well recognized that lifeline rates (increasing block tariffs) aimed at providing a minimal quantity of water at a subsidized price have substantial problems. Subsidizing connections is probably better than subsidizing consumption, even though it is not perfect in targeting the poor. The evidence from Côte d'Ivoire and Senegal is that if connections are subsidized, the users will pay for consumption.

## **Three Recommendations**

- Licensed water resellers should not face an increasing block tariff.
- The frequency of billing should be reduced; once every two or three months works a great hardship on poor customers.
- A fuller and more detailed investigation of social connections might result in lessons that could be applied to India and other developing countries.



# 1 INTRODUCTION

This study aims at drawing lessons from Côte d'Ivoire and Senegal in West Africa about making social connections of households to piped water networks that can be applied in Africa and other developing countries that are undertaking reforms in the water sector.<sup>6</sup> Government subsidies to the water and sanitation sector are substantial in many countries. In India, for example, a recent study put the total value of subsidies at US\$1.4 billion, about 90 percent of which comes from state budgets (unlike Senegal and Côte d'Ivoire, where government budgets provide essentially no monetary subsidies to the water sector). However, many subsidies, perhaps most, seem not to be effectively targeted toward poor households. Data suggest that access to private water connections is skewed toward high-income households and that the largest subsidies seem to be channeled toward households with high consumption. An important objective of sector reform in developing countries is to reduce financial dependency on state subsidies, moving water utilities toward self-sufficiency. To achieve this, policymakers need case studies and lessons about different methods for subsidizing the poor. One of the tasks at the heart of this goal is to identify more effectively the targeted beneficiaries of pro-poor subsidies.

Experience from West Africa and Latin America suggests that capital subsidies for covering connection costs may be an effective use of subsidy finance. The Bank-Netherlands Water Partnership (BNWP)<sup>7</sup> project entitled "Evaluation of Pro-Poor Subsidies for Urban Water Services in West Africa" aims at assessing the effectiveness of the subsidy schemes used in Senegal and Côte d'Ivoire in providing piped water supply to the poor. The study described herein was commissioned to make a preliminary evaluation of the subsidy schemes that have been adopted mainly in Dakar and Abidjan. The fieldwork of this study was largely a reconnaissance mission to explore whether the social connection programs in West Africa might merit further study for application in other developing countries. It was conducted April 22 through May 5, 2002.

The hypothesis that motivated this study was that if two different technologies for connecting houses to piped water networks were available—one that provided a low level of service at low cost and another that provided a higher level of service at higher cost—poor households would select the one with lower cost (poorer service), and wealthier households would select the one with better service (higher cost). For example, if households were given options between a connection lateral with small diameter that was free and a larger one that they would have to pay for, assuming that quality of service is better with a larger diameter, households selecting the lower-cost, poorer-service option presumably would do so because they are poor.<sup>8</sup> Thus, it was hypothesized that it might be possible to use lateral size as a criterion to identify poor households, and if so, perhaps that criterion could be used to channel subsidies in India and elsewhere more effectively. Senegal and Côte d'Ivoire offer different options for making connections to water networks: virtually free social connections that are aimed at poor households, and ordinary connections whose full cost must be paid by users (which are for wealthier households and businesses). This project involved a preliminary study of the household connection schemes in these two countries.

## 1.1 Objectives and Approach

The first task for this study was to explore and describe the schemes used in Senegal and Côte d'Ivoire for making social connections and then to address the question: How well do these systems work in actually serving poor households and allocating subsidies? Are the households that are being served with social connections, in fact, poor? If not, are subsidized connections being made available to

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<sup>6</sup> "Social connections" is a term used throughout this report to designate subsidized private connections of residential dwellings to piped water networks, which are intended to benefit the poor.

<sup>7</sup> The mission of BNWP is to improve delivery of water supply and sanitation services to the poor, and therefore it supports a broad sector reform agenda with a strong poverty focus. BNWP activities center on providing support to solve immediate problems with actual cases, testing policy and service delivery innovations, and plugging gaps in existing knowledge in the water sector as a whole.

<sup>8</sup> A lateral is the pipe that connects the house to the water pipe in the street.

households that should be served with ordinary connections? It appears that two types of error are possible here: (a) errors in which wealthy households that can afford to pay for their connections are being subsidized and (b) errors in which poor households fail to get a subsidized connection.

The terms of reference for this study indicate that a well-designed subsidy scheme needs to meet four criteria, as shown below in Table 1:

Thus, this study aimed at evaluating the subsidy schemes used in Senegal and Côte d'Ivoire against these criteria. The study is preliminary in nature and was aimed at collecting enough information to assess whether the West Africa experience merits fuller examination in a follow-up study, and if so, to prepare draft guidelines for it. Hence, study tasks include (a) examining the institutions, policies, and procedures for providing subsidized connections; (b) evaluating how well the existing subsidization schemes meet their objectives; and (c) identifying any negative outcomes that have resulted from the existing subsidy schemes.

**Table 1 Criteria for an Effective Subsidy Scheme**

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- (a) It must respond to a genuine need.
  - (b) It should serve the poor.
  - (c) It should have low administrative costs.
  - (d) It should avoid perverse incentives.
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Source: World Bank

## 2 CRITERIA FOR SOCIAL CONNECTIONS

The study quickly found that although the costs to households of ordinary and social connections are different (social connections are free, and ordinary connections cost more than US\$200), the levels of service are equal. Social connections in Senegal are made with a 15-millimeter-diameter meter and a 20-millimeter-diameter lateral; in Côte d'Ivoire, both the meter and the lateral are 15 millimeters in diameter. However, ordinary connections for households use the same diameters as social connections.<sup>9</sup> Hence, both social and ordinary connections render essentially the same service. In fact, a household would not be able to obtain a larger diameter meter even if it were willing to pay for it; only high-water-use customers are eligible for meters larger than 15 millimeters; otherwise, the velocity in them would be too low, causing erroneous meter readings. Furthermore, the laterals used for social connections are the same diameter as those for ordinary connections because the water utility does not want to have to replace them should a household decide to upgrade in the future from a social to an ordinary connection. The result is that the hypothesis of differentiated levels of service and costs that motivated this study as a potential criterion for targeting the poor could not be thoroughly tested because, although the cost of social and ordinary connections is differentiated, service quality is not.

The process for getting a social connection is complicated and different in Senegal from that in Côte d'Ivoire (it is described in Section 4 below). What is relevant here are the eligibility criteria that applicants must meet for getting a social connection. Table 2 below sets out the criteria for social connections in Senegal.

Among these criteria, the key ones upon which the social connection policy primarily rests are (e), (f), and (g), which are discussed later in this report in some detail. Criterion (e) requires applicants to own the house and land for which they seek a water connection; it implies that the community in which the house is located needs to be fairly well established, thus ensuring that the applicant is not in the poorest social category. Criterion (f), perhaps more than the others, tends to distinguish rich from poor. A household that wants a social connection must wait until construction of the street main has been extended to its house (not more than 20 meters away); however, if a water main is farther away, a household can pay for its extension to its property plus the cost of the meter and lateral for an ordinary connection. Hence, criterion (f) to a large extent is a surrogate for waiting time: Households anxious for a connection can get one sooner by paying to extend the water line, while applicants for social connections must wait until the main reaches their property. Households that pay for an ordinary connection distinguish themselves as rich, but it does not follow that those who wait for a social connection are poor. Criterion (g) is an impediment for the poorest houses that cannot pay the security deposit for consumption charges should the user default in paying its bill; the deposit is for consumption, not for the connection.

In Côte d'Ivoire, the criteria for social connections are similar, with a few differences. Applicants cannot have more than five taps in their houses (a requirement that the water company thinks is unenforceable and unimportant); the water main must be within 60 meters of the applicant's house; all houses approved for social connections are provided 12 meters of lateral installation free of charge; and upon approval, the security deposit is CFAF 19,000 (US\$27), about 50 percent higher than in Senegal, because the billing cycle is three months in Côte d'Ivoire and only two months in Senegal.

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<sup>9</sup> Only households are eligible for social connections; commercial customers, industries, and government units such as schools and offices are not eligible.

**Table 2 Criteria for Social Connections in Senegal**

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- (a) Applicants cannot be wealthy.
  - (b) A house must exist on the lot that is to be served by the connection.
  - (c) It must be a residence, not a business; the connection cannot be used for commercial purposes such as selling water to neighbors.
  - (d) The connection cannot cross private property.
  - (e) The applicant must have title to the house and land.
  - (f) A pipe of the water network must be within 20 meters of where the house connection is made, or if a 100-meter long extension is made of an existing pipe in the water network (not more than 100 millimeters in diameter), it can serve the houses of at least four applicants.
  - (g) If approved for a social connection, the applicant must pay a security deposit of CFAF 13,000 (US\$19) against future water consumption charges; no charge, however, is made for the meter and lateral.<sup>10</sup>
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Source: SDE

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<sup>10</sup> At the time of this study, the exchange rate was approximately CFAF 700 = US\$1.

### 3 PRO-POOR SUBSIDIES

This study quickly found that the meter and lateral diameters used in West Africa are not useful criteria for identifying the poor so that subsidized water connection can more effectively be channeled to them. As described in Section 4, the process for targeting the poor is cumbersome, which raises some questions about subsidies in general and subsidized water connections in particular. The intent here is not to thoroughly probe the theory of subsidies and subsidized water connections, but rather to examine some of the issues related to these questions in light of the terms of reference for this study.<sup>11</sup>

#### 3.1 Classification of Goods and Services

Two ways to characterize goods and services are by *exclusion* and *consumption*, which are technical terms in economics that have various synonyms such as *accessibility* (or *excludability*) and *subtractability*, respectively. Exclusion is the property that denies a potential buyer or user access to a good unless he meets the conditions of the seller or supplier; use of a good is typically achieved by paying a fee. Normal economic goods have the exclusion property: it is generally not possible to have a new car or suit of clothes or food without paying for them. However, access to many goods is not restricted by having to pay a fee, such as fish in the ocean, groundwater, fire and police protection, highway travel, museums, scenic beauty, boating and hiking, and so forth.

The consumption or subtractability property pertains to whether the benefits derived from the consumption or use of a good or service is available only to a single consumer or whether it can be jointly obtained simultaneously by several consumers. The benefits derived from a suit of clothes or from food accrue almost exclusively to the user or consumer, whereas several consumers using the good simultaneously do not diminish the benefits from a movie, TV, scenic beauty, and national defense.

Most goods and services have exclusion and consumption properties to different degrees that fall on a continuum. The following table shows the labels commonly attached to goods, depending on whether exclusion is feasible or not and whether consumption is individual or joint; that is, for goods that have these characteristics to the fullest or least extent.

For examples of labels commonly attached to goods, see Table 3 below.

Access to private or individual goods is easily obtained by charging a fee, and their benefits are available mostly to the consumer; that is, these goods have high excludability (of access) and subtractability (of benefits)—they include most of what is purchased in markets (food, clothing, sporting goods, cars, houses, and so forth). Similar to individual goods are toll goods because access to them can also be restricted by charging a fee; however, their benefits tend not to be diminished by

**Table 3 Labels Commonly Attached to Goods**

		<i>Exclusion</i>	
		<b>Feasible</b>	<b>Infeasible</b>
<b>Consumption</b>	<b>Individual</b>	Individual goods	Common pool goods
	<b>Joint</b>	Toll goods	Collective goods

Source: Authors

<sup>11</sup> Fuller accounts of some of the material summarized in this section can be found in numerous sources (for example, E. S. Savas. 2000. *Privatization and Public Private Partnerships*. New York: Chatham House Publishers; and Arturo Israel. 1992. *Issues for Infrastructure Management in the 1990s*. Discussion Paper 171. World Bank, Washington, D.C.).

joint consumption. Public water systems fall into this category (one needs to pay a fee to connect to and use the system, but water quality is not diminished by joint consumption, and the overall ability of the water system to simultaneously serve multiple users is not much affected by an individual user). Examples of toll goods abound: schools and colleges, theaters, pay TV, sports arenas, highways, national parks, and so forth. Toll goods can be (but are not always) distributed through markets, as discussed below.

At the other extreme from individual goods are collective goods. Access to collective goods is not easily restricted, and consumption by one user does not (significantly) diminish the benefits obtained by other users; allocation of collective goods is typically achieved through government intervention and regulation because of the inability of markets to distribute them. Environmental goods are a major component of this category, including such things as water and air quality and scenic beauty. Pure collective goods are also called "common property resources." Access to common pool goods cannot easily be restricted through pricing (for example, groundwater or fish in the ocean), but once extracted by individuals, their benefits tend not to be available for joint consumption; they too cannot be supplied by markets because consumers cannot easily be restricted from using them, so governments typically intervene to allocate them; they are the subject of Hardin's classic article, "Tragedy of the Commons."<sup>12</sup> Because of the difficulty of controlling access and because benefits diminish with consumption, common pool goods are susceptible to overuse and extinction.

### 3.2 Worthy Goods

This simple classification is most often cited to show the need for government intervention, administration, and regulation when markets fail, especially in cases where exclusion by charging a fee for access is infeasible. However, the classification is also cited when describing another type of goods called "worthy goods" or "merit wants." These are often toll goods that are deemed so important by society that barriers to access by charging a fee are removed, either for the entire population or a certain portion of it. In other words, society deems use of worthy goods so important that their consumption is subsidized, whether consumers can pay for them or not.

Examples of worthy goods abound and include such things as public education, highways, national medical insurance, museums, cultural halls, exhibition centers, and so forth. Most of these were once toll or individual goods that migrated from high to low excludability by society's choice. In so doing, they were taken out of the marketplace (entirely or in part), and their allocation became the province of government or the private sector through a process of administration and regulation. Because access to them is not through user fees, they are frequently paid for from general or special use taxes collected and redistributed by governments. For example, the first roads and schools in the United States were privately owned, and access to these toll goods was only possible to users who paid a fee. Over time, the benefits to society from using highways and schools were deemed so great that the access fees were rescinded to make these goods available to all without impediment (in fact, not only is public education encouraged but also a minimum amount is mandatory in most countries). Highways in many countries are paid for mainly from taxes levied on gasoline used by vehicles, and schools mainly by property taxes. Many worthy goods are paid for by income taxes. The government units that collect these taxes employ layers of administration to first collect and then redistribute the revenues back to the separate units that supply the goods (for example, to specific roads and schools).

A strong rationale for worthy goods is that they usually provide positive externalities. For example, schools raise the general level of education, making citizens more useful and productive to society; highways, museums, and national health insurance are generally perceived as contributing to the overall social welfare through positive spillovers. Because these goods are perceived to benefit society as a whole, they are typically paid for in part or in whole from general tax revenues.

While the externality and public-good characteristics probably pertain to the majority of worthy goods, there are many worthy goods that seem to be more like individual goods, either with small externalities or with ill-defined or controversial spillovers that are not readily apparent. For example, food is a nearly pure individual good for which a convincing case cannot be made that it should be

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<sup>12</sup> Garrett Hardin. 2000. "Tragedy of the Commons," reprinted in *Economics of the Environment*. R. N. Stavins, ed. New York: Norton.

subsidized by society, yet virtually all societies provide emergency food for the needy, as is generally true for clothing and housing. In the United States, private ownership of housing is subsidized through national tax policy that enables homeowners to exempt interest paid on home mortgages from income tax, yet private home ownership seems to be mostly an individual good, with only modest positive externalities. Some states in the United States have policies of "homestead exemption," in which part of the assessed value of houses that are owner-occupied is exempt from property taxes; more generally, most countries provide publicly assisted housing for the poor. Many governments, plus the private sector in the United States and elsewhere, subsidize medical care (by various methods, including a reduction in income taxes); the elderly (for example, by reducing their income tax or the fees they have to pay for certain goods or services); the blind; the disabled; and the widowed. In some parts of the United States, it is common for the "poor" to qualify for subsidized lifeline rates for heating fuel in winter, telephone service, and water supply; shelters and soup kitchens are widely available for the indigent. For many of these examples, the externalities appear to be minor or modest, yet society chooses to subsidize them, mainly on humanitarian grounds. Where externalities are not large or lacking and the goods are more like individual than public goods, the worthy goods come under attack, their subsidies are threatened, and they must continually be defended.

### **3.3 House Connections: Unlike Most Worthy Goods**

This background brings us to the subject of subsidizing house connections for the poor in developing countries. In this section, subsidized water connections are discussed with respect to how they fit (or fail to fit) into the general scheme of worthy goods; although the treatment is not rigorous or systematic, it is aimed at stimulating discussion about house connections so that the criteria in Section 2 regarding well-designed subsidy schemes can be addressed. One of the first things to note about water connections is that they are targeted for the poor, which is unlike most of the worthy goods mentioned above. Neither schools nor highways nor museums nor subsidized public transportation are aimed specifically at the poor, but are usually made available to all, regardless of ability to pay; these worthy goods are like lifeline water rates, which are available to all, even those who can afford to pay. Even shelters for the homeless and soup kitchens are not restricted to the poor per se, but are available to anyone for the taking. Perhaps this targeting implies that free water connections provide only modest benefits to society beyond the recipient and hence are offered mainly on (more difficult to justify) humanitarian grounds.

The subsidy for a water connection is given only once, rather than repeatedly. Consider schools, or highways, or soup kitchens, or lifeline rates, or subsidies for home ownership, or medical care, or the elderly, or the blind: These subsidies are offered repeatedly over time, whereas a water connection is given whole, all at once. Even public housing that is earmarked for the poor is given one month or one year at a time, on condition that the recipients continue to document their eligibility. Once the subsidy is given for a water connection, there can be no follow-up to ensure the recipient's eligibility. The subsidized connection directly increases the recipient's wealth; it is a good, rather than a service; it is privately owned, as opposed to, say, schools or highways or museums or public housing, which are publicly owned; and the subsidy is not terminated if the recipient's economic status improves.

Another difference between a subsidized water connection and most of the other worthy goods mentioned above is that a connection is more like a private individual good than a public collective good. Individual goods like food, clothing, and housing are often subsidized for the indigent on humanitarian grounds, and it may be on this basis that the rationale for subsidized water connections rests. However, the indigent are very needy; yet to qualify for a subsidized water connection, a house must be privately owned and its owner (by definition) is not indigent. In contrast, where an individual good like owner-occupied housing is subsidized, it is typically made available to all and not just the poor.

Water connections are different from most of the worthy goods mentioned above in that they seem not to have large positive externalities; in addition, they produce negative spillovers in the form of wastewater, particularly if the community where the subsidized connections are made is not sewered. Most worthy goods are paid for from general tax revenues if they are perceived to generally benefit society, whereas house connections are cross-subsidized by large water users who could themselves be poor (as discussed below); the subsidies are not necessarily provided by the wealthy.

A water connection is a bundled good that provides no social benefits without water consumption, even though it may increase the market value of the property it serves. It is difficult to find similar examples of bundled worthy goods from those listed above. It might be argued that free highways are bundled with the vehicles that use them, that a highway without vehicles renders no social benefit; however, society benefits from free highways even if its individual members do not personally own vehicles, making highways different from water connections for houses.

The criterion problem for identifying the poor is not trivial. Some of the worthy goods mentioned above are in fact targeted for specific subsets of the population such as widows, the disabled, homeowners, the blind, owners that occupy their houses, and so forth, but it is relatively straightforward in industrialized countries for the applicants to document how they meet the criteria. For goods aimed specifically at the poor such as food stamps in the United States and lifeline rates for utilities, applicants are typically required to show proof of income, which for workers in the formal sector is not difficult. Shelters and soup kitchens in industrialized countries in some respects seem to target the kind of poor for whom water connections are intended in developing countries: in both cases, the worthy goods are very much like individual goods, and they are offered to anyone for the taking, but in the case of shelters and soup kitchens, the quality of the subsidized goods is typically unacceptable for persons who are better off, leaving the poor to self-identify themselves.<sup>13</sup>

These comparisons among various worthy goods show that water connections in some respects are unique and have only some of the characteristics that are commonly associated with subsidized worthy goods. However, our purpose here is not so much to argue the suitability of connections for subsidies as it is to explore the systems used in West Africa for allocating them. Before reporting on the fieldwork that was done for this study, let us briefly consider the four criteria in Table 1 regarding an effective subsidy scheme: (a) it must respond to a genuine need, (b) it should serve the poor, (c) it should have low administrative costs, and (d) it should avoid perverse incentives. These criteria are addressed more fully in Section 6, but a few observations can be made immediately.

Regarding the second criterion, Senegal and Côte d'Ivoire both require applicants for subsidized connections to own their houses, which automatically eliminates them from the category of very poor; thus, an effective subsidy scheme need only serve the relatively poor among those who own their homes.

Regarding the third criterion, it is the very nature of worthy goods to require administration for their distribution, rather than the less cumbersome market mechanism of paying a fee in order to access them; what then does low administrative cost mean?

Regarding the fourth criterion, it is possible to detect at least four perverse incentives: (a) subsidized connections constitute increased real wealth for recipients that can easily be converted to cash; (b) negative spillovers from wastewater may outweigh positive gains; (c) the costs of subsidizing water connections may be borne by households poorer than the recipients; and (d) free water connections provide houses with access to piped water that is highly sought after and must be paid for by the users, but the nature of the good, the technology of its supply, and the method of charging and paying for it all put consumers at risk of using more than they can pay for.

The difference between house connections and others is summarized in Box 1.

#### **Box 1 House Connections Are Different**

Access to subsidized worthy goods is usually unrestricted and available to anyone, whereas house connections are limited to a particular group of society, the poor. Most worthy goods are offered on a recurring basis, but the beneficiary of a connection gets it only once. Goods eligible for subsidies typically produce large externalities, but house connections are more like individual goods with small externalities. Goods that produce large negative spillovers seldom qualify as worthy goods, but house connections potentially produce such externalities in the form of wastewater. Whereas most worthy goods are unbundled, a house connection is bundled and produces no social benefit without the purchase of water.

Source: Authors

<sup>13</sup> This notion of differentiation is what motivated this study, but was found not to apply in the case of connections of houses to water networks.

## 4 URBAN WATER SUPPLY IN DAKAR

In 2000, the Dakar region, including Dakar, Rufisque, and Pikine, had an estimated population of about 2.4 million (M) persons and an annual rate of population growth of about 4.5 percent; in 2010, the population is estimated to be about 3.8 M. The population of the region is estimated to be presently growing at 100,000 to 120,000 persons per year.

Most of the population increase is due to migration into the region from outside by people seeking better lives. The migrants are almost universally poor, and the majority settle into informal areas called *quartiers spontanés* or *quartiers irréguliers*; they build shacks in areas without public transport, health clinics, or schools on land that they do not own and that has no services such as water supply, sewerage, refuse collection, or electricity. These *quartiers* are often near more-formal residential areas that are supplied by water from piped networks or water sellers or both, from whom the squatters can obtain water.

### 4.1 Water Policy

It is the policy of the Senegal government to provide water service to all households via formal mechanisms such as licensed sellers at *bornes-fontaines* and legal private connections to piped networks; the policy is not to rely unduly on informal mechanisms such as natural sources or unlicensed vendors. The goal of this policy is to provide each household with its own private connection to a piped water network as quickly as possible. The government requires that for sustainability, the piped water supply system must be financially self-sufficient, with its costs (including debt service on loans) completely covered by its revenues.

Recognizing that a large fraction of the families in Senegal are poor, especially new migrants, government policy is to subsidize water supply for the poor. Given that the water enterprise is required to be financially self-sufficient, the policy of subsidies does not imply financial gifts from government or other donors, but rather cross-subsidies from larger water users to ones whose consumption is low (presumably, but not necessarily, from "rich" to "poor"); the resulting "cost" to government of the subsidy policy is not pecuniary, but rather political, in terms of supporting a potentially unpopular policy. In a similar way, the policy of financial self-sufficiency imposes a political, but not necessarily a financial, cost on government funds. Government has promoted three main types of cross-subsidies in the water sector:

- *Bornes-fontaines* (standposts), aimed especially at the newest and poorest households in Dakar
- Social connections, for more-established households in Dakar
- Progressive (lifeline) tariffs, for households with private connections.

The *bornes-fontaines* constitute a cross-subsidy, in that their licensed operators buy water from the water company at a price (CFAF 307 per cubic meter [m<sup>3</sup>]) that is below the marginal cost of production, with the intent that the "savings" be passed on to consumers after marking up the price to cover the costs of the operators. Central to the policy of *bornes-fontaines* is recognition that private connections cannot be made to new households in informal (unstructured) areas that do not yet have piped networks. Hence, the *bornes-fontaines* are an immediate response to an important social need that cannot be met with the more permanent technology of individual house connections; the system of *bornes-fontaines* in the long term will gradually be replaced as the more permanent solution of connections is implemented. In the short term, not only do the *bornes-fontaines* meet water needs where pipe networks do not yet exist, but they also provide a choice for poor households that do have the option of connecting to a network, should private connections prove too expensive for them.

Social connections are considered by the Senegal government as the preferred means for supplying poor households with water. The government's policy regarding social connections has an implicit—if not formally stated—goal that social connections are to be provided to poor households "as quickly as possible." That is, the policy is not simply to subsidize private connections in zones that have complete primary-secondary-tertiary piped networks in place, but to simultaneously construct tertiary and, in some cases, even secondary pipe networks while providing opportunities for poor households

to connect to them while they are still under construction. Demand for private connections is a major force that motivates construction of tertiary networks in Dakar; government's response to it implies a policy of providing rapid connections for the poor that is uncommon in many countries where the approach is to first build complete pipe networks, after which households are given opportunities to connect to them. Moreover, while the policy in Senegal is to provide private connections in formal zones where households have tenure to the land, some households can get connections even if they do not have tenure, which is another indication that government wants to provide service as quickly as possible. That said, the period of time between when a *quartier* spontaneously forms and when subsidized connections are made available in it is often 15 years or longer.

The policy of lifeline tariffs is to provide all households that have private connections, regardless of their income, with the ability to buy a certain quantity of water at a subsidized price that is below the marginal cost of water production. In Senegal, the "social tranche" is 0 to 20 m<sup>3</sup> for two months, and the current price is CFAF 203 per m<sup>3</sup>, making the household cost of the full (20 m<sup>3</sup>) social tranche about CFAF 4,100; the next tranche, from 20 to 100 m<sup>3</sup> for two months, is sold at CFAF 706 per m<sup>3</sup>, and the price for consumption above 100 m<sup>3</sup> is about CFAF 810 per m<sup>3</sup>.

## 4.2 Senegalese Institutions for Making Social Connections

Because meter and lateral diameters are not useful criteria for targeting subsidized house connections to the poor, the approach used in Senegal and Côte d'Ivoire is to serve the areas where the poor are living. Identification and selection of these regions is a very labor-intensive process that requires many layers of administration, involving both the public and private sectors. In this section, the major administrative units involved in this work in Senegal are described. Section 4.3 describes how they interact and how the process of making social connections works in Senegal. Then the major differences between Senegal and Côte d'Ivoire are summarized in Section 4.4.

The main institutions concerned with water supply in Dakar are (a) Société Nationale des Eaux du Sénégal (SONES), (b) Sénégalaise des Eaux (SDE), and (c) Environnement et Développement du Tiers Monde (ENDA), a nongovernmental organization (NGO). Three additional key organizations are (d) Direction de l'Hydraulique, the Ministry of Water; (e) Ministère de l'Urbanisme et de l'Habitat, the Ministry of Urbanism and Housing; and (f) the FDV.

The government agency responsible for community water supply in Senegal is the Ministry of Water. Starting in 1996, the water sector was reorganized, with creation of the public asset-holding company SONES, which has a contractual relationship with the Ministry of Water to provide the population of Senegal with water services. SONES, in turn, has a 10-year lease-operate (performance) contract with SDE, a private contractor, whose responsibility is to implement the plans and policies of SONES. SDE does not own facilities, but rather leases them from SONES, the holding company, and operates them to supply water to users; similarly, SDE implements construction of new water facilities (such as extensions of water networks and house connections) on behalf of SONES, but does not own them; ownership resides with SONES. Hence, the contractual partnership between SONES and SDE lies at the heart of policymaking and implementation in the water sector; it covers the entire country, although our concern herein is with the region of Dakar, including the capital city and its neighboring towns.

SONES retains additional services through contracts with ENDA, which is a large international NGO that has 5,000 staff in Senegal; within ENDA, the key unit with which SONES does business is Eau Populaire, which is concerned mainly with water services for the poor. To a large extent, ENDA's main work is to assist development of administrative units within the *quartiers*, especially the poorest ones just springing into existence that lack infrastructure (such as water supply). ENDA typically helps the *quartiers* identify leaders, organize themselves administratively, and elicit information from *quartier* inhabitants about their preferences for social improvements (including water and sanitation), and it helps communicate that information (demands for improvements) to SONES and SDE to assist the planning process in serving the (poorest) *quartiers* with water. Although SDE has no contractual arrangement with ENDA, the two agencies have a close working relationship with each other and with SONES, and the three agencies act as a partnership.

ENDA plays a key role in identifying the *quartiers* that are ready for private house connections to the water network and where they should be made. Hence, ENDA has substantial input to the program of social connections, which mainly involves restructured *quartiers*, not *quartiers spontanés*. ENDA works with numerous *quartiers* that are in the process of being restructured from their informal state to

### Box 2 Key Water Institutions in Senegal

- The FDV, working with the Ministry of Urbanism and Housing, recommends priorities for formalizing and restructuring *quartiers*, which enables households to acquire land tenure and thereby plays a key role in determining where extensions of the primary and secondary mains of the water network are made.
- ENDA, working with SONES, is concerned with building institutional capacity in restructured *quartiers* and recommending priorities for the construction of tertiary networks and house connections.
- SONES, in turn, delegates by contract the responsibilities for implementation and operation of capital facilities to SDE.
- All these organizations have significant impact on the timing of house connections in Senegal (that is, the duration between when migrants first arrive in the city and when they have their own connection) and thus on which of the region's poor households get piped water.

Source : Authors

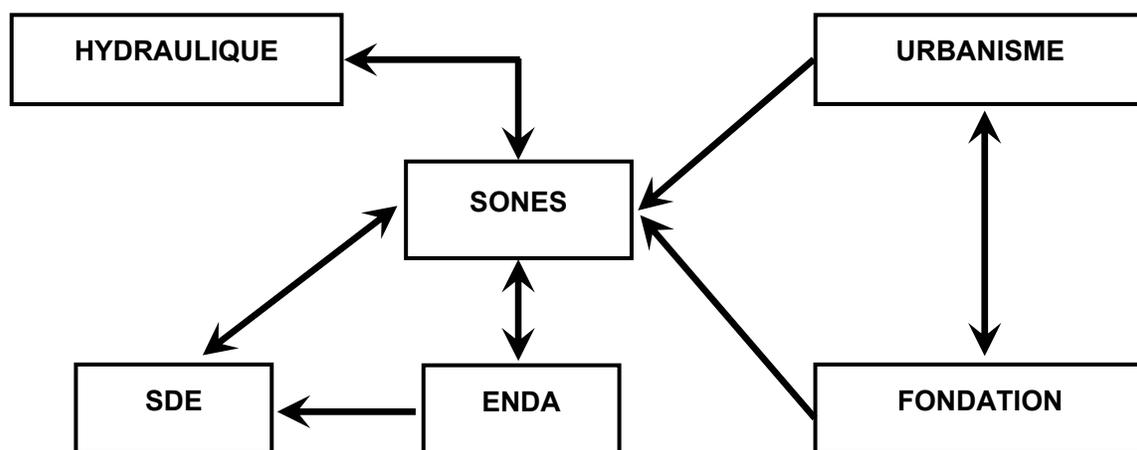
recognized urban areas, where residents have tenure to their land and thus are ready for such basic services as water, sanitation, electricity, schools, and health clinics. From its vantage of working with numerous *quartiers* in various stages of development, ENDA is able to advise SONES on which ones are ready for water improvements; that is, it can assist in assigning priorities for construction of tertiary water networks and private connections and thus have important impact on the timing of which newly structured *quartiers* get connections first.

However, before construction of tertiary networks and house connections is the need to have served the *quartier* with primary and secondary pipe networks of the water system, which involves identification of how the water network is to be extended in the urban area and where the main pipes are to be laid. The work of restructuring *quartiers* from informal to

formal status, including decisions about land use (such as the location of roads and commercial, residential, and public areas) is the responsibility of the Ministry of Urbanism and Housing. Just as SONES contracts with ENDA for assistance in assigning priorities for making house connections to (mainly) restructured *quartiers*, the Ministry of Urbanism and Housing has recently contracted with the FDV, an NGO-like not-for-profit organization, in assigning priorities for restructuring, which in turn implies priorities for extending primary and secondary mains of the water network. The foundation is presently working in an area with only 11 *quartiers* in a region of 500 hectares, but its scope of services may be expanded in the future.

The key water institutions in Senegal are summarized in the Box 2. The interactions among them are shown in Figure 1 below, where heavy double-headed arrows indicate contractual arrangements and lighter single-headed arrows indicate flows of information; government agencies are in the top row, the public holding company SONES is in the middle, and the private organizations, which have primary contact with water users, are in the bottom row.

Figure 1 Interactions among Key Water Institutions in Senegal



Source: Authors

### 4.3 How Social Connections Are Made in Senegal

As the public unit concerned with community water supply, SONES routinely gets requests for improving water supply and providing social connections in different *quartiers*. Probably the majority of the requests comes from the *quartiers* themselves (for example, from the *quartier* delegate or chief); ENDA assists in preparing some of the requests from the different *quartiers*, and it periodically meets with SONES to provide information on water improvement needs that it knows about. SONES also gets requests directly from individual citizens and from elected political officers (such as town mayors).

SONES forwards these requests to , which also receives requests for house connections from *quartiers*, from ENDA, from the FDV, from its own staff, and from other sources. Usually in September each year, prepares a draft capital improvement plan for the next three years that indicates the different improvements to water supply infrastructure that SDE proposes to make, based on its own assessment of needs plus information received from SONES, ENDA, the FDV, and other sources. The proposal identifies each project by name (hundreds of them) and its location or *quartier* and gives a general description of proposed work (for example, "1,000 social connections in *quartier* XYZ"), the estimated cost, and the proposed year of implementation.

The proposed plan is delivered to SONES for review; following which, a meeting is scheduled between SONES and SDE to discuss the proposal and make decisions about which projects to implement and what changes (if any) to make from how they were originally proposed. SONES has a fairly firm estimate of its budget by September for making capital improvements, and thus the projects selected for implementation must fit within it, especially those proposed for the first year of the three-year planning period. SONES's budget is a combination of funds returned to SONES by SDESDESDE under its contract plus funds from loans from the World Bank and other donors. An agreement is reached between SONES and SDE on which projects to implement; following which, the capital improvement plan is finalized by SDE to reflect the agreement, including comments on each project that emerged during the discussion. The plan is signed by representatives of SDESDESDE and SONES and becomes part of the contract documents for the next year, which are typically executed in January.

Once SDE has an executed a contract for the next phase or year of work that indicates (among other things) the number and location of social connections (not only in the Dakar region but also throughout Senegal), it calls a meeting in its offices of the delegates (or chiefs) of the *quartiers* in which social and ordinary connections are targeted for construction. The delegates are informed of the intention to build tertiary networks and house connections in their *quartiers* and are asked to inform their constituents of the pending construction. The delegates are informed of the criteria that are used to judge whether a household is eligible for a social connection and the conditions under which households must pay for ordinary connections. (The eligibility criteria for social connections in Senegal are listed in Table 2.)

The *quartier* delegates to the meeting with SDE are informed about enforcement of the tariff, disconnection and reconnection charges, billing practices, and so forth and are urged to inform their constituents of these rules and to request that before applying for social connections, applicants should assure themselves of their ability to pay and to abide by the rules.

Upon returning to their neighborhoods, *quartier* delegates hold information meetings with their constituents, and SDE runs advertisements (on radio, in newspapers, at mosques, and elsewhere) inviting households in eligible *quartiers* to apply for social connections; the available number is not indicated. Applicants in Dakar must go to one of SDE's 10 offices in the city to apply, bringing title to their land and completing an application form with information on the number of room, bathrooms, and so forth.

Once the application form is completed, SDE sends one of its inspectors to visit the house of each applicant; not infrequently, applicants are denied, based on the information they provide at the time of application. SDE uses four inspectors, who each make about 20 inspections per day if the applicants' houses are in close proximity, but possibly as few as 7 inspections if the applicants are dispersed. If the criteria for making a social connection are satisfied, the inspector is authorized to approve the application at the time of his visit, and the applicant is instructed to return to an SDE office to pay the CFAF 13,000 (US\$19) deposit against future consumption. The application form has a space where the inspector can make a sketch map of the property, showing the location of the nearest water main where the house connection is to be made. If an extension is required of the pipe

network to serve four houses, the inspector verifies that its length will not exceed 100 meters, and his sketch shows how the houses are to be served.

SDE targets construction of social connections within one month from the time they are approved and within two weeks for applicants for ordinary connections. Delays, however, are common; for example, applicants may be approved, but exceed the quota for the current contract between SONES and SDE, and thus have to wait until a new contract in the following year is executed. Once the connections are built, SDE prepares invoices for each one with itemized quantities and submits them to SONES for payment each month. Upon receipt of invoices, SONES sends its field staff to inspect and approve them; all ordinary connections are inspected before being approved for payment, but only a sample of social connections is inspected; in selecting the samples, greater weight is placed on the wealthier *quartiers*, where opportunities may exist for fraud (that is, where high-income households might have fraudulently applied for a social connection). If connections are found that fail to meet the criteria for social connections, they are disapproved by SONES for payment. (The process for making social connections in Senegal is summarized in Box 3 below.

#### 4.4 How It Works in Côte d'Ivoire

The institutional structure in Côte d'Ivoire for community water supply is much simpler than in Senegal. Responsibility for ownership of water facilities, water policy, tariffs, decisions about water network extensions and hardware, and overall fiscal management of the sector rests with the Ministry of Economic Infrastructure. Within the ministry is the relatively small Office of Urban Hydraulics, which is the executing unit for the urban water sector. The ministry has a concession contract with the Société de Distribution d'Eau de la Côte d'Ivoire (SODECI), which is similar to SDE in Senegal, for implementing its policies. In Côte d'Ivoire, unlike Senegal, there is no public asset-holding company like SONES that is entirely dedicated to water supply; only part of the ministry's mission is water. Furthermore, the size of the Office of Urban Hydraulics is much smaller than SONES, with fewer personnel for dealing with SODECI. The contract between the ministry and SODECI does not include performance specifications. Hence, without inputs from a unit like SONES and NGOs like ENDA and FDV and with fewer government personnel concerned with the sector, SODECI has much greater latitude in water supply planning and decisionmaking than SDE in Senegal.

Whereas Senegal depends mainly on the use of loan funds for making social connections, especially its new Long-Term Water Sector Project loan from the World Bank that started in 2001, Côte d'Ivoire uses a portion of the revenues from its water sales for financing them. A surtax is applied to the water tariff that generates revenues for the Water Development Fund (FDE), which are used for making social connections and other hardware improvements (such as extensions of the water network); the fund does not distinguish or earmark the amounts for social connections and other facilities. The FDE fund is administered by SODECI (unlike SONES, a public agency, that administers funds in Senegal), with ultimate responsibility and oversight from the ministry. SODECI is given wide latitude for deciding which *quartiers* to serve with piped water and which houses to serve with social connections, with minor

##### Box 3 The Process for Making Social Connections

- *Quartiers*, ENDA, government officials, and others send recommendations to SONES throughout the year on where to build future social connections, extensions, and so forth. SONES sends this information to SDE, which adds its own recommendations.
- SDE prepares a three-year capital improvement plan (CIP) proposal in September (with connections, extensions, and so forth) that shows locations, costs, and details and sends it to SONES for approval. SONES and SDE jointly agree to CIP, which becomes the contract for new work.
- SDE invites *quartier* delegates to their offices to inform them of pending construction in their areas, the procedures for applying for social connections, and general information about using water from piped water connections. SDE advertises for social connection applicants in eligible areas on radio, in newspapers, and so forth.
- *Quartier* delegates hold public information meetings in their neighborhoods and invite households to apply for social connections if they think they are eligible. Each applicant fills out an application form in an SDE office and shows proof of tenure or ownership.
- SDE sends an inspector to each applicant's house to verify the application. If criteria are met, SDE approves the connection; questionable cases are referred to SONES. Applicants return to SDE offices to pay security deposit.
- SDE builds the connection and sends itemized invoice to SONES for payment. SONES sends inspectors to review construction and authorizes payment to SDE, if satisfactory.

Source: Authors, SDE and SONES

involvement of the ministry. It does not advertise when social connections are available, but instead relies on word of mouth, nor does it work with *quartier* leaders in preparing neighborhoods to apply for them. It is reimbursed a flat amount for each social connection it makes without having to submit itemized invoices.

It was previously suggested that efficiency in serving the poor with social connections probably depends on the amount of administrative effort invested, given the lack of a simple criterion like lateral diameter to identify those eligible for subsidies. The numbers of personnel, layers of administration, and overall effort in Côte d'Ivoire for targeting social connections to the poor are relatively modest, and the general consensus there is that social connections seem to be available for almost any house that applies for one as long as it does not egregiously violate the criteria. The ministry is concerned that the number of social connections each year may be excessive and that too much of the Water Development Fund is being used for social connections and too little for network extensions and other facilities.

## 5 PERFORMANCE OF THE SOCIAL CONNECTION PROGRAMS

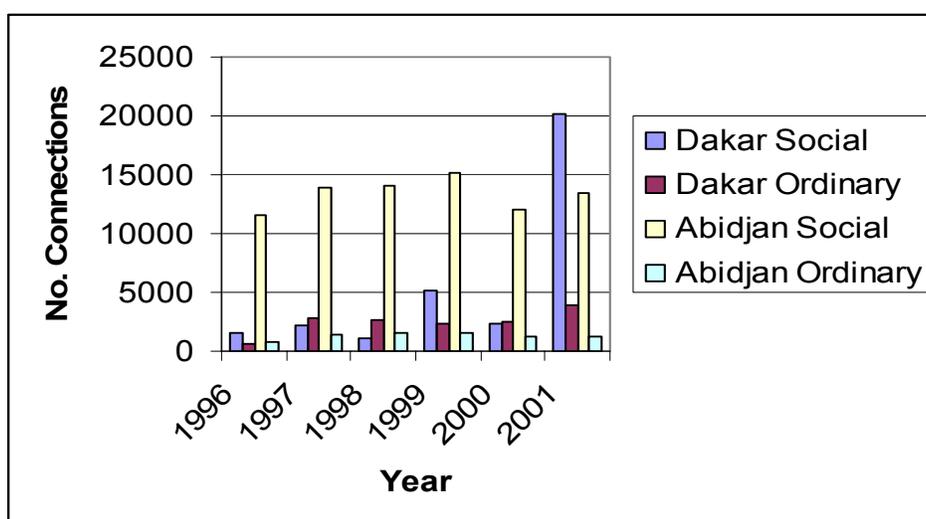
The population of Abidjan is about 3.0 million, and that of the greater Dakar region is about 2.4 million. Water supply coverage in Abidjan is reported to be about 90 percent, and in Dakar about 92 percent; hence, these two cities are similar in size and in piped water coverage. One of the striking differences between them is that Abidjan privatized its water company in 1960, whereas the private company in Dakar has been in operation only since 1996. Despite similarities in size and coverage, in a recent six-year period (1996–2001), Abidjan made about 14,600 water connections per year on average, compared with an average of about 7,800 per year in Dakar. Moreover, about 90 percent of the connections in Abidjan are social connections, compared with about 70 percent in Dakar. Figure 2 shows historical data on connections in Dakar and Abidjan.

An important question for this study pertains to how effective the criteria in Table 2 are in targeting social connections for the poor. If the criteria and procedures used for making social connections were badly flawed (that is, if they did not distinguish the recipients of ordinary and social connections), then we might expect rates of water consumption and the fraction of users that confined their consumption to the social tranche to be about the same for the two categories of users. If, however, the criteria and procedures are effective, we might expect social customers to use less water than ordinary customers and for a larger fraction of them to restrict their consumption to the social tranche.

### 5.1 Côte d'Ivoire

Requests were made from SDE in Senegal and SODECI in Côte d'Ivoire for water billing data for the full year 2001 Côtefor two samples of residential customers: those with ordinary connections and those with social connections. The data received from Côte d'Ivoire cover the four billing periods, each of three-months duration, which is the frequency with which SODECI renders water bills. SODECI provided information on 499 ordinary connections and 1,001 social connections, all located in the same *quartier* (Yopougon). Any customer who did not receive a bill in any billing period was removed from the sample. In addition, four outliers with excessively high consumption (more than 500 m<sup>3</sup> per month) were removed, which resulted in records for 933 social customers and 460 ordinary customers. The data from SODECI were billing amounts in CFAF, which were converted to cubic meters (m<sup>3</sup>) of

**Figure 2 Water Connections in Dakar and Abidjan, 1996-2001**



Source: SDE, SODECI

consumption, using the tariff in Tremolet (2002).<sup>14</sup> On average, the ordinary connections for the Côte d'Ivoire sample were made in July 2000, and the social connections were made in May 2000. Because the samples were not randomly drawn, they do not necessarily represent Yopougon or Abidjan; hence, care is needed in generalizing from the analysis of this section.

Table 4 lists summary statistics for the Côte d'Ivoire samples. Customers with ordinary connections used larger amounts of water and paid higher bills than those with social connections, which is also shown in Figure 3. For example, median consumption was about 10 m<sup>3</sup> per month for customers with social connections, compared with 14 m<sup>3</sup> per month (40 percent higher) for customers with ordinary connections.<sup>15</sup> Thus, households with social connections were much more frugal in their water use than those with ordinary connections. The average customer with an ordinary connection had a nearly 60 percent higher water bill than the average social customer, and, on average, ordinary customers paid about 75 percent more for water than social customers. The standard error of average consumption shown in Table 4 is considerably smaller for social than for ordinary customers, which implies that social customers were more consistent than ordinary ones in trying to keep their consumption and bills low. Furthermore, a much higher fraction of social customers restricted their consumption to the social tranche than ordinary customers.

**Table 4 Summary Statistics, Ordinary and Social Connections, Côte d'Ivoire**

	<i>Social</i>	<i>Ordinary</i>
Number of Sample Customers	933	460
Average Consumption, m <sup>3</sup> / year per customer	168	238
Median Consumption, m <sup>3</sup> / year per customer	126	169
Standard Error Average Consumption, m <sup>3</sup> / year per customer	5	12
Maximum Consumption, m <sup>3</sup> / year per customer	1,426	2,585
% of Customers Who Consumed in Social Tranche	21	11
Total Amount Billed All Sample Customers in 2001, CFAFa	43,624,232	33,981,806
Total Amount Paid by All Sample Customers in 2001, CFAFa	32,613,184	28,282,752
Billing Recovery Rate, %	75	83
Average Bill, CFAF <sup>a</sup> /customer (for 3 months)	11,689	18,468
Average Payment, CFAF <sup>a</sup> /customer (for 3 months)	8,739	15,371
Total Bills Rendered	3,732	1,840
Bills Not Paid	417	230
% of Bills Not Paid	11	13

<sup>a</sup> CFAF = Communauté Financière Africaine francs

Source: SODECI

About 87 percent of the customers with ordinary connections paid their bill, compared with 89 percent of social customers; hence, the payment rate was about the same for both types of connections, and both types on average paid their bills on time. About 6.6 percent of the customers with ordinary connections and 8.5 percent of the customers with social connections were disconnected—again, the difference is small. Ordinary customers were connected for an average of 450 days before they were disconnected, compared with social customers, who had their connections for an average of 500 days—not much difference. The average bill (for three months) sent to ordinary customers who were disconnected was about CFAF 30,000, and the average for social customers was about CFAF 25,000. Hence, in both cases, the disconnected customers were large water users, far above the average. The ordinary customers paid about 22 percent of the

<sup>14</sup> Sophie Tremolet, S. Browning, and C. Howard. 2002. "Emerging Lessons in Private Provision of Infrastructure Services in Rural Areas: Water Services in Côte d'Ivoire and Senegal." Ref. 8524, World Bank, Washington, D.C. The lifeline block in the tariff for Côte d'Ivoire is 18 m<sup>3</sup>, equivalent to an average of 6 m<sup>3</sup> per month.

<sup>15</sup> Half the sample consumed amounts greater than the median and half consumed less than the median.

amounts billed to them before being disconnected, compared with 16 percent that was paid by social customers before disconnection.

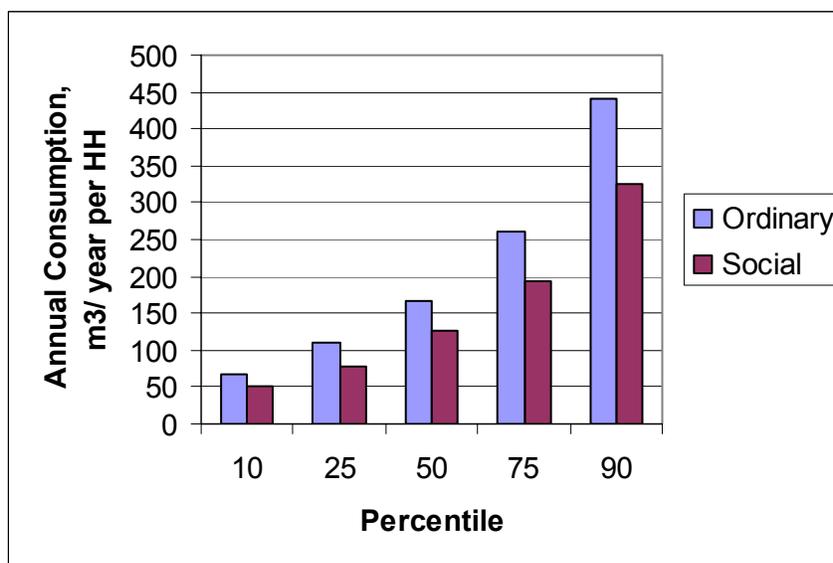
This evidence indicates that the criteria and procedures used by SODECI in Côte d'Ivoire for making social connections have in fact identified a class of customers different from households with ordinary connections: Social customers use less water, there is less variation in their usage, they pay much lower water bills, and more of them confine their consumption to the social tranche. Are the social customers poor and ordinary customers rich, as intended by the social connection program? There is no way of knowing from these data: SODECI's efficiency in serving the poor and denying subsidized connections to those who can afford them cannot be determined, but the evidence suggests that the customers with social connections have the expected characteristics of poor households, especially their frugality in water use.

The distribution of household water use in Côte d'Ivoire is summarized below in Figure 3.

## 5.2 Senegal

A similar request was made for water billing data from Senegal, but instead of sending a sample, SDE provided data for about 280,000 customers in 66 different *quartiers*. Unfortunately, the type of connection was not indicated, and thus it is unknown which of the customers had ordinary connections and which had social connections. Without information about the type of connection, a test of the extent to which the social connection program in Senegal meets its goals could not be made.

**Figure 3 Distribution of Household Water Use in Côte d'Ivoire**



Note: HH = Household

Source: SODECI



## 6 EVALUATION OF THE SOCIAL CONNECTION PROGRAMS

### 6.1 Is There a Need for Social Connections?

Despite having upgraded themselves from squatters living in *quartiers spontanés* to now living in structured neighborhoods and owning their own homes, a process that typically takes 10–20 years, the targeted beneficiaries of subsidized water connections in Senegal and Côte d'Ivoire are poor and needy by any standard and would thus benefit from humanitarian assistance. That said, some caveats must be added. The word “need” implies something absolute and tends to ignore other important considerations. If the intent of this criterion is to address arguments that can be made for subsidizing house connections, then some of the issues discussed in Section 3.2 must be considered. Yes, the targeted beneficiaries are needy, their lives are improved by having subsidized water connections, they avoid spending long hours collecting water from *bornes-fontaines* and other sources, they lower their water costs, they increase their water consumption, and the quality of their lives improves. But the outcomes are not all positive: Should individual goods with modest externalities be subsidized? In the absence of sewerage, house connections produce negative spillovers: Do they outweigh the positive benefits of piping water into the house? Society is not the source of the subsidies for social connections, but rather large water users, many of whom are poor: How does that affect the question of need? These are the kinds of questions that this criterion presumably intends to address, and the answers are not clear: House connections are not like schools, which are almost universally accepted as legitimate worthy goods. These questions cannot be answered by consultants, donors, and outsiders. They must be addressed and answered by the people of Senegal and Côte d'Ivoire; it is up to individual societies to decide which goods and services they choose to treat as worthy goods.

An issue related to the need for making social connections has to do with the question of connecting private houses to piped water systems: What is the need for such connections? The issue of social connections focuses on water mainly as a social good, whereas house connections in general are more concerned with water as a commercial good. What seems indisputable is that the financial viability of a water company depends to a large extent on its residential customers having their own private connections. Just as telephone companies could not survive if they depended primarily on public pay phones, restaurants would go out of business if they did not have repeat local customers, highways would fall into disrepair if their users were mainly bicycles and motorcycles that produced little revenue, and airlines would be at major risk if they depended mainly on tourists and did not have business travelers, so, too, households with private connections are the lifeblood of water companies. Others who buy water from piped systems, such as users of *bornes-fontaines*, are marginal customers, not the ones on whom sustainability depends. Household connections are the key to generating sufficient revenue so that service continues without interruption.

It follows that impediments to making house connections should be minimized. It has been well documented that the up-front cost of a connection and security deposit impedes many households from having their own connection. What this argues for are ways to reduce high initial costs, such as through financing; it does not, however, argue per se for subsidizing connections.

### 6.2 Are Social Connection Programs Serving the Poor?

The poorest households in Senegal and Côte d'Ivoire are not being served by social water connections. That is because the poorest households are in *quartiers spontanés* without title to the land on which they live and hence are not eligible. The criterion that they must have tenure to the land and that an existing house must be located on the property in order to be served implies that they are not the poorest households. In Senegal, a squatter in an eligible neighborhood can buy and register his lot for CFAF 250 per square meter (m<sup>2</sup>) if it is on land owned by the government. However, the market value of land for most squatters seeking tenure is in the range CFAF 1,500–2,500 per m<sup>2</sup>. Average lot size is about 170 m<sup>2</sup>, making the cost of a subsidized lot about CFAF 42,000 (US\$60) and the cost of an unsubsidized lot 5 to 10 times this amount. Households that can pay these amounts are not the poorest ones in Senegal.

Why are the poorest households precluded from having subsidized water connections? It is because social connection programs are intended for neighborhoods that are stable, where the residents have

established themselves and formed a community that is collectively motivated to improve itself. Although stability is not explicitly stated as a criterion of the social water connection programs, it is in fact a requirement for most investment in public infrastructure such as schools, health clinics, and piped water supply; electricity in Senegal and Côte d'Ivoire are exceptions. Thus, the social water connection programs are aimed at the "stable" and "organized" communities of mostly poor households, but not the poorest of the poor, who are usually the newly arrived migrants living in unstructured *quartiers*.

Given the implicit requirement for community organization and stability, we can ask whether the criteria for social connections in Senegal and Côte d'Ivoire in fact serve the poorest eligible households? The answer is not necessarily. Houses with social connections and ordinary connections in Senegal and Côte d'Ivoire both receive essentially the same quality of water service. The social connection programs unquestionably include households that cannot afford an ordinary connection, but some households that can afford to pay are also served by them. Twenty-five percent of the social connections in the sample from Côte d'Ivoire use more than 500 liters per day, paying more than CFAF 12,000 (US\$17) each billing, and 10 percent use more than 800 liters per day, paying more than CFAF 20,000 (US\$29). Households that can pay such large amounts each billing period do not seem to be poor. This study collected no data on household incomes, but the willingness-to-pay study by Lauria and others (1996) in Dakar found that the poorest 20 percent of homeowners had incomes less than CFAF 25,000 per month.

Once a *quartier* spontané is restructured, it will eventually get mains of the tertiary water network on all its streets. Households that get social connections must have the tertiary main in front of their houses; that is, they must wait until a main is extended to their property before they can apply for a social connection, whereas many of the households that pay for an ordinary connection do so because the tertiary network has not yet reached their property. Hence, the distance to the water main in the eligibility criteria for social connections is a surrogate for timing, and it plays an important role in identifying the "relatively rich," who pay their own way. However, those who wait for the tertiary main to reach their property so they can apply for a social connection are not necessarily poor; some of those who decide to wait may be able to afford an ordinary connection.

### **6.3 Are Administrative Costs of Social Connection Programs Low?**

This question, like the one for the criterion in Section 6.1, is framed in absolute terms; we need to ask: Low compared with what? The administrative efforts and costs of the social connection programs in Senegal and Côte d'Ivoire are substantially different: lower in Abidjan than in Dakar. The administrative efforts are of two kinds: (a) to serve the poor and (b) to exclude the rich. Senegal makes both kinds of efforts to a much greater degree than Côte d'Ivoire, making its administrative costs higher than those of its neighbor. In addition, Senegal seems deeply committed to serving the poor as quickly as possible, which has much to do with why its administrative inputs are so large. Preparing *quartiers* for stability, governance, and self-sufficiency, which are the necessary conditions upon which social connections in Senegal rest, accounts for much of the administrative cost there. Hence, the concern that a social connection program should have low administrative cost is definitely violated in the case of Senegal.

Sections 4.2 and 4.3 describe the several public and private agencies concerned with water supply in Senegal and how they interact in laying the foundation for and making social connections. Without question, the layers of administration are numerous, and the process is complicated. By comparison, Section 4.4 describes the simpler approach used in Côte d'Ivoire, where most of the responsibility for making social connections has been relegated to SODECI. It follows that SODECI relies much more heavily than agencies in Senegal on applying the criteria without supplementing them with extensive administrative inputs. As a result, applicants for social connections in Côte d'Ivoire are not as heavily scrutinized as in Senegal.

The application of eligibility criteria (such as those used in Senegal and Côte d'Ivoire) without intervention at the community level may not be able to efficiently allocate house connections earmarked for the poor. Such criteria as land tenure and proximity to a water main can easily be used as a basis for making social connections, but there is nothing to suggest that they alone would result in serving the poor. Hence, we might ask: What level of supplementary administration is optimal? With reliance primarily on eligibility criteria and with relatively minor administrative input, the consequences

would most likely be delay in serving the poor, service to a higher fraction of households that could probably pay for an ordinary connection, and risk of serving either poorly organized communities that might not have households with the ability to pay water consumption costs or communities with greater needs than piped water supply.

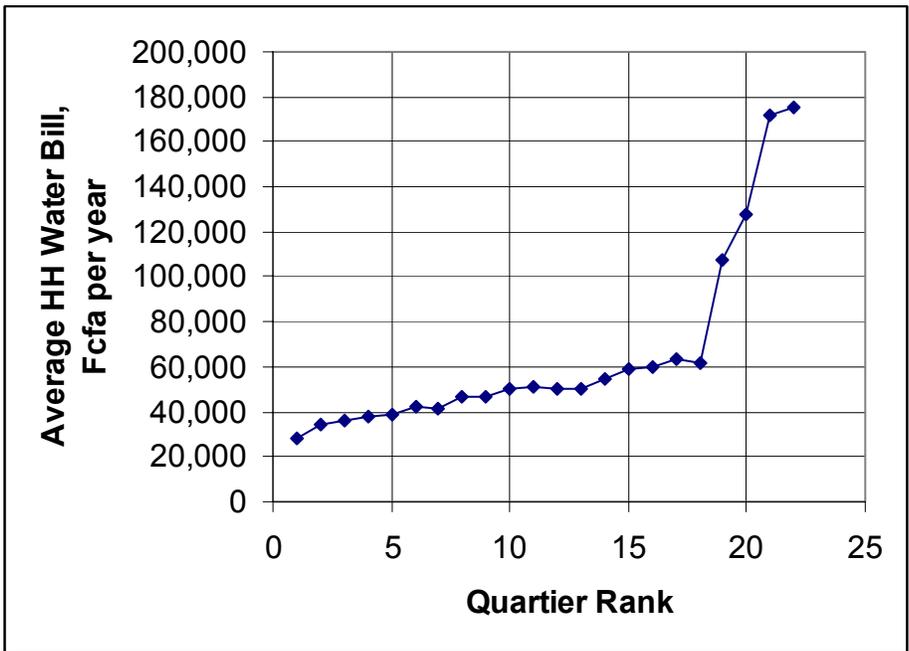
Before concluding, however, that heavy use of administration is right and that simple reliance on criteria is wrong, it would be useful to revisit the issues in Section 3.2, especially the one about targeting the poor. If a country were convinced that the benefits of piped water supply to society were enormous, then it would seem to follow that all households should get subsidized connections, which is the implication in Côte d'Ivoire. That is, Senegal seems to be spending large sums in its effort to target the poor, whereas Côte d'Ivoire spends far less, perhaps because it is less concerned about targeting the poor and more content to treat most households as needy.

An important question then is, Why target the poor? As suggested from the outset of this report, the motivation seems to be for humanitarian reasons. The policy does not seem to be driven by a conviction that households with water connections will be more productive or more stable or better citizens; if that were the case, then there should be less concern about making mistakes by serving the rich with social connections. If piped water supply is mostly an individual good that provides only modest spillovers to society, then we should ask whether high administrative costs incurred to target the poor are warranted.

The water consumption data provided by Senegal, which unfortunately were unable to indicate success in meeting the goal of its social connection program, are useful, however, in showing the sharp stratification of *quartiers*. A random sample was drawn of 22 *quartiers* from the total of 66, which included about 90,000 households. The average household consumption and average annual water bill were calculated for each *quartier*, and the *quartiers* were then sorted (ranked) from lowest consumption (water bill) to highest; the results are in Figure 4 below.

The chart shows that 18 of the 22 *quartiers* (82 percent, with two thirds of the total customers) had consumption and water bills that did not vary much from one to the other. Average annual consumption in these *quartiers* was 143 m3 per household (HH), ranging from 108 to 169. The small coefficient of variation (0.13) further confirms the homogeneity of these *quartiers*. The other 4 *quartiers* with higher consumption were markedly different: Their average annual consumption was 287 m3 per

**Figure 4 Average Household Water Bill in 22 Senegal Quartiers**



Note: HH = Household  
Source: SDE

HH, twice as high. These data basically support the information in Sections 4.2 and 4.3 that poor *quartiers* in Senegal are homogeneous, with few (presumably rich) large consumers of water. Hence, if Senegal wanted to lower its cost of screening applicants to ensure that rich households do not receive social connections, it could probably do so by identifying entire *quartiers* that were eligible, rather than by checking the eligibility of each applicant. However, some caveats are warranted: (a) *quartiers* classified as ineligible might contain poor households that would be excluded from getting social connections; (b) consumption and billing data like those analyzed herein are not available ex ante for awarding social connections, which poses some, but probably not large, risk in basing eligibility solely on neighborhood characteristics; (c) the designation of some neighborhoods as eligible provides an incentive to locate there, possibly leading to further stratification of the community; and (d) eligibility would need to be specified for a fixed duration, because neighborhoods change over time.

#### **6.4 Do Social Connection Programs Produce Perverse Incentives?**

It was previously suggested that there are at least four perverse incentives, which are discussed in this section: (a) the subsidized connections constitute a one-time increase in real wealth for the recipient that can easily be converted to cash; (b) the negative spillovers from wastewater are not inconsequential; (c) the costs of subsidizing water connections may be borne by some households that are poorer than the recipients; and (d) free water connections provide houses with piped water that is highly sought and must be paid for by the users, but the nature of the good, the technology of its supply, and the method of paying for it all put consumers at risk of using more than they can pay for.

Worthy goods for the poor are typically provided over time, on condition that the recipients maintain their eligibility to receive them. However, such is not the case with social water connections, which are provided at one point in time without regard to continued eligibility of the recipient. An incentive exists for the recipient to sell or rent his house and reap the benefit in cash. When the recipient's economic status improves, there is no mechanism to terminate the subsidy.

Social connections promote the consumption of water in the community and, by so doing, result in increased production of wastewater. This perverse outcome has nothing to do with whether sewers exist: wastewater increases once piped water connections are made. The fact that sewers are typically lacking in the communities where social connections are made poses an even greater threat to health than if sewers were in place. Many professionals believe that the (negative) externalities associated with wastewater are larger than the (positive) ones associated with public water supply; hence, by providing social connections, the negative effects may outweigh the positive. It follows that by not providing connections, the amount of wastewater produced would be less, and risks to health would be lower. In our field visits to a *quartier* that was newly served with social connections in Senegal, the increased production and improper disposal of wastewater were among their greatest concerns.

Both Senegal and Côte d'Ivoire license water resellers who typically operate in *quartiers irreguliers* that are still informal, without water networks and thus without social connections. These resellers typically have an ordinary connection to the water network in an adjacent formal *quartier*; they face the ordinary increasing block tariff, but because they are businesses, they pay a security deposit that is about 10 times higher than that paid by households. It is common for water resellers to own multiple water lines that extend from formal *quartiers* to the informal ones where they do business. However, to avoid paying multiple security deposits, they may run several lines off a single meter. The result is that although they are serving the poorest households in the city in the *quartiers irreguliers*, the large consumption of their meter puts them in a high block of the tariff. The perverse outcomes are that the poorest houses pay more for their water because their consumption falls in a high block of the tariff, and—more important—because social connections are cross-subsidized by revenues from the large water users, the squatters in the *quartiers irreguliers* are subsidizing homeowners in formal *quartiers*.

The situation is similar for multiple poor households that are served by a single meter (for example, in large concessions); they pay a higher marginal price for water because of their combined consumption and thus cross-subsidize social connections. It is not uncommon for larger concessions to be poorer than smaller ones.

The security deposit is an impediment that prevents many houses from applying for a social connection, and even houses that get social connections, thinking that they can afford to pay their bills frequently, sometimes find they cannot, in which case they are disconnected. Much of this problem is due to the technology of water supply and the method of rendering bills. It is not easy for homeowners to carefully monitor how much water they use; reading the meter on a regular basis and making calculations to determine whether their consumption is in the lifeline block of the tariff is simply beyond most households that apply for social connections. To further complicate matters, Senegal renders water bills only once every two months, and Côte d'Ivoire renders them once every three months, which pose serious cash flow problems for the poor houses that are targeted by social connections. Hence, the perversion is that the program of social connections encourages poor houses to use a good they desperately want, but they are not given adequate means to monitor their consumption to keep it within affordable limits, and the water companies render bills on an infrequent basis (to meet their own needs), which presents serious cash flow problems for the consumers, putting them at risk of disconnection.

Beyond these four perverse incentives, there are others. In Côte d'Ivoire, much of the decisionmaking about social connections is left to the concessionaire (SODECI), which is defensible if government wants to minimize its costs of administration in making social connections. However, two problems arise as a result: (a) the concessionaire has an incentive to maximize the number of social connections that are made, and (b) he has an incentive to select social connections that have the lowest construction costs. The first results from the fact that the concessionaire is remunerated based on the amount of water sold, regardless of the tariff block into which consumption falls. Because the contractor manages the Water Development Fund and has discretion to use it for either social connections or facilities (such as pipeline extensions), it is to his advantage to make connections, which is in fact what is happening and what the ministry wants to change. One of the perverse effects of building "too many" social connections may be to delay extensions of the pipe network into newly restructured *quartiers*, thereby lengthening the time that the neediest households have to wait before getting a connection. The other perverse incentive results from the fact that the contractor is reimbursed a flat rate for each connection and does not have to submit itemized invoices for payment; consequently, it is to his advantage to select connections for which construction costs are low, rather than ones that might provide higher social benefits; SODECI has acknowledged that cost minimization is one of its objectives in selecting social connections.

If a social connection program were very successful in targeting the poor, one might expect that a large fraction of the households getting social connections would restrict their water consumption to the social tranche; for the SODECI data herein, it is about one third. The price, however, of the social tranche is below the average cost of water production; hence, a successful social connection program would cause average revenue to decrease and might put the water enterprise at risk of being unsustainable if its revenues did not cover its costs. This is particularly true of a program that makes "too many" social connections. From the data analysis of this study, households with social connections in Côte d'Ivoire paid an average price of about CFAF 240 per m<sup>3</sup>, which is lower than the price in the second tranche of SODECI's tariff, which applies to consumption between 18 and 90 m<sup>3</sup> per trimester.

Large multiple-family dwellings with only a single meter are not eligible for social connections; however, the poorest households often live in them. This does not appear to be a large problem in Senegal or Côte d'Ivoire, but it could be in other countries.



## 7 DISCUSSION AND RECOMMENDATIONS

The issue of subsidized water connections for houses needs to be reexamined because (a) water is more like an individual good than a public good; (b) the positive externalities from house connections seem only modest; (c) the negative externalities from wastewater can be substantial; (d) the way subsidies are made is flawed, all at one time and with disregard for changes in the recipient's economic status; and (e) private connections seldom serve the poorest households. This is not to say that subsidized connections are ill advised, only that governments and donors should be sure of what and whom they want to subsidize and why.

In particular, a reexamination should clarify whether (a) the focus is really on improved water supply for "the poorest," or (b) a higher level of service for the "relatively poor" who own property, or (c) making more private connections to ensure the viability of water systems. These substantially different objectives are addressed in the next three sections.

### 7.1 Serving the Poorest

Assuming that land tenure and home ownership will continue to be requirements for subsidized connections, they imply requirements for community organization and stability, which typically are not achieved for a decade or more following formation of *quartiers spontanés*. Hence, if the objective is improved water supply for the very poor, subsidies aimed at serving the *quartiers spontanés* would probably do more to help them than subsidizing water connections for houses. Two ways to serve the very poorest households with water are (a) by subsidizing temporary infrastructure and (b) by accelerating the restructuring of *quartiers spontanés*. Licensed resellers in the countries of this study typically build their own laterals that extend from formal *quartiers* (where they are connected to water networks) into unstructured *quartiers* (where the poorest households are located); these temporary laterals may be hundreds of meters long, and they represent a major investment for the resellers. Recovery of their costs is passed onto the (poor) customers who buy water from the resellers. Because of the high cost, the number of such laterals and the water points they serve are relatively few. However, if the laterals were subsidized, it is likely that more could be built; that the number of water points could be increased; that very poor households could have water closer to their houses; that increased competition would lower the prices; and that the poor at large would benefit, rather than more-well-to-do households, as in the case of social connections.

An objection to this might be that private businessmen should not be subsidized. However, in at least some *quartiers* in Senegal, the resellers are selected by the community, which decides the prices they charge, and a portion of the revenue is returned to the community. Thus, these resellers are basically employees of the community. One of the benefits of this arrangement is that it requires the community to organize itself, which is a step toward the stability objective that is an unstated requirement for social connections, and it ensures that the resellers and the prices they charge have community approval. The situation in many *quartiers* in Senegal and Côte d'Ivoire, maybe in most, is that the resellers are private business people who at best have the approval of the *quartier* chief and who are sometimes unacceptable to the community because of the high prices they charge or for other reasons; subsidizing their laterals would present greater problems than subsidizing resellers who are approved by the *quartiers*.

Another objection to subsidizing resellers is that their laterals are temporary and will need to be replaced. However, permanent mains of a water network cannot be laid in unstructured *quartiers* where public rights of way and land use are undecided. Hence, if the objective is to bring water closer to the poorest households, temporary mains would seem to be a requirement.

If use of temporary mains is rejected, but the goal is still to serve the very poor, it seems to follow that the *quartiers spontanés* need restructuring as quickly as possible so that houses in them can acquire tenure sooner. Senegal has a pilot project precisely for this purpose, to subsidize land tenure and accelerate restructuring, but funding it is a problem. Water supply is one of the few public services that generates revenue and is a potential source of funds for subsidizing tenure; however, the obstacles for using water revenues not for water facilities, but for tenure, might be substantial. It is possible that this

kind of subsidy would be infeasible, but Senegal already has much of the institutional infrastructure in place to test such an arrangement.

## 7.2 Serving the Relatively Poor

If, instead of serving the very poor in *quartiers spontanés* with improved water supply, the objective is to serve relatively poor property owners with a higher level of service, it will not be easy to target them without (a) differentiated water supply technologies or (b) the kind of intensive administrative screening used by Senegal. A low-level technology for serving individual houses was not found during this study, although 30 years ago one did exist in the form of "Fordilla valves," which were manufactured by the Ford Meter Box Company.<sup>16</sup> These valves were used for making yard and patio connections, and several pilot applications were made, especially in Latin America. Given that the beneficiaries 30 years ago were not being asked to pay for water, Fordillas had to compete with ordinary connections and were not well received, so the company stopped making them. However, it seems that if households were given the choice between a free Fordilla valve and an ordinary connection they would have to pay for, the poor would probably opt for Fordillas and the rich for ordinary connections. Another low-technology alternative might be shared patio connections between two or more houses in close proximity.

In the absence of differentiated technology, the approaches presently used in Senegal and Côte d'Ivoire for targeting relatively poor homeowners in formal neighborhoods would seem to be required. A high level of efficiency in identifying the poor and excluding the rich probably requires high administrative cost. The costs of screening seem much higher in Senegal than in Côte d'Ivoire, but efficiency in serving the poor in the two countries may not be substantially different: In Côte d'Ivoire, 90 percent of the connections are social connections, whereas in Senegal it is 70 percent, which might suggest that the higher level of administration in Senegal eliminated only a relatively small fraction of (rich) households that could afford an ordinary connection. Another potential payoff of the screening, however, which could not be thoroughly examined in this study, might be the higher level of cost recovery obtained in Senegal, compared with that in Côte d'Ivoire. As indicated in Section 6.3, the apparent homogeneity of primarily poor neighborhoods in Senegal probably makes it possible to base eligibility for social connections on *quartier* characteristics, rather than those of individual households, with a substantial reduction in administrative costs. However, the potential loss in effectively targeting the poor would have to be studied.

## 7.3 Making Connections

If the primary objective is not so much to serve the poor with their own connections, but rather to encourage private house connections to ensure the financial viability and sustainability of the water system, what needs to be addressed is the high up-front cost of the connection and security deposit. The solution to this problem probably entails more-creative financing options; making more connections does not imply having to subsidize them. If more connections were available and if households with connections were not prohibited from selling water to their neighbors, the poor without connections would have more and closer sources from which they could get water, competition would increase to bring down the prices that the poor would have to pay, and the water company would get its revenue as long as it enforced the tariff.

Although not a formal component of this study, it is pertinent to comment on subsidies for consumption, as well as subsidies for connections, recognizing that they are not mutually exclusive. It is well recognized that lifeline rates (increasing block tariffs), aimed at providing a minimal quantity of water at a subsidized price for poor households, have substantial problems, including (but not limited to) the following: (a) a greater share of subsidized consumption is often by rich, not poor, users; (b) if rich households do not consume substantially more than poor ones (on average), a lifeline rate provides no benefit; (c) poorer households frequently share a single meter, pushing their consumption into a higher block, for which they pay more; and (d) if the lifeline rate is charged to water resellers

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<sup>16</sup> A *Fordilla* valve attached to a standpipe employed a dashpot that held about one liter of water, which was delivered through its faucet by pushing and holding down a button or lever. Once delivered, the button had to be released for the dashpot to refill. Consequently, the user had to expend some effort and time to collect water, which (among other things) prevented waste and high water bills.

who serve households without connections (which is the case in Côte d'Ivoire), the poorest households in the community end up subsidizing their neighbors who are better off. Listing these problems is not to say that subsidizing consumption is ill advised; however, subsidizing connections is probably better than subsidizing consumption, even though it is not perfect in targeting the poor. The evidence from Côte d'Ivoire and Senegal is that if connections are subsidized, the users will pay for consumption; the billing recovery rate is about 80 percent in Côte d'Ivoire and more than 90 percent in Senegal.

## 7.4 Three Recommendations

We end this report with three recommendations.

First, licensed water resellers should not face an increasing block tariff; their tariff should be the same as that used for *bornes-fontaines*: namely, a flat rate set below the average cost of water production.

Second, a significant improvement in serving the poor would be made by changing the frequency of billing for water consumption; once every two or three months works a great hardship on poor customers. It does not necessarily follow that meters would have to be read to match the billing frequency; consumption could be estimated in off months and corrected only periodically. Years ago, in parts of the United States where homeowners were poor, it was common for sellers of newspapers, milk, bread, and life insurance to visit their clients' households each week to render bills and collect revenues; a similar arrangement would seem to be possible for water consumption charges; collection could be privatized.

Third, it would seem desirable to follow this study with a fuller, more-detailed investigation that would result in lessons learned that could be applied to India and elsewhere. (Some preliminary thoughts regarding follow-up work are in Annex A.)

A list of objectives is given in Box 4.

### Box 4 What Are the Objectives?

The current interest in subsidized house connections for the poor is not clear. Is the intent to (a) provide improved water supply for the "very poor," or (b) provide a higher level of service for the "relatively poor" who own property, or (c) make more private connections in order to ensure the viability of water systems? Each objective needs a different approach. The poorest households are squatters not living in formal neighborhoods, who may not even have easy access to standposts because of prohibitions against constructing pipelines in areas without land-use plans; expensive private water venders are frequently their only source. The relatively poor living in structured neighborhoods, who have access to standposts, neighbors, and other water sources, need something different. If the goal is not so much to serve the poor as to make connections because they generate the basic revenue needed for the sustainability of water companies, the solution is not necessarily to subsidize them: subsidies for worthy goods are usually given for other reasons.

Source: Authors



## ANNEX A CONSIDERATIONS FOR FOLLOW-UP WORK

1. The study reported herein was a modest reconnaissance mission that was aimed in part at learning lessons and suggesting next steps to deal with the general issue of pro-poor water subsidies, with a long-range focus on India and other developing countries. Senegal and Côte d'Ivoire are excellent places to study, because the water systems work well in both countries, despite serving relatively poor customers. Moreover, the two countries are sufficiently different to provide a wealth of diverse experiences. Given that this study has barely touched the surface of pro-poor subsidies in these two countries, it would seem that there are numerous lessons to learn from follow-up work. The purpose of this annex is to suggest a plan for follow-up work that can be discussed to more sharply define next steps. It is proposed that a study be undertaken with the following three objectives:
  - a. Explore the issues of pro-poor subsidies in Senegal, Côte d'Ivoire, and India
  - b. Explore alternatives for subsidizing the very poor in *quartiers spontanés*
  - c. Explore alternatives for subsidizing the relatively poor in structured *quartiers*
2. The entire issue of pro-poor water subsidies would benefit from reexamination. What is it that governments, donors, and others want to achieve? What are the objectives and constraints for subsidies? Why is it deemed desirable to subsidize water? How is water like and unlike other worthy goods, and what lessons about subsidies can be learned from them? What are the theoretical underpinnings for subsidizing water in developing countries? What are the potential negative outcomes from subsidizing water? These are some of the questions that can be explored under objective a.
3. The exploration can be undertaken at a few different levels. It would seem that it should begin within the Bank, possibly with one or more seminars. It was not very long ago that the Bank was one of the most vocal opponents of water subsidies, but now it is a strong supporter. What motivated the change? If the motivation goes beyond external criticism of Bank policies to include findings that support making connections worthy goods, those findings need to be identified, discussed, and disseminated.
4. The Bank may or may not be interested in exploring this issue in-house, but whether it is or not, it would seem desirable to engage governments in the dialogue. What are the objectives of countries like Senegal, Côte d'Ivoire, and India in making subsidies? What balance is sought between subsidies for the very poor in *quartiers spontanés* and subsidies for the relatively poor in formal *quartiers*? At the root of this question is who are the targeted poor and should subsidies be considered for most or all households, rather than a subset? Because Senegal and Côte d'Ivoire have presumably thought about these questions, it would follow that those countries might be the venue for a seminar on them to which representatives from other countries like India would be invited, plus donors and others such as ENDA, FDV, and consultants. Such a seminar need not be an enormous effort nor require more than a fraction of the budget of follow-up work, but not to have such a kickoff event and to plunge into fieldwork without a clear agenda would seem to be misguided.
5. The second objective (b) in paragraph 1 is aimed at exploring water subsidies for the very poor. If it emerges that the very poor are the principal targets of water subsidies, then what are the means to serve them? Subsidizing water resellers may merit consideration. The water resellers in Côte d'Ivoire are organized, and it would be well to engage them to more fully understand the problems and obstacles they face and to get their suggestions for improvements. Furthermore, Senegal has *quartiers* that provide substantial input into selection of resellers; they could be potential models for making subsidies. NGOs like ENDA and FDV are key players in building capacity and should be included in work that focuses on the *quartiers spontanés*. Because the overall goal of follow-up work is to improve the water sector in India, that country should probably be involved in any explorations that take place in West Africa.
6. The third objective (c) in paragraph 1 is similar to the second, except that it focuses on water subsidies for more-well-to-do houses. Although the technology for making house connections is not differentiated in West Africa, it would probably not be too difficult to make a pilot study to investigate the use of Fordilla valves, shared taps, or similar alternatives. This need not be done in

the capitals, but could be undertaken in smaller towns. Also, it would probably be desirable to make a similar pilot investigation in India, because that is one place where the findings might be applied.

7. Senegal and Côte d'Ivoire provide an excellent opportunity to investigate more thoroughly the use of administrative inputs for targeting subsidized connections to homeowners. The two countries have very different philosophies and methods, and they both have reliable data on how ordinary and social connections perform, which would provide a basis for comparing them. It would not make sense, however, to study the institutions in West Africa as a potential model for a country like India without at the same time exploring the possibilities of exporting the West Africa model abroad. Thus, any study of institutional arrangements should involve recipient countries, as well as Senegal and Côte d'Ivoire.
8. The next step is to discuss this proposal within the Bank, first to determine whether follow-up work is warranted, and if so, to seek agreement on the objectives and methodology.

## **ANNEX B KEY PERSONS MET**

### **Senegal**

1. Mamadou Samb, General Manager, SONES.
2. Aladj Dieng, former General Manager, SONES; consultant.
3. Oumar Diallo, Comptroller and Financial Officer, SONES
4. Abdou Diouf, Director of Planning, SONES.
5. Frederic Renault, General Manager, Sénégalaise des Eaux (SDE).
6. Mamadou Dia, Deputy General Director, SDE.
7. Mayoro Niang, Technical Director, SDE
8. Abdul Ball, Director of Works, SDE.
9. Waly N'Dour, Director of Customer Service, SDE.
10. Mamadou Diagne, General Administrator, FDV
11. Mamadou Diasse, Engineer, Maître d'ouvrage Délégué, FDV.
12. Malal Toure, Coordinator, Eau Populaire, ENDA.
13. Matar Diop, Technical Adviser, Eau Populaire, ENDA.
14. Mme. Fall, President, GIE Thiaroye M'Bao.
15. Matar Fall, World Bank, Dakar

### **Côte d'Ivoire**

1. Patrick Achi, Minister, Ministry of Economic Infrastructure.
2. Berte Ibrahiman, Director of Planning and Evaluation, Ministry of Economic Infrastructure.
3. Tchimou N'gbocho, Director of Human Hydraulics (Direction de l'Hydraulique Humaine), Ministry of Economic Infrastructure.
4. Basile Ebah, Deputy Director General, Société de Distribution d'Eau de Côte d'Ivoire (SODECI).
5. Any Patrice, President, Association of Resellers of Water in Informal Quartiers.
6. Isaac de Claude, World Bank, Abidjan
7. Peter Kolsky, Senior Water Engineer, World Bank.
8. Dennis Mwanza, Director General, Water Utility Partnership for Capacity Building



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- No. 2 Assessment of Resource Flows in the Water Supply and Sanitation Sector: Ethiopia Case Study. Peter L. Watson, Joseph Gadek, Eyob Defere and Catherine Revels. January, 2005.
- No. 3 Pro-Poor Subsidies for Water Connections in West Africa: A Preliminary Study (full report). Donald T. Lauria, Omar S. Hopkins and Sylvie Debomy. January, 2005.
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