Water Supply & Sanitation Working Notes

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PRO-POOR SUBSIDIES FOR WATER CONNECTIONS IN WEST AFRICA

A PRELIMINARY STUDY
EXECUTIVE SUMMARY

Sylvie Debomy
Donald T. Lauria
Omar S. Hopkins

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Contact details

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Sylvie Debomy, Senior Urban Planner, World Bank, (202) 473-0602, sdebomy@worldbank.org

Donald T. Lauria, Professor, Department of Environmental Sciences and Engineering, School of Public Health, (919) 966-7644, dlauria@unc.edu

Omar S. Hopkins, AAAS Diplomacy Fellow, United States Agency for International Development (USAID)\EIT\Energy, (202) 712-0546, ohopkins@usaid.gov

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1 BACKGROUND

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[1] programs might merit further study for application in other developing countries.

1.1 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.

2 SENEGAL

2.1 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 or her 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 of 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).[2] 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.

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[1] "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.

[2] 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.

2.2 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 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^3] per month in Côte d'Ivoire and 10 m^3 in Senegal).

2.3 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 Senegal (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[3]), 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 the Foundation for the Rights to the City for assigning priorities for restructuring and extending primary and secondary mains of the water network.

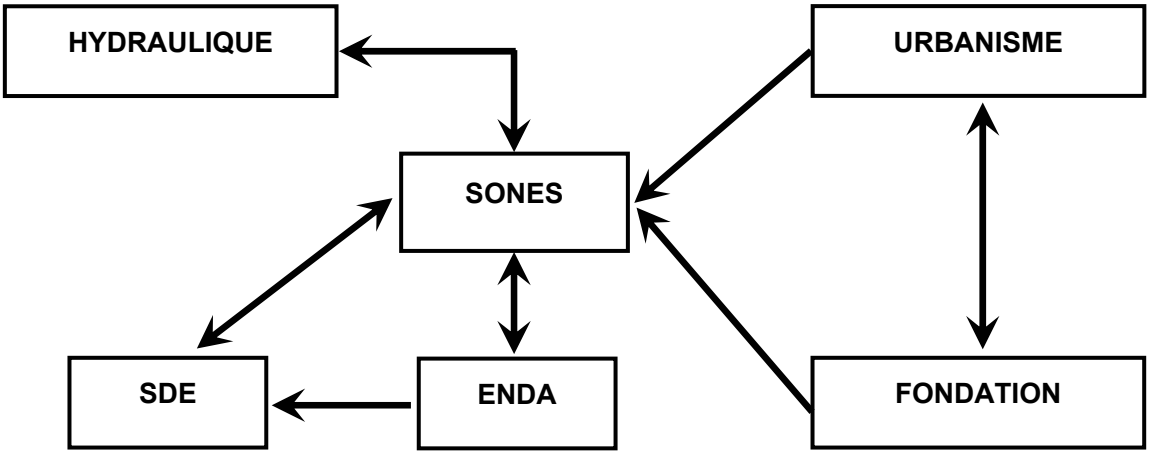
The interactions among the key water institutions in Senegal are shown in Figure 1 below. Double-headed arrows indicate contractual arrangements, and single-headed arrows indicate flows of information.

2.4 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.

[3] FDV is a foundation established to work on land rights and urban upgrading.

Figure 1 Interactions among Key Water Institutions in Senegal



Source: Authors

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.

3 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 Hydralique 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 the 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.

4 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 (see Figure 2 below).

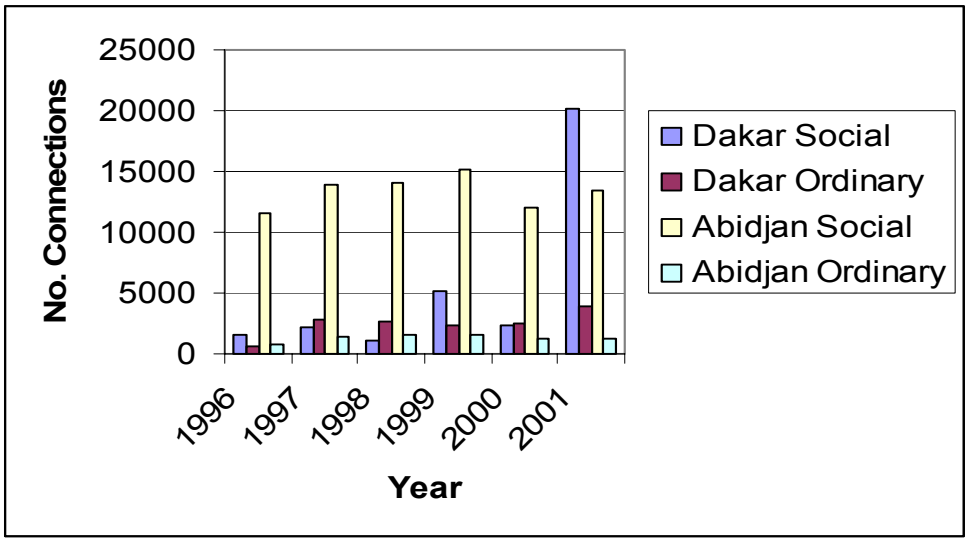
If the criteria and procedures used for making social connections in Senegal and Côte d'Ivoire were badly flawed, if they did not distinguish the recipients of ordinary and social connections, then we might expect rates of water consumption and the fraction of users that confined their consumption to 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.

4.1 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^3) of consumption, using the tariff. (Because the samples were not randomly drawn, care is needed in generalizing from this analysis.)

Table 1 below 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.

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



Source: SDE, SODECI

Table 1 Summary Statistics, Ordinary and Social Connections, Côte d'Ivoire

	Social	*Ordinary*
Number of Sample Customers	933	460
Average Consumption, m3/ year per customer	168	238
Median Consumption, m3/ year per customer	126	169
Standard Error Average Consumption, m3/ year per customer	5	12
Maximum Consumption, m3/ 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[a]/customer (for 3 months)	11,689	18,468
Average Payment, CFAF[a]/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

a CFAF = Communauté Financière Africaine francs
Source: SODECI

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.

4.2 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 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 it goals could not be made.

5 ANALYSIS

5.1 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.[4]

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.

5.2 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)[5] 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."

5.3 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 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

[4] A typology of goods and services, including "worthy goods," is presented in Section 3 of the report.

[5] Donald T. Lauria and others, 1998, Willingness to pay study for improved water and sanitation, SONES, Dakar, Senegal.

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.

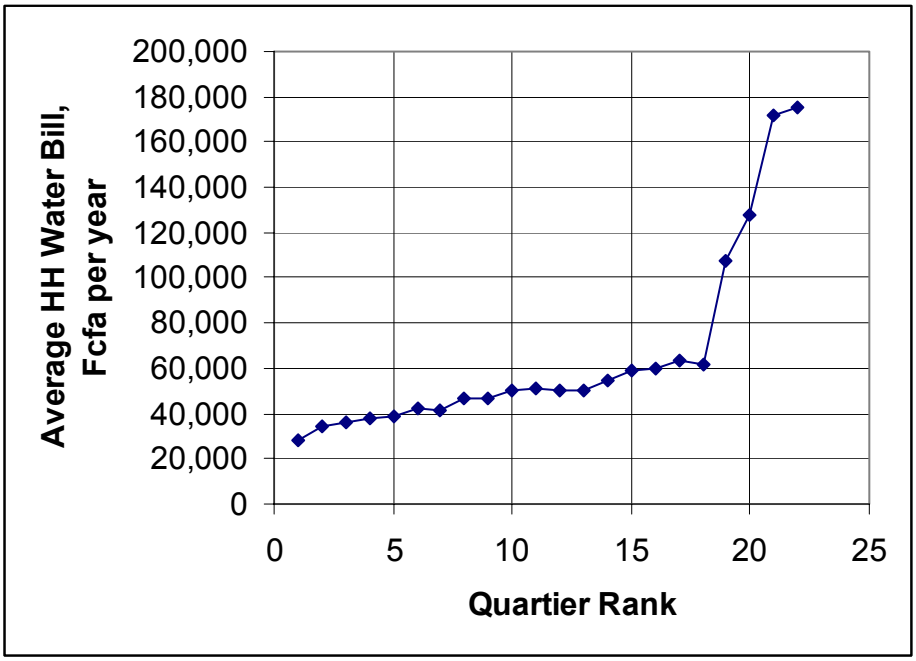
The water consumption data provided by Senegal were useful in showing the sharp stratification of *quartiers*. For a random sample of 22 *quartiers*, average household consumption and average annual water bill were calculated for each, and the *quartiers* were sorted (ranked) from lowest consumption to highest, producing the results shown in Figure 3 below.

Figure 3 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.

5.4 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.

Figure 3 Average Household Water Bill in 22 Senegal *Quartiers*



Note: HH = Household
Source: SDE

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.

6 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"; or (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.

6.1 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.

6.2 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).[6] 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 effectiveness in targeting the poor, however, incurs increasing cost and begs the question: What are the negative consequences of failing to hit the target?

6.3 Making Connections

If the objective is not so much to serve the poor, but rather 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 the *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.

6.4 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.

[6] 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. 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.

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