Water and Sanitation Program

An international partnership to help the poor gain sustained access to improved water supply and sanitation services

Water and Sanitation for the Urban Poor in Côte d'Ivoire

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Acronyms

AFVP	Association Française des Volontaires du Progrès; French Overseas Volunteers
AREQUAPCI	Association des revendeurs d'eau dans les quartiers urbains populaires du Côte d'Ivoire ; Association of water resellers in urban squatter settlements
BNETD	Bureau Nationale d'Etudes Techniques; National Bureau of Technical Research
CDA	Contribution au Développement de l'Assainissement ; sanitation surcharge
CIE	Compagnie d'Electricité ; electricity utility
DCGTx	Direction centrale des Grands Travaux ; Central Office of Public Works
FAC	Fonds d'Aide à la Coopération ; French bilateral assistance
FDE	Fonds de Développement de l'Eau ; Water Development Fund
FNE	Fonds National de l'Eau ; National Water Fund
INADES	Institut Africain de Développement Economique et Social ; African Institute of Economic and Social Development
INS	Institut National de la Statistique ; National Statistics Institute
SODECI	Société des Eaux du Côte d'Ivoire ; water company

SUMMARY

1. Rising Demand for Urban Services

Côte d'Ivoire, like many African countries, is experiencing very rapid urbanization, which has created ever-increasing demand for serviced residential and commercial land. While major investments have been made in land subdivision and provision of new roads and water, sanitation, and electricity services, these network and service extensions have not kept pace with growth.

In particular, the lowest-income neighborhoods have been bypassed and remain largely unserved. More than 11 percent of Abidjan's population, and 35 percent of the residents of Côte d'Ivoire's other cities, live below the poverty threshold of about CFAF 160,000 per year, or $US 0.70 per day (1998 household income survey).
By 1992, over a third of the residents of Abidjan, or some 775,000 people, lived in neighborhoods that lacked some or all basic urban services, in particular, water and sanitation. Another 300,000 people, or 15 percent of the city's population, live in spontaneous, unplanned settlements built on land unsuited for development or reserved for other uses. Building in these areas is considered illegal, and people who live there, among the poorest in Abidjan, are in a precarious situation. They may be evicted or barred from entering the areas at any time, and they cannot afford to pay for any kind of land tenure (sometimes even after the subdivision and regularization of land tenure in spontaneous areas that are considered buildable).

The purpose of this study is to assess current policy regarding access of low-income residents of Abidjan to water and sanitation services, primarily in the underserved and unauthorized areas of the city, and to propose avenues of future work to improve this access.

2. Most Cities Have Piped Water With Full Cost Recovery

A private utility company, SODECI (Société des Eaux du Côte d'Ivoire), holds exclusive right to the technical and commercial exploitation of water in Ivoirian cities, under the direction of the Ministry of Economic Infrastructure. As of 1999, SODECI delivered piped water to 544 urban centers of all sizes—from Abidjan with 3 million inhabitants to many small urban centers with a few thousand residents each—a remarkable performance.
The policy of full recovery of both operating and investment costs ensures a strong base for the water sector. Through payment of a fee for the Water Development Fund (FDE) and a surtax earmarked for the National Water Fund (FNE), water users have financed most investments over the last dozen years: infrastructure replacement, reinforcement, and extensions, construction of new water plants, subsidies to new household connections, and debt service.

3. Elements Of Water Service Policy In Low-Income Areas

Cross-subsidy through tariff policy

Tariff policy is an important tool for making water service available to the maximum number of households. There is a two-fold cross subsidy:

- at the national level, water service is made available at the same rates in all 544 cities and towns served; because of the preponderance of users in Abidjan, where hydrogeological conditions are very favorable, SODECI makes enough in Abidjan and six other large cities to compensate for losses in serving other urban centers.
- the progressive structure of tariffs means that high-volume customers cross-subsidize a portion of the cost of providing water to low-volume consumers, and also contribute most of investment costs through the FDE fees they pay with their water bill.

Despite heavy cross-subsidy, poor households have difficulty paying for household connections

In order to make household connections as affordable as possible (rather than relying on standpipes as in many neighboring countries), SODECI grants large subsidies for new connections, applying to 91 percent of household connections installed over the last 10 years. All income groups have benefited from this policy, not just the poor, and it has resulted in a doubling of the number of water customers over the 10-year period. At this rate of increase, the spread of household water connections has more than kept pace with the growth of population, making Côte d'Ivoire one of the countries with the highest household water coverage in West Africa (8 connections for every 100 residents in Abidjan, more than 5 connections per 100 in the smaller centers).

However, around half of Abidjan's population still does not have direct access to water and these households get their water from resellers—that is, standpipe operators and resellers of home water, both licensed and unlicensed. In effect, households either cannot or will not spend more than a certain share of their income to buy water. Households for whom the cost of a household connection and the payment of a quarterly bill fall within this share will find it acceptable to pay for a connection, but those with lower incomes will not (see fig. 1 at end of summary)

- In areas of the city covered by the piped network (in fig. 1, labeled A), the water mains are close to residential buildings and the connection fee more or less covers the actual cost of connection. With the subsidy, most families (about 80 percent) can afford a connection (in fig. 1, all those with incomes above Y_1). But there are still some families who cannot and who will still buy from resellers (those with incomes below Y_1).
- In areas not reached by the mains (labeled B), the connection costs are increased by the cost of running a pipe from the nearest main (extension costs) and this can amount to several thousand CFAF. These charges constitute a major obstacle to poor families living in these areas and only a few residents will be able to afford a connection (those with incomes above Y_2). In underserved and squatter settlements not reached by the mains, they will often become resellers to their neighbors. These isolated connections, often quickly installed, are subject to high water losses, resulting in high maintenance costs and also very large water bills that may be contested by the user and left unpaid.

Coin-operated standpipes have little impact

SODECI has promoted coin-operated Yakoli standpipes because they should allow users to buy water at a guaranteed fixed price. However, nearly half of these standpipes are not in service and less than 0.5 percent of water is sold from them. This very limited impact results from a lack of interest on the part of consumers, who find this service less satisfactory than getting water from resellers. The Yakoli standpipes are too far away, too difficult to use, there is no possibility of getting short-term credit—and the water is not always less expensive than buying from neighbors because many Yakoli attendants bypass the mechanical system and charge a higher rate.

Resale of water to neighbors is the way most poor families get their water but is not encouraged

Although 45 to 60 percent of poor families (and 80 percent of the poorest) buy their water from a neighbor with a household connection, this resale of water to neighbors is tolerated only when the reseller has been licensed to do so by SODECI. But outside of this arrangement, such resale is sanctioned and punished. Since the licensing conditions are stiff (no connection subsidy is offered, no guarantee that any additional investments made by the licensee will be compensated), probably more than 90 percent of resellers are not licensed.

4. Proposals To Improve Access To Water For Poor Families

In order to improve service to the poor, a two-pronged approach is proposed:

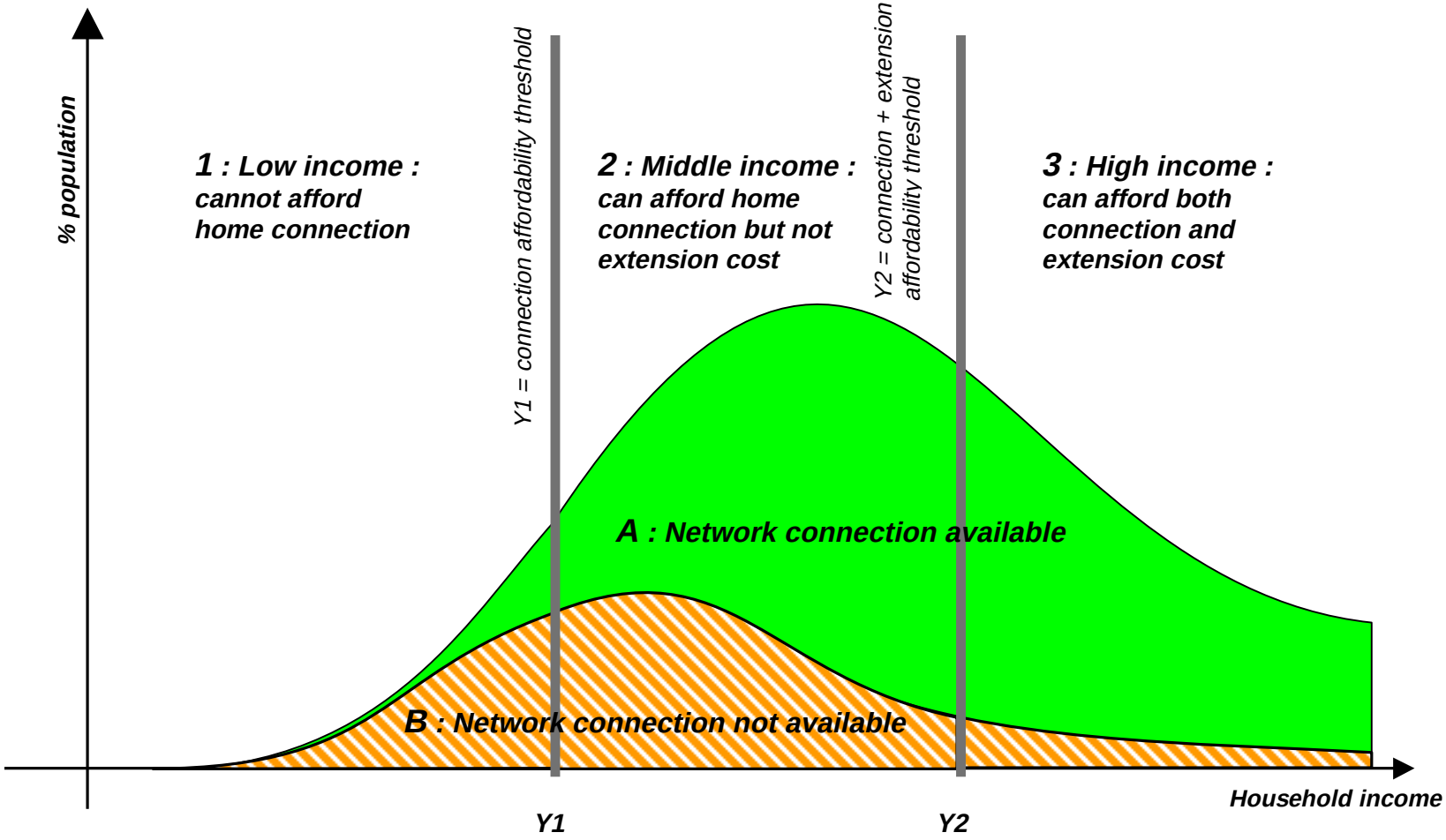
- Extension of the water main networks into underserved and unauthorized settlements, in order to reduce the extension costs charged to households wanting a connection
- Optimization of the reselling arrangement through connection subsidies, reduced fines, and some kind of minimal protection of resellers' investment in tubing or piping for distribution to other households.

These two complementary actions would make household connections affordable to a broader segment of households and improve access to water for others (more resellers will bring the nearest reseller closer to low-income households). Figure 1 shows the different market segments by income group and the potential for expanding SODECI's client base in greater Abidjan and in illegal and unserved areas (new potential clients in area labeled 2B). The network extensions required to make connections affordable to these new potential clients could be financed under the Water Development Fund by shifting funds away from subsidizing individual connections to more network investment, by capping the amount for individual subsidies, and by restricting eligibility for the subsidy to certain areas. Network extension and optimization of water resale would also increase competition among resellers, which is the only way to bring down the price of water for the families that cannot afford their own connection (households in 1A and 1B).

5. National Sanitation Policy Does Not Serve The Poor

National policy regarding household sanitation clearly favors the collective solution of piped sewerage networks. But this limits service to 20 to 35 percent of Abidjan's residents, with no service in any other city or town. SODECI's recent contract to provide only sewerage service is therefore not going to make much difference to access to safe sanitation for the poor, even though every water user will be contributing to the financing of the piped sewerage network through the sanitation surtaxes. Only a policy that promotes household-level sanitation options and improves options for latrine sludge disposal can have a significant immediate impact on sanitation for poor households.

Figure 1 : Abidjan : Water market segments by income group and network availability



A = areas covered by water mains
B = areas not covered by water mains (underserved and squatter settlements)
A + B = Abidjan metro area
1A : reseller client (connection available but not affordable)
1B : reseller client – at higher prices (connection neither available nor affordable – huge extension costs to water main)
2A : SODECI'S core clientele
2B : potential SODECI clients : could afford connection if extension costs are eliminated or reduced by network extension
3A : SODECI'S core clientele (and the most profitable clientele)
3B : users supplied by trucks and also some resellers who can afford connection plus extension costs for resale use

LOW-INCOME URBAN AREAS

Thirty Years Of Rapid Urbanization

For nearly 30 years, Côte d'Ivoire has experienced strong demographic expansion. Its population surged from 4 million in 1960 to 10.8 million in 1988. Preliminary 1998 census results indicate a population of 15.3 million and a slight reduction in the growth rate to about 3.5 percent. This expansion has been paralleled with an acceleration of urbanization. The percentage of the population living in cities rose from 20 percent in 1960 to 44 percent in 1990.

Table 1. Côte d'Ivoire: Total and urban population growth, 1960–95.

	1960	1988	1995
Urban	800,000 (20%)	4,800,000 (44.4 %)	5,500,000 (45.8%)
Rural	3,200 (80%)	5,900,000 (55.6%)	6,500,000 (54.2%)
TOTAL	**4,000,000**	**10,800,000**	**12,000,000**

Source: National Report for Côte d'Ivoire,
Habitat II, UN Conference for Human Settlements, March 1996.

Throughout the urbanization process, Abidjan grew even more rapidly than the urban population as a whole because of the high concentration of economic activity in the capital city and because of the effort to modernize urban infrastructure (roads, water, housing). The population grew at an average annual rate of 8.5 percent from 180,000 in 1960 to 2.1 million in 1900, compared to the national urban growth rate of 5.6 percent. Abidjan's share of the urban population increased from 32 to percent in 1960 to 43 percent in 1987, and its share of the total population increased from 7 percent in 1963 to 21 percent in 1987.

The urbanization process resulted in a strong increase in demand for housing, infrastructure, and urban and community services. While a lot of land has been built up over the last 20 years, both in Abidjan and other cities, the need for land outstripped investment capacity, many settlements sprang up without benefit of infrastructure (roads, water, sanitation, electricity, street lighting), and many areas have remained underserved. In addition, other areas were illegally occupied by squatters and have never benefited from public investment.

Legally Settled Areas with Inadequate Infrastructure

A good number of the legally occupied but underserved areas were settled following a simple site survey. Residents and central and local governments have financed some investments but service levels are far below those of other urban areas. These areas consist mostly of compound housing (structures grouped around a central courtyard) occupied by low-income households. Infrastructure deficiencies vary and piped water is neither systematically absent nor systematically available.
In 1990, such tenured, but underserved, areas constituted 156 of Abidjan's 352 municipal wards. In these areas lived about 700,000 residents, or about 35 percent of the city's population.

Table 2. Abidjan: Size and population of underserved areas by district, 1995.

District	Abobo	Adjamé	Attécoubé	Cocody	Koumassi	Marcory	Plateau	Port Bouet	Treich-veille	Yopougnon	TOTAL
Total pop.	401,211	199.720	163,658	128,756	229,963	146,098	11,647	168,725	110,040	374,524	1,934,342
Of which underserved:											
Area (ha.)	731	69	263	98	62	86	0	n.a.	5	418	2,574
Pop. (% total)	266,734 (66%)	46,330 (23%)	102,550 (63%)	28,952 (22%)	32,182 (14%)	57,467 (39%)	0 (0%)	21,092 (13%)	6,501 (6%)	115,419 (31%)	677,227 (35%)
Density (pop. /ha.)	366	729	437	260	745	669	n.a.	165	1,150	258	263

Source: *Study of urban service improvements in under-equipped areas of Abidjan*, DCGTx (Direction centrale des grands travaux), November 1995; 1988 official population and housing census statistics.

All but one of the city's districts include some underserved wards, in some cases forming small pockets surrounded by other well-equipped areas. Plateau district is the exception. The Abobo district has the largest area of underserved settlements, followed by Yopougnon and Attécoubé. The percentage of district residents living in underserved areas is highest also in Abobo and Attécoubé (about two-thirds).

Illegal Squatter Settlements

A substantial share of the population lacks sufficient income to afford a surveyed plot in a tenured area, and these households have settled in squatter areas in unsurveyed areas that are not suited for building or are reserved for other uses. These residents have no legal tenure and in principle can be evicted or moved to another site at any point in time. Their description as squatters refers to their lack of tenure but does not denote a short-term or temporary situation, and they may live many years in this situation. It also does not imply low standard housing; these are not slums but permanent though basic dwellings, identical to those found in tenured areas. These areas usually lack any kind of urban services or infrastructure.

Between 1990 and 1995, DCGTx (Direction central des grands travaux, an interministerial public works office reporting directly to the president) identified 72 illegally settled areas in Abidjan. Their 1992 survey estimated that 285,000 urban poor (members of households with monthly household incomes below the poverty threshold of about CFAF 50,000) lived in these areas, about 15 percent of Abidjan's population.

Some of these settlements are located on buildable land that could easily be subdivided and urbanized. At some point in the future, such areas are likely to be regularized, with residents buying tenure rights and land use being restructured. But other squatter settlements are built on land that cannot be urbanized because of dangerous terrain (thalwegs) or because it is needed for future highways or utility plants. The Ministry of Housing and Urban Development has estimated that about 60,000 people in Abidjan are currently living on such land, about 15 to 20 percent of squatters.

Table 3. Abidjan: Size and population of squatter settlements by district, 1995.

District (commune)	Abobo	Adjamé	Attécoubé	Cocody	Koumassi	Marcory	Plateau	Port Bouet	Treich-veille	Yopougnon	**TOTAL**
1998 pop.	401,211	199.720	163,658	128,756	229,963	146,098	11,647	168,725	110,040	374,524	**1,934,342**
Of which squatter settlements:											
Area (ha.)	156	0	55	46	126	0	0	163	0	70	**616**
Pop.	58,856	0	38,600	19,85	60,900	0	0	78,200	0	28,700	**285,106**
(% total)	(15%)	(0).	(24%)	0 (15%)	(26%)	(0)	(0)	(46%)	(0)	(8%)	**(15%)**
Density (pop./ha.)	377	0	708	436	483	0	0	481	0	413	**463**

Source: *Study of urban service improvements in underserved areas of Abidjan*, DCGTx, November 1995; 1988 official population and housing census statistics.

Availability Of Data About The Urban Poor

Limited 1998 census data

The 1998 census count has not yet been completed and will be available in digital form during 2000. But it will probably include few statistics at the neighborhood level. The census included only one very general question about access to water, which should provide an overall picture of accessibility at the city level, possibly by city district or even by ward.

The National Statistical Institute (INS) set the 1998 country-wide poverty threshold for urban and rural areas alike at CFAF 162,000 per person per year (about US$250), or CFAF 810,000 per household per year (about US$1,250) and CFAF 67,500 per household per month (about US$100). Use of this threshold underestimates urban poverty relative to rural poverty. According to 1998 household income surveys, 11 percent of Abidjan's population and 18 percent of other cities fall below this threshold (I. Ouattara, *1998 Poverty Profile, Côte d'Ivoire*, INS, March 1999).

Official status of underserved and squatter areas

The DCGTx study of urban services in underserved areas of Abidjan, prepared at the request of the World Bank in 1992, laid the foundation for an official classification of these areas which has since been adopted by the Ministry of Housing and Urban Development. The existence of this classification would allow the government to define its policy vis-à-vis these areas, should it choose to do so. The Ministry has further subdivided this group into those that are

urbanizable and those that are not. This is a step in the right direction and indicates willingness to deal with the problems which such areas present.

Data on water access hard to come by

Though SODECI and the Water Department have made much data available on a city-wide basis, there is little specific information about the use of Water Development Fund monies, the number of water users whose accounts have been closed or are inactive, or about current and future investment in sewerage. Since SODECI's field agents have broad discretion in their work, practice varies widely from one city to another in terms of tolerance for overdue water bills, acceptable payment periods for quarterly bills and connection fees, and arrangements with home water resellers. While such flexibility is favorable for adapting service conditions to local needs, it makes it difficult to generalize or aggregate data.

SODECI SERVICE POLICIES IMPACTING THE URBAN POOR

Promotion Of Home Connections

Heavily subsidized connections constitute the most widespread mode of water access. In order to increase coverage via home connection, water sector authorities have aggressively pursued a policy of subsidizing such connections since the 1980s. The subsidies apply only to 15 mm pipe connections for domestic use and only within 12 m of the nearest main; the meter is installed on public land (not on-site). Beyond these limits, the additional connection charges must be paid by the household, including any underground work when the pipe must pass under a public thoroughfare and any other fittings besides the meter. With the subsidy, the basic connection charge is reduced from CFAF 185,290 (US$280) to CFAF 19,305 (US$30), about a 90 percent reduction.

Table 4. Abidjan: Water connection charges and subsidies.

Charges (CFAF) /Customer categories	Home water reseller	Full cost (w/out subsidy)	Subsidized
Connection cost	160,000	160,000	0
Prepayment of water use	200,000	16,500	16,500
Account setup fee	2,803	2,803	2,803
Meter installation	9,342	9,342	0
TOTAL CHARGES	369,000	189,000	19,303

Note: Fittings and supplies used for subsidized water connections are exempt from import and value added taxes, which do apply to non-subsidized connections, including those to home water resellers. In the case of a regular connection, the cost net of value added tax is CFAF125,110.

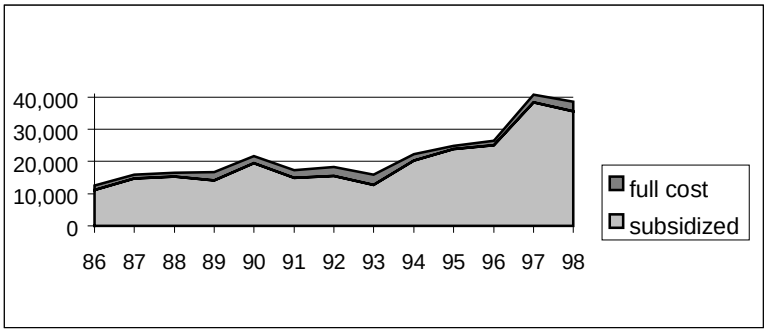
SODECI carries out connection works between the main and the meter and is reimbursed a flat amount of CFAF 100,000 for each subsidized connection by the Water Development Fund following approval by the Water Department (Ministry of Infrastructure). The amount of the subsidy is lower than the cost of a normal connection because of the exemption from taxes for subsidized connections and a lower profit margin earned by SODECI.

The criteria for qualifying for a subsidized connection are not restrictive. The connection must not be used for commercial purposes (in particular, resale of home water from subsidized home taps is not allowed) and no more than four taps are allowed. This last criterion was added in 1998 in order to limit subsidies to those with modest use requirements.

The customer must also present a tenure document (land title or landlord's affidavit in the case of a rental household). Since 1998, connections for residences under construction (when there is no practical way to determine the number of taps) and those carried out for real estate developers are not eligible for the connection subsidy.

The promotion of subsidy policy is effected by systematically proceeding with any and all household requests that satisfy the subsidy criteria, in all locations served by SODECI. In this way, between 1986 and 1998, 286,853 new home water connections were installed, of which 261,019 subsidized and 25,834 without subsidy (all types of users and pipe sizes). Forty-four percent of the new subsidized connections were located in Abidjan, where half of SODECI's customers lived. Over 90 percent of new connections were subsidized (87 percent of those in Abidjan and 95 percent of those in other cities), and a subsidized connection became the norm.

Figure 2. Côte d'Ivoire: Number of new home water connections in all urban areas (subsidized and unsubsidized), 1986–98.



Source: SODECI annual reports; note that 1997 covers 15 months.

Figure 3. Côte d'Ivoire: Percentage of new home water connections installed with subsidy, 1986–98.

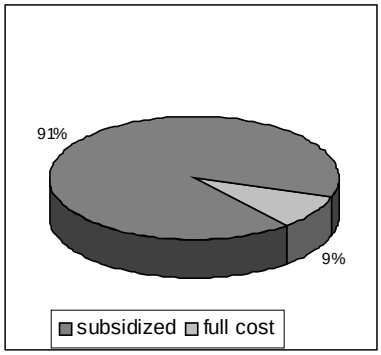


Table 5. Côte d'Ivoire: Number of new home water connections in Abidjan and other urban areas, 1986–98.

	Total new home connections, 1986–98		
Location	Full-cost	Subsidized (percent of total)	Total
Abidjan (percent)	18,007	115,475 (87%)	133,482
Other cities	7,827	145,544 (95%)	153,371
TOTAL	25, 834	261, 019 (91%)	286,853
(of which Abidjan)	(70%)	(44%)	(46%)

Source: SODECI annual reports and data furnished by Water Department (Ministry of Infrastructure)

Connection subsidies have significantly expanded service coverage

The subsidy policy resulted in a substantial increase in the number of water customers—an 87 percent increase between 1989 and 1998. The increase was about the same in Abidjan (92 percent) as in the other cities served by SODECI (83 percent). This rate of increase in home water connections was faster than the growth in population (3.9 percent in Abidjan, lower in other cities), and the coverage ratio (number of people with access to home water per hundred population) also increased over the period.

Figure 4. Côte d'Ivoire: Number of household water connections, total and urban, 1985–97.

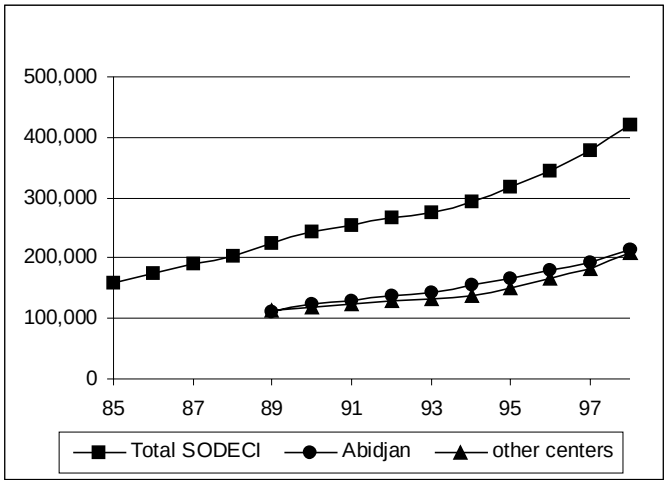


Figure 5. Côte d'Ivoire: Coverage ratio for home water connections in Abidjan, Bouaké, and Man, 1989–97.

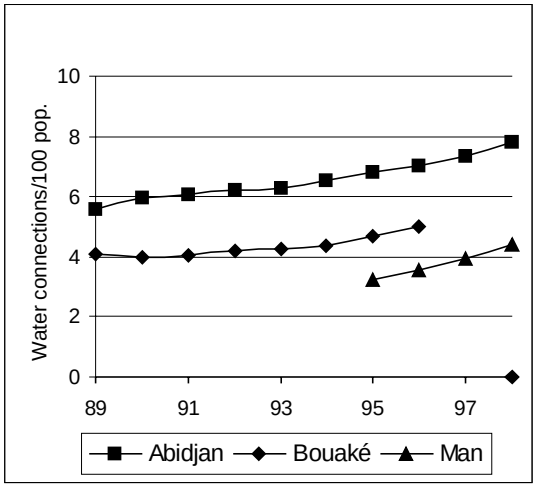


Table 6. Côte d'Ivoire: Percentage of urban population and urban poor with access to piped water for domestic use, 1998.

	Percent of urban poor (below poverty income threshold) with access to piped water		Total urban population with access to piped water	
Means of access	Abidjan	Other cities*	Abidjan	Other cities*
Home connection	21	22	39	30
Shared connection	8	6	15	11
Reseller	70	11	44	12
Standpipe	2	1	2	1
Subtotal, SODECI water	100	40	99	55
Private wells	0	60	1	44

*Not all cities are served by SODECI.
Source: 1998 household income survey in *Profile of Poverty* report by I. Ouattara (INS), March 1999.

Based on the rule of thumb that each connection supplies water to about 10 people, 78 percent of Abidjan's population had access to piped water in 1998. The coverage ratio has substantially increased over the last 10 years.

Table 7. Côte d'Ivoire: Coverage ratio for piped water, Abidjan, Bouaké, and Man, 1989–98.

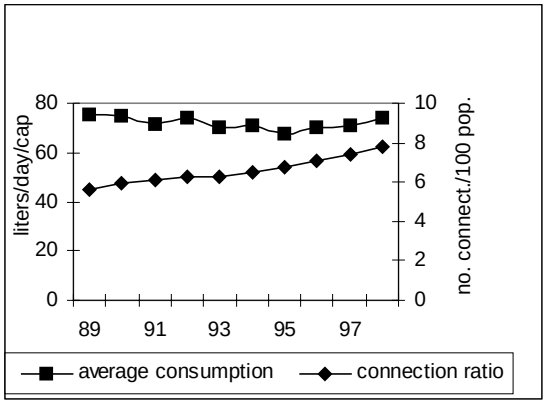
City	1989	1995	1998
Abidjan	56 %	68 %	78 %
Bouaké	41 %	47 %	n.a.
Man	n.a.	33	44
Other cities	No significant comparable data available (changing service areas)		

Source: SODECI annual reports.

For the last ten years, average per capita water consumption has remained stable at 72 liters a day (+/- 4 liters). So water production has also generally kept pace with population growth. On the other hand, the increase in the percentage of households with connections has led to a decrease in consumption per connection, which in Abidjan has fallen from 494 to 345 cubic meters a year. This is probably due to

- poor production and distribution performance in some areas of the city, causing water shutoffs and insufficient water pressure (unsatisfied demand)
- a decrease in shared water practices (in particular, home water resale) and increased consumer vigilance to reduce spilled water.

Figure 6. Abidjan: Per capita water consumption and home connection ratio, 1989–97.



Source: SODECI annual reports

Suspension of service for nonpayment is strictly enforced and there are many inactive water connections

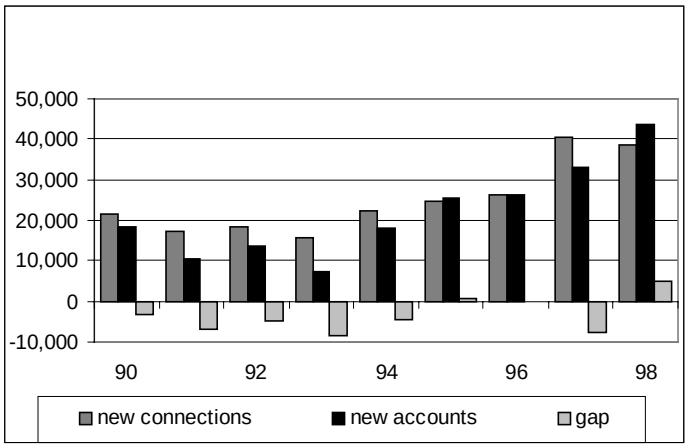
Cutting off water service has been SODECI's main tool for dealing with unpaid water bills. In 1997, 23,000 household water connections were disconnected, including those requested by the user due to moving house. The number of involuntary cutoffs due to lack of payment was estimated at 17,000.

For the most part, disconnected customers pay up and get reconnected fairly quickly but there are also those who do not return. According to various statistics provided by SODECI, there are somewhere between 66,524 and 98,757 inactive or permanently suspended connections, but it is unclear what categories these numbers cover. This amounts to between 14 and 19 percent of total connections, with figures up to 30 percent in some areas (in Gagnoa, 25 percent). The gap between the number of new connections and the number of new customer accounts amounts to 29,481 over the 1989–98 period, or about 13 percent of new connections. This figure is considerably lower than the numbers cited in some publications. The gap is smaller for Abidjan and larger for other urban centers.

Box: Procedure for suspension of service due to nonpayment of water bill

From 80 to 85 percent of water customers pay their bills before they become overdue (within 45 days) and another 10 to 12 percent pay them late, with a 10 percent penalty. Three to five percent do not pay and in these cases, the water meter is removed and their service is cancelled—even if there is still a positive balance from the security deposit made at the time of connection. In order to get reconnected, the back due amount plus penalties must be paid, along with a reinstallation fee for the water meter (CFAF 9,342) and any repairs required if the pipes have deteriorated or been removed (up to CFAF 30,000).

Figure 7 and Table 8. SODECI: Gap between new water connections and new customer accounts, Abidjan and other urban centers, 1989–98.



Location	New water connections	New customer accounts	Gap between connections and accounts
Abidjan	112,559	101,895	-10,664 (9.5%)
Other cities	113,085	94,268	-18,817 (16.6%)
Total urban	225,644	196,163	-29,481 (13%)

Source: SODECI statistics.

The recent reduction in the number of inactive connections reflects SODECI's efforts to win customers back by partial debt forgiveness and by arranging installment payments for reconnection and repair charges. It should be noted that the high level of subsidy for new connections creates a financial incentive for those who qualify to let their connection lapse and reapply for a new connection. While there are no data on the extent of this practice, it appears to occur, especially in the underserved areas where it is more difficult to identify the actual user of the water connection.

Legalization Of Home Water Resale

Forty percent of Abidjan's residents buy water from neighbors at least occasionally

In Côte d'Ivoire, piped water is resold from

- standpipes leased by SODECI
- licensed resellers of home water, recognized by SODECI
- unlicensed resellers who sell from their homes but without declaring the sales to SODECI

Other means of sale, such as by truck or handcart, which are important in other countries in sub-Saharan Africa, are of marginal importance in Côte d'Ivoire.

Resale of piped water serves a major part of the city's population, especially in the illegal and underserved areas where access to home connections remains marginal. The 1998 household survey gives a glimpse of water-buying practices, in particular those of the lowest income groups (see table 6): 46 percent of the city's residents (72 percent of the urban poor) buy resold water, 44 percent from home water resellers and 2 percent from standpipes. Another 15 percent share a courtyard water connection, often managed by a single landlord or tenant, an arrangement very similar to resale of water from a single home connection. Thus resale is the way about half the city's population obtains piped water, including about 80 percent of the urban poor.

Coin-operated standpipes (Yakoli) have not been a success

A few years ago, SODECI developed coin-operated standpipes, called Yakoli. They deliver a fixed amount of water from a calibrated reservoir (set at the standard of 21 liters). The release valve is triggered by inserting a coin (set for a 10 CFAF piece). They were designed to guarantee affordable access to water for households who cannot afford a house connection, at a fixed price (480 CFAF per cubic meter). In practice, the Yakoli operators have often bypassed or simply broken the coin-operated mechanism and served clients from an intermediate container, charging a higher price similar to that charged by home resellers or at the regular standpipes.

The Yakoli standpipe operators were originally appointed by the municipal authorities. After a number of these operators departed leaving unpaid water bills, the Yakoli standpipes were leased to private operators who apply for the job directly with SODECI. Since these are considered commercial operators, they are required to pay the bills left behind by their predecessors; not surprisingly, they capture the necessary income by raising the rates charged to their customers.

Whether coin-operated or not, standpipes have not captured much of the market, which continues to be dominated by resellers of home water, both recognized and clandestine. Standpipes fail to compete in a number of respects:

Service aspect	Yakoli standpipe	Home water reseller
Price	In theory, fixed; in practice, identical to home water resellers' price	Fluctuates in a competitive market
Distance from residence	Further because sales points are fewer	Closer because sales points are numerous
Time required to fill basin	One to three minutes	Short
Ease of use	Pail or pan must be lowered to be filled and raised again to be carried; must bring right coin	Easier because spigot is set high so pan may be filled while resting on carrier's head); no coin required
Short-term credit	Not meant to be possible since coin should be needed to activate release mechanism	Depends on reseller's commercial strategy
Public investment	CFAF 1.7 million per standpipe	CFAF 100,000 in connection subsidy for unlicensed resellers
Private investment	Operator must make security deposit and pay any back payments due; costs are passed on to customers	CFAF 369,000 for connection and security deposit for licensed resellers, plus cost of spigot setup; costs are passed on to customers

There are 270 standpipes in Abidjan, of which only 142 (52 percent) are still functional. They distribute on average 60 cubic meters a month each; however, it has been demonstrated that 150 cubic meters is the minimum monthly sales volume for a standpipe operation to be profitable (Morel à l'Huissier, 1998). The water sold at Abidjan's standpipes (300 cubic meters a day) represent 0.1 percent of water sold and the clientele thereby served about 15,000-30,000 users (assuming 10-20 liters/person/day), or about 1 percent of the population, equivalent to less than 5 percent of the population of the city's underserved and squatter settlements. Thus standpipes play a marginal role, even for the city's poor.

Licensed home resellers: tolerated but not promoted

Most water utilities have banned the resale of home water and SODECI did also until recently. After having attempted for many years to stamp out the practice, SODECI decided to license it, in order to at least be able to oversee it. The licensing of home water resale has meant that SODECI has been able to improve its billing position: licensed resellers must make a security deposit of CFAF 200,000 and they are billed on a monthly rather than quarterly basis. Also, since these are considered commercial connections, connection charges of around CFAF 160,000 are not subsidized. These operating costs are recovered from the resellers' customers.

The resellers also face the same water tariff structure as normal home consumers, a steeply progressive one that rises quickly beyond a minimal consumption level intended for a single household. It is still lower than that charged to standard standpipe operators for less than 80 cubic meters a month (or 40 with the discount offered by SODECI to standpipe operators since the last tariff adjustment; see table 12). Since only the largest resellers sell more than about 50 cubic meters a month, only they (and their customers) are penalized by the tariff structure.

It is difficult to obtain reliable statistics about water sold by home resellers (or from standpipes) because the statistics that SODECI publishes do not list them separately (though there may be some unpublished in-house analysis). Table 9 does provide some insight for the 1994/95-1996/97 period (1998/99 statistics are not included because they are not comparable).

Table 9. SODECI: Water sales by licensed home resellers, Abidjan and other cities, 1994/95–1996/97.

	1994/95	1995/96	1996/97
A. ABIDJAN			
Total city water bill (million cubic meters)	60,603	80,436	86,303
Water sales billed to resellers (% total city bill)	0.65 (1.1%)	0.51 (0.6%)	0.46 (0.5%)
Number of licensed water resellers	1,034	933	869
Average reseller's bill (cubic meters/year)	627	542	536
Total customers served by resellers (@ 20 liters/person/day)	88,825	69,222	63,787
B. OTHER CITIES			
Total city water bill (million cubic meters)	32,726	34,412	36,217
Water sales billed to resellers (% total city bill)	0.09 (0.3%)	0.12 (0.3%)	0.09 (0.3%)
Number of licensed water resellers	145	157	155
Average reseller's bill (cubic meters/year)	630	760	610
Total customers served by resellers (@ 20 liters/person/day)	12,504	16,345	12,945
C. TOTAL URBAN, CÔTE D'IVOIRE			
Total urban water bill (million cubic meters)	93,330	114,848	122,520
Water sales billed to resellers (% total urban bill)	0.74 (0.8%)	0.62 (0.6%)	0.56 (0.5%)
Number of licensed water resellers	1,179	1,090	1,024
Average reseller's bill (cubic meters/year)	627	573	547
Total customers served by resellers (@ 20 liters/person/day)	101,329	85,566	76,733

The table shows that while the principle of licensing home water resale is a good one, in practice it remains marginal: the volumes billed to resellers are on the order of 0.5 percent of the total volumes billed, and the clientele served is 80,000 to 150,000 persons (assuming respectively 10 or 20 liters per person per day), or less than 4 percent of the urban population. The volumes sold are also very low, about 50 cubic meters a month per reseller, in Abidjan and in other urban centers, about the same as for a standpipe. The annual sales volume is also low: a monthly water bill of CFAF 15,000-20,000 and monthly sales of CFAF 35,000-50,000.

Though SODECI expected that the number of licensed resellers would increase following their public information campaigns promoting this option, in fact their numbers have decreased by about 16 percent over the last three years. This would seem to indicate that SODECI's decision to license the resellers was made under duress because of the magnitude of reselling going on, but that its underlying position is still to oppose the practice of reselling, whether licensed or not. In fact, a number of reseller's licenses have been cancelled in areas where the water mains were extended, with the justification that the availability of resold water in those areas was reducing the incentive for households to sign up for their own connections.

Unlicensed clandestine resellers dominate the market

The difficulty of meeting the licensing requirements encourages most resellers to remain clandestine. By definition, their numbers are therefore difficult to assess, but the volume of water sold is without a doubt 10 times greater than that sold by licensed resellers. It is estimated that 40 percent of Abidjan's residents buy their water from resellers, while licensed resale serves less than 5 percent of the population.

Some individual clandestine resellers may handle a large volume of business, though not necessarily more than individual licensed resellers, but most are probably selling on a small scale to their immediate neighbors or within the same courtyard or compound. Yet SODECI continues to seek to identify the clandestine resellers (with the help of their licensed brethren) and when they succeed, they present the culprits with a choice between becoming licensed or ceasing resale, sometimes even threatening to cut off water service. Because it reduces the number of resellers and

thereby reduces competition, this policy clearly does not lead to improved service to users, nor to lower prices, in the underserved and illegal settlements where resold water is often the only option for low-income households.

Urban Sanitation

Piped sewerage

Public sanitation services in Abidjan are limited to a network of piped sewerage that covers at most about 35 percent of the population. Official figures indicate that 45 percent of those with household water connections also are connected to the sewerage network. Using the same ratio of network length per household served as for water (15 meters per household) yields an estimated 70,000 household sewerage connections. If there are 6 to 7 persons per connection (a lower number than for water because there is no resale of this service), then fewer than 500,000 residents are using the sewer system, or less than 20 percent of the city's population.

The sewerage network is located in well-served areas where residential lots are large and residents well-to-do or where there are office and government buildings.

Self-help household sanitation

Most households in Abidjan—in particular, low-income households— and all those in the other urban centers use individual self-constructed and maintained sanitation solutions such as traditional or improved pit latrines or septic tanks, or simply empty waste buckets into a ditch. Each household pays for whatever solution is adopted, which can run into hundreds of thousands of CFAF for a lined tank or tens of thousands for a latrine. The removal of sludge is likewise carried out by individual cleaners or small entrepreneurs, either manually (CFAF 30,000 per cleaning) or using a suction truck (CFAF 60,000). Until recently, SODECI also offered cleaning services in order to keep its city drain-cleaning trucks busy but has stopped doing so since the adoption of new arrangements for sanitation (see below), which reserve tank and latrine cleaning services for small independent private entrepreneurs.

Considering the sizeable sums that must be spent to keep home privies operating, even by the poor, there is a big market for sanitation services, especially considering the high densities and the difficulty of finding affordable legal tenure, which only serves to drive up densities yet further. Some squatter areas in Abidjan have densities of over 1,000 persons per hectare.

SODECI's most recent sanitation contract agreement

Before the most recent contract agreement, SODECI provided a number of sanitation services. These works were carried out under a services contract or under force account for the Sanitation Department (Ministry of Housing and Urban Development) and paid for from the National Water Fund (FNE). The funds were supposed to come from a transfer of a portion of housing tax monies from the public treasury to the FNE, but since 1996, they have been provided through a transfer from the Water Development Fund (FDE). The annual volume of SODECI's sanitation activities amounted to CFAF 1 to 1.5 million, or about 5 percent of SODECI's annual income.

Since August 1, 1999, a new sanitation contract has come into effect and is expected to have the effect of tripling expenditure for sanitation services and therefore tripling demand for works and contracts. Funding is to be provided through the introduction of a sanitation surcharge to be added to all water bills, described below.

Figure 8. SODECI income from sanitation services, 1992–98 (CFAF millions)

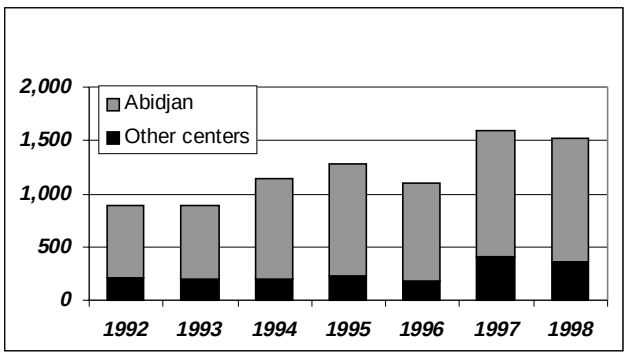


Table 10. SODECI: Expected annual sanitation budget from 2000 (CFAF millions/year)

Expenditure item	CFAF million (% total)
SODECI management fee	1,912 (44%)
Stormwater drainage maintenance	800 (18%)
Sewerage network maintenance	511 (12 %)
Sewerage rehabilitation & extension	489 (11%)
Sewerage connection subsidies	250 (6%)
Debt service	200 (6%)
Supervision of works	200 (6%)
TOTAL	**4,362 (100%)**

Stormwater drainage and sewerage works were previously financed from the FNE with income from the water fee and a share of the housing tax, plus a transfer of CFAF 1 billion from the FDE from 1997. With the new sanitation contract, sanitation services will be financed directly by a surcharge on water bills in Abidjan. The income from this surcharge will be shared by SODECI, along with a value added tax of 11.11 percent on the sanitation surcharge, to maintain the existing drains and sewers, and by a sanitation infrastructure fund that will be managed by SODECI.

The sanitation surcharge rates will be based on the water customers' access to sewer hookup. There are three categories, each charged at a different rate:

1. those already having sewer connections
2. those who could technically get sewer connections because they are within range of the existing network
3. those who are out of range of the sewer network, in underserved areas or on land lying below the sewer collector mains

The first two categories pay more than the last, even if they are not actually getting sewerage service. The rationale for this rate structure is that it will encourage those who could get the service to actually sign up for it, since in effect they are already paying for it. In any case, after two years, all those who are connectable will be charged the top surcharge rate whether they are hooked up or not.

Table 11. SODECI: Rate structure for sanitation surcharge introduced in August 1999 (CFAF/m3/quarter).

Volume of water consumed	Water customers with sewer connections			Water customers within range of sewer			Water customers beyond sewer's range		
(m3/quarter)	Total	SODECI	CDA	Total	SODECI	CDA	Total	SODECI	CDA
Residential: Less than 18	15	5	10	8	4	4	3	0	3
18-90	35	16	19	25	14	11	8	2	6
90-300	75	36	39	55	33	22	28	8	20
More than 300 Public sector	15	5	10	8	4	4	3	0	3

CDA: sanitation surcharge (Contribution au developpement de l'Assainissement)
quarter: three months

Tariff cross-subsidy policies

Between Abidjan and other urban centers

SODECI provides piped water in 550 urban areas but only makes a profit in seven of these. In particular, water operations in Abidjan are favored by good hydrogeological conditions and production costs are low (water from boreholes requires no treatment or filtration) and high population densities mean that water distribution and administrative costs are low. These conditions are not found in most other urban centers in Côte d'Ivoire. SODECI water operations in Abidjan involve half of operating costs to serve 52 percent of all water customers and bring in 60 percent

of their water income after deducting location-specific overhead costs. The use of a single tariff structure for customers in all urban centers therefore implies heavy cross-subsidization of water services in most centers from profits made in Abidjan.

Figure 9. SODECI: Cross-subsidy of water service in other cities from profits made in Abidjan, 1995-96.

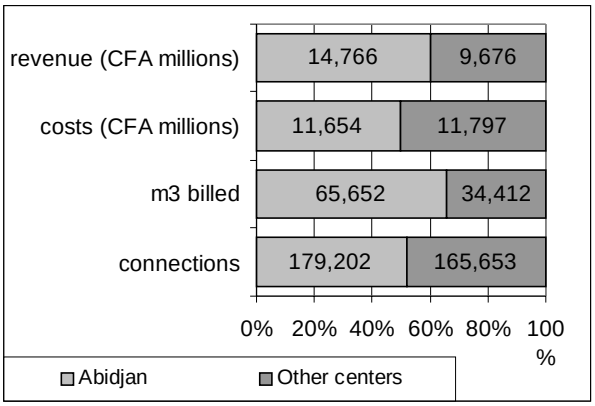
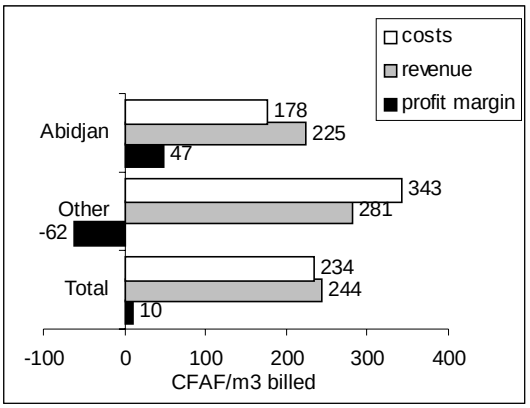


Figure 10. SODECI: Comparison of costs, revenue, and profit margins in Abidjan and other cities, 1995-96.



The picture is different for sanitation services

The new sanitation arrangements and related sanitation surcharges apply only to users in Abidjan. In other cities and towns, users contribute to the financing of sanitation services nationwide by paying the FDE fee and FNE surcharge, but receive few benefits (mainly local stormwater drainage).

Between groups of water customers

There is also cross-subsidization of low-volume consumers by high-volume ones through the highly progressive tariff structure. While the base water charge rises somewhat with volume of water consumed, the FDE fee and FNE surtax rise sharply with consumption, and the highest (industrial) rate is three times the lowest (social) one on a per cubic meter basis.

Table 12. SODECI: Rate structure for water effective May 1996 (CFAF per cubic meter)

Volume of water consumed (m3/quarter)	Base rate	Value added tax	Total water charge	FDE surcharge	FNE tax	**Total water rate**
Residential:	144	16	160	10	14	**184**
Less than 18 (social)						
18-90 (domestic)	198	22	220	54	12	**286**
90-300 (normal)	198	22	220	197.5	46.5	**464**
More than 300 (industrial)	198	22	220	228	84	**532**
Public sector	198	22	220	57	119	**390**
Special standpipe rate [a]	158	17.5	175.5	45.5	95	**311**

[a] Since February 1999, SODECI has given standpipe operators a 20.25 percent discount in order to maintain their rate at the pre-May 1996 rate of 311 CFAF per cubic meter.

The May 1996 tariff increase reduced the maximum monthly consumption allowed at the lowest (social) rate from 10 to 6 cubic meters (from 30 to 18 cubic meters a quarter). This reduction has had a significant impact (see fig. 11). The share of water billed at the social rate, which had risen steadily since 1992, reaching 33 percent in 1995, fell to 22 percent in 1998.

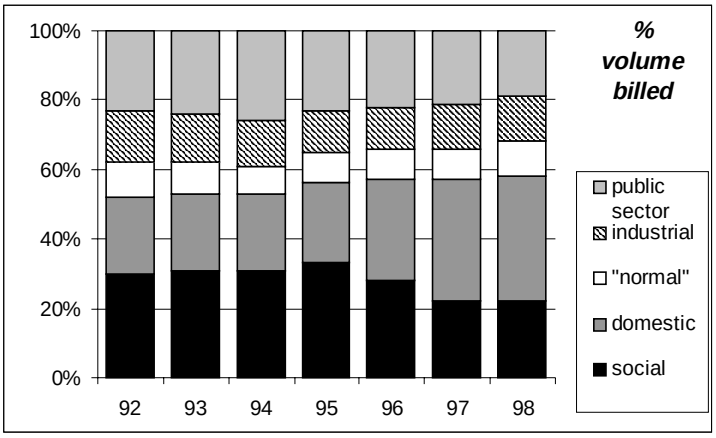


Figure 11. SODECI: Share of total water billed at different tariff rates, 1992–98.

The structure of the new sanitation surcharge is actually regressive and has a negative social impact, since even those who are too far from the sewer network to be connected to it will still contribute to the cost of running the sewerage system. These mostly low-income residents benefit only indirectly from this system, mainly through the impact of stormwater drains in the city as a whole. The rate differentials in fact benefit those already connected to the sewer network, who are in the highest income group.

High-volume consumers contribute the most to water connection subsidies through the FDE

The progressive structure of the FDE fee rates (see Table 12) means that low-volume consumers contribute very little to the FDE. A consumer using 100 cubic meters a month pays FDE fees equivalent to the cost of the connection subsidy within seven months, while a consumer using only 6 cubic meters a month would take 139 years to pay back the connection subsidy in FDE fees paid.

Table 13. SODECI: Payback time of connection subsidy through quarterly FDE fees.

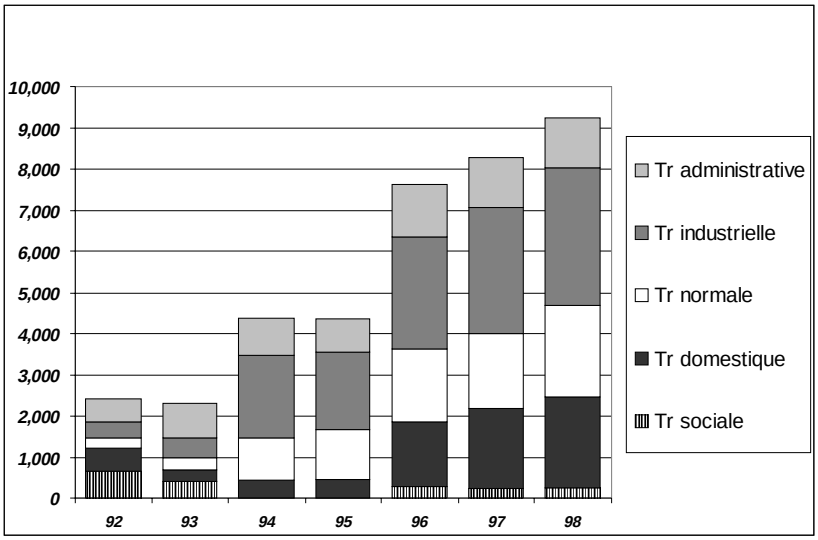
	Monthly water consumption (cubic meters)		
	6	30	100
Total FDE fees paid over a year	720	16,272	179,802
Time required to pay back connection subsidy	139 years	6 years	7 months
Rate of subsidy paid back after 5 years	4%	81%	910%

Source: SODECI, 1996 annual report

Self-Financing Of Urban Water And Sanitation Through The FDE

In 1987, the FDE (Water Development Fund) was established to finance water sector investment, and the FNE (National Water Fund) was established to finance water sector debt service and sanitation sector investment. The FDE is funded by the FDE fees on water bills, and the amounts collected increased dramatically in 1994 and 1996 when the fee rates were raised.

Figure 12. SODECI: FDE income from water bill fees by tariff category, 1992–98 (CFAF million).



Over the last ten years, water consumers have thus financed most water sector investment through their contributions to the FDE: water connection subsidies, maintenance, new works (water systems in smaller urban centers, and rehabilitation and extension of existing water networks). The largest contributors are the industrial and high-volume residential consumers who pay the highest water rates. Over the next five years, a larger share of new water sector investment should be financed by borrowing from donors.

Table 14. FDE: Total expenditure by category, 1992–98 (CFAF million)

Connection subsidies (SODECI)	14,386	39%
Water network maintenance (SODECI)	5,403	15%
New works (SODECI)	9,214	25%
New works (competitive bidding)	1,268	3%
Other (sanitation transfers, Water Department supervision charges, etc.)	6,830	18%
TOTAL, FDE	37,102	100%

Though FDE expenditures have been dominated by connection subsidy costs, which accounted for about 40 percent of total expenditures over the 1992-98 period, their share is now declining (see figs. 13 and 14). Amounts absorbed by the annual transfer for sanitation investment since 1996 (about CFAF 1 billion a year) and other expenditure categories (overall sector supervision by the Water Department in the Ministry of Infrastructure and other categories for which detailed data is not available), have also been declining. Since 1996-97, new works have been absorbing a greater share of FDE expenditures. The growth in new works should accelerate in the next few years, when construction of piped water systems in ten more urban centers are planned at an annual cost of CFAF 2.2 million.

Figure 13. FDE: Annual expenditure by category, 1992–98 (CFAF million)

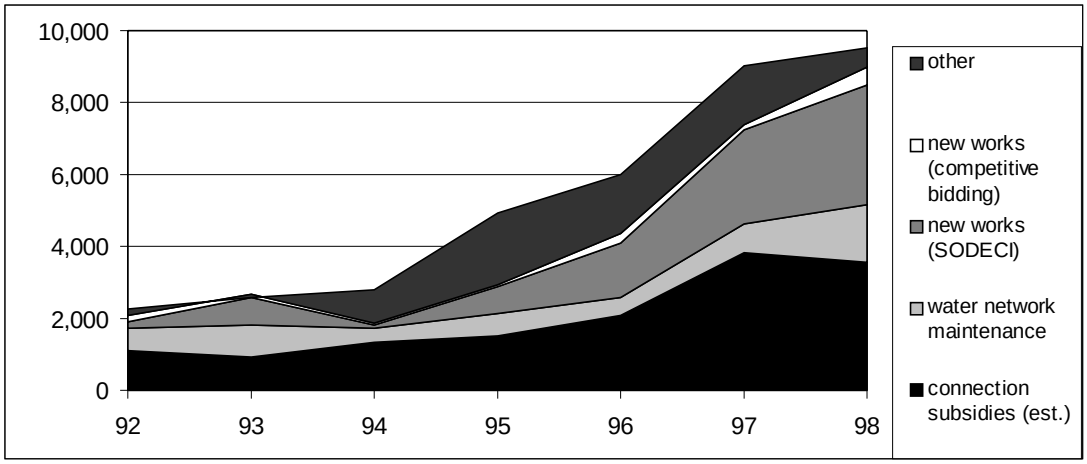
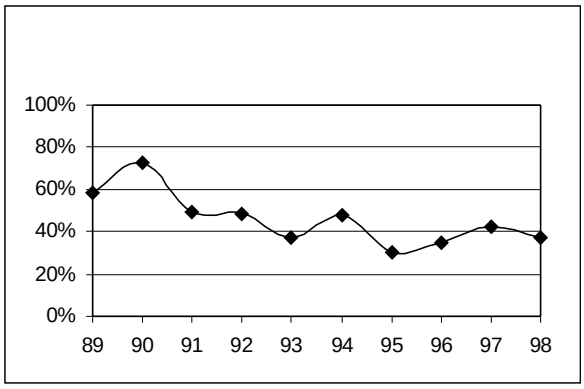


Figure 14. FDE: Share of expenditure allocated to connection subsidies, 1989–98.



IMPACT OF SODECI POLICIES FAVORING ACCESS BY LOW-INCOME HOUSEHOLDS

Access To Home Connection

Connection subsidy widens access to home water in serviced areas

In order to bring water into a house, SODECI must run a pipe from the main and install a water meter. The flat fee for this includes up to 12 meters of pipe between the main and the meter; if more than 12 meters' piping is required, SODECI charges extra. Any supplemental piping beyond the meter is installed and paid for by the consumer. The meter must be placed on either public right-of-way or tenured property.

Where water mains pass through residential areas, most houses are within 12 meters of the mains. The water meter may be placed on the lot and most supplemental piping is within the residence. In these areas, the connection subsidy fulfills its social role by making home connection affordable to more households. The connection subsidy results in a major reduction in the cost of getting a water connection (by about 90 percent), and this has a beneficial impact on all income groups. Still, there are families living in these areas who cannot afford a connection charge of less than CFAF 20,000 and/or the quarterly water bills.

But in underserved and squatter areas, home connection still costs too much for most households

Where water mains do not run through or close to an urban settlement area, households receive the connection subsidy, but there will be extra charges if the meter is installed more than 12 meters from the main. Since the meter must be installed on land which is either clearly a public right-of-way or clearly private tenured property, the cost of piping from the meter to a house in a squatter settlement may amount to several hundred thousand CFAF (several hundred meters at CFAF 1,000-2,000 per meter). The impact of the connection subsidy is thus minor on the overall cost of getting water to the residence.

In these areas, the overall cost of connection remains an important obstacle to low-income families. Moreover, the low quality of installation work for the secondary extension and meter-to-house piping often results in leakage, leading to high maintenance costs and high water bills. These in turn lead to unpaid bills and cancellation of water service.

Legal tenure requirement remains a major obstacle

SODECI's requirement that households applying for home water connections must produce proof of occupancy (either a property deed or affidavit from the landlord in the case of tenants) unquestionably restricts access to water for low-income families. Many low-income families cannot produce such documents because they are squatters or the tenants of squatters, lacking legal tenure. SODECI's reason for imposing this requirement is to avoid customers who leave behind unpaid bills, especially when the previous tenant or owner also failed to pay. SODECI also seeks to avoid legal disputes with property owners closest to the meter locations.

In practice, water agents have some leeway in the application of this requirement and may choose to make exceptions or accommodations with individual households. One reason for this flexibility may be that the number of connections and new customers is a criterion in the performance evaluation of water personnel. However, such arrangements can put the households who make them somewhat at the mercy of the water agents, the municipal staff who may have issued occupancy papers, the property owner on whose property the water meter is located, or the compound landlord, who may be selling water to his tenants. Such arrangements may involve costs that are more than symbolic: one reseller in a squatter settlement told of paying CFAF 30,000 for meter installation and CFAF 5,000 a month thereafter to the property owner where the meter was located.

Impact of connection subsidies on low-income urban areas

SODECI statistics give only the aggregate figures by service areas for number of active household connections, service suspensions, and new connections, and there are no data broken down by city wards. Thus it is not possible to tell whether low-income areas are more are less affected by the connection subsidy policy. However, the 1998 data by service area do appear to show a negative relationship between the number of new connections and the percentage of population living in low-income areas. The three SODECI service areas with more than 15 percent of the population living in such areas (Vridi, Koumassi, and Center) are also those with the lowest number of new connections (fewer than 3 per 1,000 residents). This suggests that current policy of connection subsidy has reached its limits in terms of making water affordable to lower income households, and that additional measures specifically targeting low-income urban areas are required to increase the coverage rates in these areas.

Figure 15. Abidjan: Negative correlation between number of new water connections and low-income residents in 8 SODECI service areas.

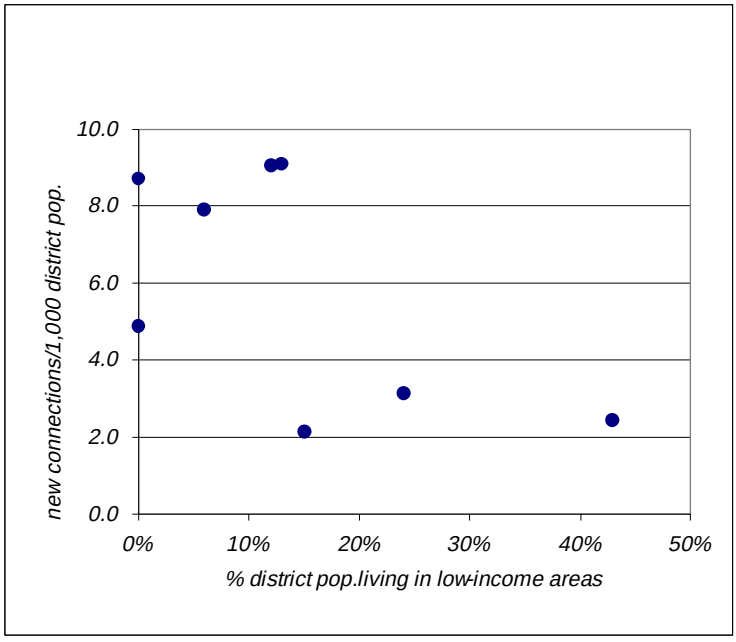


Table 15. Abidjan: Number of household water customers and new household connections, 1998.

District	SODECI service area	1998 population	1992 population living in		Number of water customers (12/98)	No. of new connections	
			Squatter areas	Underserved areas		Total	% with subsidy
Abobo (North)	Abobo North				19,687	2,741	***99%***
Abobo (South)	Abobo South	603,988	13%	***66%***	22,869	2,756	***88%***
Port Bouet	Vridi	199,633	***43%***	13%	9,765	490	***94%***
Koumassi	Koumassi	300,016	***24%***	14%	16,425	939	***95%***
Adjame		240,448	***22%***	***63%***			
Attecoube	Center	198,111	0%	23%	16,308	954	***88%***
Plateau		9,360	0%	0%			
Yopougon (West)	Niamgon		6%	31%	32,458	3,071	***87%***
Yopougon (East)	Yopougon	653,627			33,054	2,101	***94%***
Treichville	Zone 4	114,009	0%	6%	14,699	555	72%
Cocody	Cocody	240,127	12%	22%	31,186	2,176	62%
Marcorry	Marcorry	166,317	0%	***39%***	16,949	1,449	***93%***
TOTAL ABIDJAN		**2,725,636**	**13%**	**35%**	**213,400**	**17,232**	**87%**

Sources: SODECI annual report; SODECI Operations Department; National Technical Research Office (BNETD)

Water Bill Payments

Billing amounts and frequency for low-volume customers

The size and infrequency of the quarterly water bills are often mentioned as major constraints to home connection for households with low and irregular incomes. However, a household can consume up to 6 cubic meters a month at the social tariff for a quarterly bill of CFAF 3,300. This amount would appear to be feasible for a large number of households, at least in the larger cities where most economic transactions are monetized. Besides, the 45 days allowed for payment of the water bill should provide sufficient time to get the money together. The frequency of unpaid bills therefore probably has more to do with household priorities and options. For example, the minimum electricity bill is CFAF 6,000 payable every two months, or three times the minimum water bill on a monthly basis, yet in the city of Man, the electricity utility indicates that cutoffs due to unpaid bills affect only 1 percent of customers while SODECI indicates a 5 percent cutoff rate.

Progressive tariff structure discourages compound water connections

A large number of low-income city residents live in compounds with a shared courtyard. The 1998 household income survey found that 45 percent of individuals with income below the poverty level lived in compounds in Abidjan, 56 percent in other cities. The volume of water consumed in these courtyard, which house three to five families, is higher than for individual household connections, and usually exceeds the limit for the lowest (social) tariff rate (CFAF 184 per cubic meter for the first 6 cubic meters per month) and is charged at the next higher (domestic) rate (CFAF 286 per cubic meter up to 30 cubic meters per month) or even the "normal" rate (CFAF 464 per cubic meter).

Where strong family ties exist, payment of the bill is shared by compound members; where there is a landlord renting to tenants within the compound, the landlord (if he lives in the compound) or his agent will have collected money by selling water on a daily basis. But the size of the bills can lead to failure to pay when money is not well managed or there are disputes.

Water losses

Leaks of metered water (which of course are charged for) can result in high bills that go unpaid. Few water customers actually know how to read their water meters or do it with any regularity, so such leaks tend not to be detected or fixed. The problem is all the more common in underserved and squatter areas where many extensions have been attached to a metered water pipe. These extensions are often made by people with no training, using worn or improvised materials.

Lack of preventive involvement (customer relations)

As a general rule, once the meters are installed, SODECI staff seem not to visit underserved settlements with any regularity, even less so the squatter settlements. Even when installing meters, SODECI agents do not systematically seek

contact with water customers in Abidjan. In the smaller cities and towns, SODECI staff are much more likely to have good customer relations, which tends to forestall disputes. Where there is good contact, staff can advise customers about economic use of water, look into the reason for late payments, and even arrange for payment in installments to prevent service cutoffs.

But in unplanned settlements, it is not always easy to determine who is using the water that is being billed; sometimes the bill is simply left inside the water meter after turning off the tap, so that someone will have a reason to go to the meter and take the bill in. But this approach is not calculated to create good customer relations. Certainly the experience in smaller urban areas demonstrates that an ounce of preventive involvement is worth a pound of unpaid bills. Surely the distrustful or even disdainful attitude of some SODECI staff when dealing with residents of squatter settlements can hardly be justified from a commercial standpoint.

Piped Water Resale

Service to underserved and squatter areas

The resale of home water provides piped water to a large part of the population of Abidjan, in particular to low-income households. Household income surveys have found that more than 40 percent of the city's population gets water from resellers, including 70 percent of the urban poor. Resale of piped water is particularly important in underserved and squatter areas where 30 to 50 percent of Abidjan's households live.

Service closer to home

Water resellers generally draw water from a metered connection located at the edge of an unplanned settlement, on the property of a neighbor who has the required land occupancy status (since SODECI will only install meters on such property). But in order to serve more clients, the reseller will extend buried PVC piping to their own homes, within the squatter area. These tertiary connections can extend for hundreds of meters, and thus bring the water much closer to the squatter clientele. Since the market for resold water is quite competitive, many resellers also offer home water delivery, and further extend the network using flexible piping right into their customers' homes.

Pay-as-you-go convenience

Even if the reseller charges a higher price (CFAF 600 to 1,000 per cubic meter vs. CFAF 184 to 284 per cubic meter for social or domestic water connection and CFAF 500 to 700 per cubic meter for standpipe water), there are important advantages for poor clients, even from a financial point of view. (There are isolated examples of resellers charging higher prices but this appears to apply to home water delivery.) The main advantage is in being able to buy in small quantities that will vary from day to day depending on household cash flow. Resellers may also choose to sell water on credit and run a tab for their customers. Also, buying water in this fashion carries no risk of the customer being charged for water that leaked due to a poor connection.

SODECI licensing requirements discourage competition

In underserved and squatter areas, water resellers must deal with the same connection problems as anyone wanting a home water connection—the legal occupancy requirement, the cost of extension from the secondary network. But in addition, as commercial customers, licensed resellers are not eligible for the connection subsidy and must pay the full cost of connection (CFAF 150,000), meter installation (CFAF 9,000), and a security deposit of CFAF 200,000—for a total of CFAF 369,000. At the average monthly sales volume for a reseller of 50 cubic meters, this up-front investment cost amounts to nearly two years of water bills, of which one year for the security deposit alone. The only benefit from fulfilling all these requirements is that resellers' meters are read and their bills delivered on a monthly, rather than quarterly basis, plus, at least in principle, they do not risk being put out of business as do the clandestine resellers (when discovered).

The high entry costs imposed by these requirements discourage potential resellers from entering the market and thus reduce the potential service quality (in terms of proximity) and raise the price (by restraining competition). It would seem that SODECI's licensing requirements are designed to limit the number of resellers. As a result, most resellers operate without a license, with the consequent risk of cutoff and the incentive to collude with SODECI inspectors.

Resellers' association: union or cartel?

A resellers' association (Association des revendeurs d'eau dans les quartiers urbains populaires du Côte d'Ivoire or AREQUAPCI) was created in 1998 by a group of licensed water resellers in Abidjan who sought to improve their business environment. The association has 150 members, about a quarter of all licensed resellers in the city, and has organized several working meetings with SODECI representatives. The Abidjan office of the Water and Sanitation

Program (WSP-WCA) has in fact acted as a facilitator at some of these meetings. The association's president also participated in the September 1999 workshop in Bamako organized by WSP to bring together independent water and sanitation providers in the region.

AREQUAPCI's proposals for improving their business environment concern

1. changes to the tariff structure that would make it more favorable to high-volume water resale, possibly a single water rate
2. reducing competition from clandestine resellers
3. participation by the association in the licensing of new resellers, supposedly in order to guarantee service quality, but with the obvious risk of transforming the association into a cartel that limits entry in order to keep numbers down (even though greater numbers is the best guarantee of lower prices through competition)

Some resellers have made it their mission to report clandestine resellers and would appear to be intent on creating a water distribution oligopoly. Such an outcome would not benefit consumers.

Poor Access to Sanitation Services in Unplanned Urban Areas

Inaccessibility of piped sewerage

The sewer pipes of Abidjan go nowhere near the underserved and squatter areas of Abidjan, and there are no sewerage systems in any other cities or towns of Côte d'Ivoire. Nonetheless, even low-income water customers are required to pay the new sanitation surcharge on their water bills, though the only benefit they will see involves stormwater drain construction and creation of new sludge dumps. The sanitation investment program fails to include any broad measures to improve sanitation services for the vast majority of urban households, in particular, for the urban poor.

Impact of the new sanitation contract

The new sanitation contract is unlikely to have any impact on sanitation services for the urban poor and may even make access to sewer connections less affordable to the poorer residents of serviced areas where such connections are available. Though they will pay a higher sanitation surcharge, along with other households in these areas, than poor residents of underserved and squatter areas, and though the surcharge will be increased to the full level of those who are connected after a two-year grace period, poor residents cannot hope to meet the costs of actually connecting to the sewer system. The subsidized sewer connection fee is CFAF 75, 000 (50 percent of the full fee of CFAF 150,000)—or four times the water connection fee—but the amount set aside for the sewer connection subsidy will only cover about 3,000 households. Then there are additional expenses that customers must finance:

- the cost of installing pipe from the manhole (sewer mains) to the residential plot, which for low-income residents of multi-family compounds can be quite a ways and can involve removal of concrete paving;
- the cost of installing new water connections for toilet flushing; some 1,500 toilets that made use of shower runoff for flushing were installed with World Bank financing over the last decade but they were expensive.

At the very least, it seems clear that the sanitation practices and needs of low-income urban residents were overlooked in the planning of the sanitation contract and the allocation of investment anticipated from the new sanitation surcharge.

NEXT STEPS TO IMPROVE ACCESS BY LOW-INCOME FAMILIES

Extend and Densify Networks

Reduce distances and costs, increase competition

The extension and densification of public water and sanitation networks in underserved and squatter areas is an effective way to lower the financial barrier created by the hundred-meter gaps now separating the water meters and the customers' homes. Laying new pipes to do this would bring household connection costs more into line with what they are in other areas of the city.

Reducing connection costs would simultaneously

- improve access for large numbers of residents (though coverage rates may still remain lower than in planned parts of the city where incomes are higher)

- improve access to water for poor households continuing to buy water from resellers, since the number of resellers would increase, reducing prices through competition and shortening distances for carrying water
- reduce water leakage due to poor connections and also reduce the incidence of cutoffs following unpaid bills inflated by such leakage

The extension of both water and sanitation networks into the least served areas is the most appropriate and efficient solution to get services delivered, because it is unlikely that these areas will be rehabilitated or restructured in the near future. It is the only way to make existing connection subsidies meaningful to low-income residents, who now face substantial additional extension costs. These extensions could, instead, be financed using FDE funds and the works carried out by professionals using permanent materials, which would put an end to water losses from leakage due to amateur workmanship. Both SODECI and consumers would benefit from elimination of these leakages.

Technical feasibility of network extensions

In the planned, legal settlement areas, underserved settlements are mostly those where low-income residents live. Though the road network and rights-of-way for pipelines exist, past network extension priorities have been set not only on the basis of technical criteria. Political and economic considerations also enter in when there are choices to be made between adding pipeline in areas occupied by high-volume water consumers (who also contribute more to the FDE) or in those where low-income residents live. These considerations also come into play when there are decisions about allocating water supplies during periods of shortage.

In unplanned squatter areas, rights-of-way will need to be identified. The Housing and Urban Development Ministry has classified these areas according to their "upgradability". Most squatter areas are deemed urbanizable and can be restructured physically and legal land tenure granted. Some projects being prepared for these areas are even intending to begin physical improvements before resolving tenure issues at the individual plot level, beginning with setting aside key public rights-of-way to allow for construction of basic street, water and electricity networks.
About 15 to 20 percent of squatter area residents (60,000 out of 300,000 to 400,000) are slated for eventual resettlement to other areas because the land on which they are living is not urbanizable (unstable and unsafe terrain, or land required for other development uses).

Estimated cost of network extensions

As of December 1998, Abidjan's water network was about 3,100 km long and served 213,000 customer hookups, or about 15 m per connection. As a first approximation, using the same ratio, about 1,350 km additional pipeline would be required to extend service to those presently at a distance from it. This estimate compares to 230 km already in the Water Department's works program, at a cost of CFAF 1,585 million, of which CFAF 1,200 million are to be financed from the FDE and the rest is to be raised from other government sources.
Using the average cost of the works already programmed (CFAF 7,000 per meter of pipe), the remaining 1,200 km required to extend the network to all those beyond its present reach (not just the urban poor), would be CFAF 7.7 billion, *excluding* the cost of additional water production and treatment capacity.

Sources of financing: Shifting FDE funds from subsidy to works

When customer demand in an area reaches critical mass, the Water Department and SODECI carry out minor water network extension works using SODECI investment funds, on a much smaller scale than those in the FDE-financed program. In order to scale up this self-financed work program, a number of financing alternatives may be considered, including

- substantially increasing the FDE surcharge (and also the price charged for water).
- borrowing from external sources (implying stretching out the investment period), and
- reallocation of a portion of FDE funds currently earmarked for connection subsidies.

The first of these would require a decision by the Water Department. The second would require launching a survey of external donors. But the third would require only a decision by SODECI, which manages these funds and would not exclude a parallel quest for external financing. Funds presently reserved for connection subsidies could be transferred to the FDE budget line for extension of existing network without affecting other major FDE objectives, such as routine and periodic maintenance, and the construction of new waterworks for urban centers outside Abidjan.

Reducing the amounts needed for connection subsidy

Reducing the amount available for water connection subsidies would reduce the number of new house connections and slow the growth of coverage as measured by numbers of home connections. There are basically two ways in which connection subsidy funds could be more efficiently used in order to minimize the impact on new connections of shifting funds into network extension:

- tightening eligibility for the subsidy,
- reducing the amount of subsidy and
- creating incentives for maintaining current connections.

At present, the subsidy has few restrictions. Eligibility could be tightened by applying an income criterion, but this would be difficult in practice because there is no objective source of income information, such as for tax purposes. The connection subsidy could be limited to residents in certain areas, using the classification developed by BNETD, the National Bureau of Technical Research, (legal/planned, legal/unplanned, squatter/upgradable, squatter/not upgradable), or one based on level of infrastructure, as long as the first priority is given to squatter areas and that these are recognized as deserving public water service. Or the subsidy level could be reduced, either overall or selectively by area. The drawback here is that low-income households living in the better areas near the water mains would be penalized under area-specific restrictions. But those in underserved areas would see the reduction in the connection subsidy offset by a reduction in other connection costs, once new extensions brought them closer to the mains.

There is an additional benefit that would result from reducing the subsidy amount across the board: such a reduction would have the effect of encouraging households to reconnect rather than apply for a new connection. As it is, it costs less to apply for a new, subsidized connection than to reconnect an existing one that has been cut off. This encourages people to move without informing SODECI, which creates collection problems, and creates incentives for complicity between SODECI staff and households wanting a new, subsidized connection (under an assumed name, for example). If the subsidy were reduced enough to make it cheaper to simply reconnect or change addresses, these perverse effects would cease and the demand for unnecessary "new" connections would fall.

Optimize Conditions For Resale Of Home Water

Simplify the licensing procedure

Water from resellers is the only water available to squatter settlement residents where SODECI is ill equipped to operate, both for technical and legal reasons (narrow unpaved alleyways, lack of tenure, likelihood of future physical restructuring). Resale of home water also occurs in planned, legal settlement areas where some households lack the income to pay for their own home connection and to maintain water bill payments. Thus resale of home water is a flexible response to demand not satisfied by other water distribution arrangements.

However, SODECI licensing requirements are restrictive: no subsidy is allowed for the connection, a substantial security deposit is required, and the reseller must pay for extensions to connect from the secondary network. These restrictions have limited the number of licensed resellers and tended to raise the price of water as resellers seek to recover their costs.

Reduce connection charges to resellers

Cost to the consumer and service availability would be enhanced by a reduction in the connection charge for resellers by granting them the same subsidy offered to others. The security deposit could also be reduced from its present high level of CFAF 200,000; at the average sales volume of 50 cubic meters a month; this deposit amounts to pre-billing of a year's worth of water. Given the time required for billing and payment (less than 60 days), a deposit equivalent to four to six months' worth of water would appear to ensure reasonable protection to SODECI without penalizing the resellers. Security deposits could also be set at different levels to reflect the size of resellers' monthly bills.

Reduce tariff charged to resellers

Resellers are currently billed at the same progressive rates as paid by residential users, which penalize high-volume consumers (especially over 100 cubic meters a month, though few resellers sell in such high volumes—their average sales are 50 cubic meters a month). On the other hand, standpipe operators pay a flat CFAF 311 per cubic meter. This is a relatively high rate, which generally only becomes profitable at water sales volumes over 80 cubic meters a month. Still, the principle of a flat rate for resold water should be considered for resellers as well, for example, at the domestic rate of CFAF 286, currently applicable only up to 30 cubic meters a month. So that high-volume residential users continue to pay a higher rate, the proposed low flat rate should only be applied to resellers or to household connections in low-income areas, especially squatter settlements.

Protect resellers' investments

Water resellers must often invest substantial amounts in the installation of local piping. When such investment is not protected, the reseller seeks to minimize the level of investment (by using cheap materials) and/or to recoup the cost as quickly as possible (by raising prices). SODECI gives no guarantee with the licensing agreement; it imposes restrictions on the reseller but does not hesitate to unilaterally cancel the agreement and suspend water service if it feels this is in its own commercial interest (for example, when mains are extended and there are potential new customers to be signed up).

At a minimum, resellers should be offered

- compensation when their investments are taken over by SODECI (for example, allowing for 20 percent annual depreciation, as for extensions carried out at the request of other residential customers)
- the right to continue reselling water as long as they pay their bills on time, even after their service area has benefited from network extensions and densification.

Competition from other resellers, and from easier access to home connections which reduces the demand for resold water, should be the only factor limiting the number of resellers.
Prevent formation of resellers' cartel. SODECI and the Water Department need to keep an eye on the emerging tendency, for example, on the part of the resellers' association (AREQUAPCI), to seek to restrict entry or to become the exclusive interlocutor for all resellers.

Support and promote water resellers

The best way to keep the market competitive would be for SODECI to actively promote licensing of resellers, by

- giving their field agents targets or incentives for increasing the number of resellers in underserved and squatter areas
- offering technical assistance to potential resellers concerning the use of good quality materials for their networks, helping them do good quality work, and helping to find and fix leaks.

SODECI could also introduce and facilitate condominial connections (managed by the group of households that draw water from it), which is another way to maximize the number of users served per connection and to spread the cost of connection among the greatest number of users.

Adapt Connection Charge And Bill Payment System

Introduce flexible payment arrangements

In SODECI offices that do not use computerized customer data bases, a household seeking a new connection may be able to arrange with SODECI staff to pay for the connection in installments; once the full payment has been received, the connection is installed. This informal sales practice is more difficult in fully computerized offices because the software does not include an installment payment option.

There is also strong demand for payment of water bills by installment, or shortening of the current quarterly billing cycle, from customers whose income is irregular, and for lengthening the cycle for customers whose income is seasonal or who receive infrequent but large sums of money from family members abroad. Because the software for billing water use does not allow such flexibility, individual SODECI staff have managed to set up manual accounts on the side to accommodate these needs. SODECI has now decided to formally experiment with more frequent billing based on estimates of water use, since it would not be cost-effective to actually read the meters on a monthly basis, and to try annual billing of water in areas of the country where agricultural income is important (Yamoussoukro).

Rely on existing savings mechanisms

An alternative approach to dealing with the difficulty of setting aside household income for quarterly water bill payments is to make use of various savings mechanisms, whether through the banking sector (savings accounts) or traditional savings clubs (*tontines*). These mechanisms are universally available and work well for financing home construction.

On the other hand, sector- or project-specific savings arrangements may well carry higher administrative costs and be less well designed than these existing savings mechanisms. For example, two projects financed by French bilateral aid in Korogo and Man intend to set up mutual benefit organizations (patterned after French health and life insurance *mutuelles*) which water customers would be required to join in order to finance a home connection and pay their quarterly water bills. But the scheme is designed so that those who do pay end up covering the cost of those who fail to do so, and the administrative costs will also be borne by mutual members.

PROPOSED FURTHER STUDIES

Analysis Of Water Market In Selected Squatter Settlements

The detailed functioning of the water market in squatter areas is not well understood. Sound micro-economic analysis would require an exhaustive survey of all water providers (standpipe operators, licensed and clandestine home water resellers, courtyard water customers) along with interviews of SODECI field staff; data on volumes sold, clientele, operating costs and sales prices, number of persons employed in the water business, investments made, and constraints to market competition. Such detailed surveys could only be carried out effectively by establishing trust and confidentiality from the outset of the study, especially with clandestine resellers.

Legal And Institutional Analysis Of Electricity Utility Extensions In Squatter Areas

The electricity utility in Côte d'Ivoire, CIE, has had little difficulty in extending its network into urban squatter settlements. While technically it is easier to extend power lines than water pipes—the only infrastructure required is the poles—it would be useful to take a closer look at the procedures and requirements under which it operates, set by the Ministry of Housing and Urban Development and possibly other authorities. There may be lessons that would apply or be adaptable to water sector operations in these areas.

Water And Sanitation Provision In Courtyard Housing

In Abidjan, many urban residents live in courtyard housing, where water and sanitation facilities and costs are shared by four or five households (despite SODECI's efforts to promote one connection per household). Data gathered from about ten such courtyard compounds would support analysis of the way in which these costs are shared, including better answers to such questions as

- Who is considered the person responsible for the water connection?
- How are infrastructure costs financed (latrine construction, extension of water piping from the secondary network): by the property owner or the person responsible for water connection, or do others contribute?
- How is water provision managed and paid for? Is water transported in basins or jerrycans? Is a water charge added to rent paid? Through what arrangement is the sum required for quarterly water bills ensured?
- Who pays for latrine cleaning? Is the charge collected at the time the service is carried out, or is it incorporated into rents?

Policy Implications Of Urban Settlement Classification

DCGTx and the National Bureau of Technical Research (BNETD) carried out a very thorough study based on a survey of all underserved and squatter areas of Abidjan, published in 1995. Other studies and updates of this work are regularly carried out for the Ministry of Housing and Urban Development, covering Abidjan and other urban centers, in order to determine the size and characteristics of these settlements. In particular, the Ministry of Housing and Urban Development has classified squatter settlements according to whether they are considered urbanizable or not.
The proposed study would complement this work by analyzing its financial and legal implications in terms of access to water and sanitation services, and would identify actions that would increase access to low-income groups in specific areas (such as area-specific subsidies and water rates).

List Of Persons Met

Name	Title	Organization
M. DJOUKA	Director, Water Services	Ministry of Infrastructure, Water Department
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