

POLICY ON PRIVATE WATER SALES IN RURAL GHANA

By Fred O. Boadu¹

ABSTRACT: This paper examines strategies for forming public-private sector partnerships in order to improve the distribution of water in rural areas in Ghana. The options explored include: (1) An outright sale of the existing government-controlled water corporation; (2) setting up decentralized regional water utilities; (3) maintaining the existing central authority but contracting out services to the private sector; (4) charging user fees for water services based on the cost of producing and distributing the water; and (5) encouraging private and community-level institutions to participate in the water market. Based on a limited case study, the paper finds a wide disparity between public and private prices of water, which points to a need for more-rigorous pilot programs and studies to further explore alternatives for public-private partnerships in the Ghana water sector.

INTRODUCTION

Two interconnected problems dominate discussions on rural water-supply systems in developing countries today: (1) The ability of developing countries to meet operation and maintenance costs of existing water systems given restrictive budget conditions; and (2) the cost of extending potable water and sanitation facilities to populations who do not currently have them. One solution to these problems being given serious consideration by governments and donor agencies is the possibility of expanding private sector participation in the water sector to increase the efficiency of water markets and to reduce the pressure on already stretched government budgets.

The purpose of this paper is to present arguments in support of a rural water policy that encourages private-sector participation in the distribution of potable water and the maintenance of water facilities in Ghana (see Fig. 1). A successful public-private sector partnership would entail the central government granting greater autonomy to the Ghana Water and Sewerage Corporation (GWSC) in the formulation and implementation of clear rules and regulations defining the role and interaction between the private sector, consumers, and the corporation. Ghana is currently undertaking a major water rehabilitation program, which has the potential to significantly improve the availability of good quality water to urban and rural households. This paper examines some of the options facing the government in the efforts to forge effective public-private sector partnerships in the water sector in Ghana. The principles and ideas discussed in this paper should be of interest to other countries in Sub-Saharan Africa and the rest of the developing world in their efforts to provide social amenities for their peoples. For example, in response to difficult economic conditions beginning in the mid-1970s, several countries in Sub-Saharan Africa explored the possibilities of user charges for public services such as education (Thobani 1983; Tan et al. and Mingat 1984), and health (Birdsall 1983; Jimenez 1987).

¹Asst. Prof., Dept. of Agric. Economics, Texas A&M Univ., College Station, TX 77843-2124.

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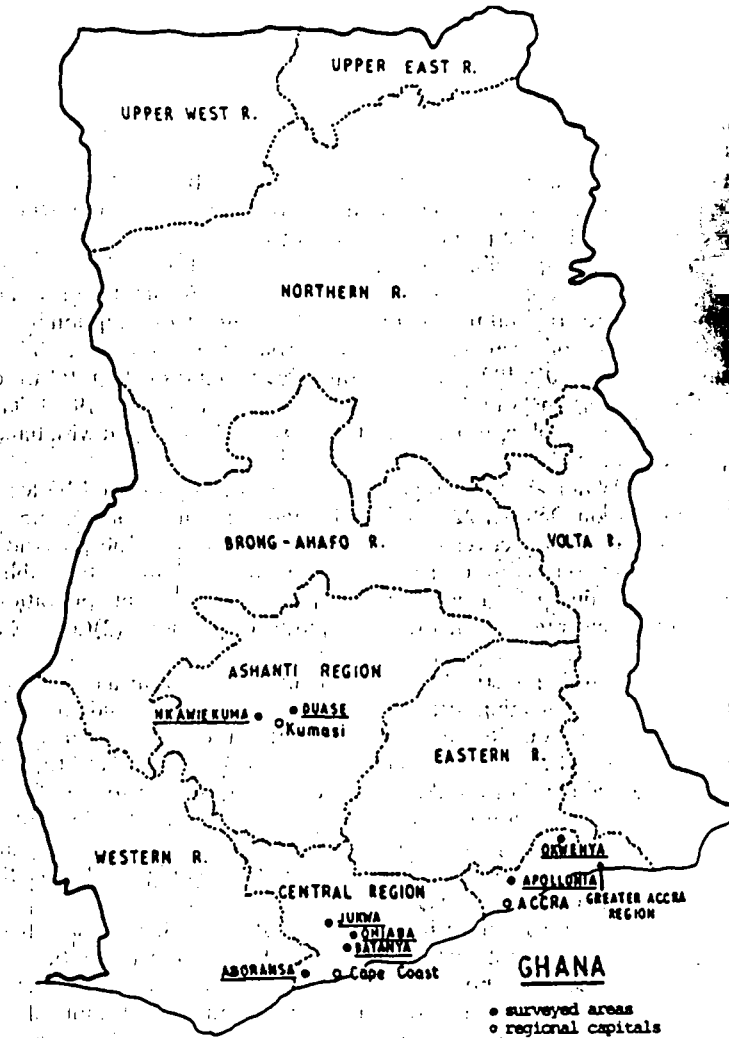


FIG. 1. Surveyed Areas

BACKGROUND OF GHANA WATER SECTOR

Ghana occupies an area of 238,500 km² on the west coast of Africa and has a population of 12,200,000 (World Bank 1991). The primary economic activity is farming, with some light industry. Cocoa is the major export crop (60% of total foreign exchange earnings) with gold, bauxite, and manganese exports on the rise. Ghana is classified as a low-middle income country, with a 1990 annual per capita income of \$450 (World Bank 1991). Mean annual rainfall varies from 2,250 mm in the west coastal area to about 750

mm in the eastern coastal area (Accra), and to around 1,000 mm in the north (GWSC 1986).

About 7,300,000 people in Ghana live in communities with water supply facilities. Of this population, 3,600,000 live in urban communities (population over 5,000) and 3,700,000 in rural communities (population less than 5,000) (Rosenberg 1987). Approximately 46% of the 3,700,000 people with rural water facilities live in communities served mainly by pipe-borne water-supply systems and 54% live in communities with nonpipd systems (boreholes equipped with hand pumps) (Rosenberg 1987).

The sole agency responsible for water and sewerage is the GWSC, which operates 208 water supply systems in Ghana, the largest of which supplies the capital city, Accra, and the major port city, Tema. Consumption in the Accra-Tema metropolitan area (ATMA), which has a population of 1,300,000, accounts for about 70% [90 Mm³ (million cubic meters) of the total water production of 130 Mm³] of Ghana's total piped systems (Ghana 1986). The GWSC is also responsible for over 6,000 shallow wells equipped with hand-pumps (Rosenberg 1987).

The Ghana Water and Sewerage Corporation was established by legislation (Act 310) on October 22, 1965, and entered into force on September 1, 1966. The stated objectives of the corporation are: (1) The provision, distribution, and conservation of the supply of water in Ghana for public, domestic, and industrial purposes; and (2) the establishment, operation, and control of sewerage systems for such purposes. [section 2(2)(a) of Act 310].

The corporation is governed by a six-member board that along with a chairperson and a managing director, is appointed by the President of the country. In carrying out its functions, the corporation is "guided by the Minister [Works and Housing] in matters of general policy" (Act 310, subsection 4). Subsection 7 of the Act directed the corporation to manage its affairs "in accordance with the practices observed in public utility enterprises" and, more importantly, "to ensure that, taking one year with another, its revenues are equal to or greater than its outgoings." The GWSC is to collect water user fees to cover its costs.

The corporation is also authorized to raise funds through borrowing from domestic and foreign sources with prior approval of the minister of finance. It is to keep its accounting books subject to directions from the minister of finance. The auditor-general is responsible for auditing the accounts of the corporation and, in turn, is to submit his or her report to the minister for the corporation. The corporation is exempt for paying income taxes or any other prescribed tax (subsection 16).

Probably the most important authority given to the board is the authority to make regulations pertaining to matters enumerated under subsection 14 (a-g). These matters include: (1) Fixing of water rates and sewerage charges; (2) preventing water waste; (3) suspending water supplies for nonpayment of water fees; (4) preventing water pollution; (5) inspecting water supply facilities; and (6) setting corporation staff service conditions. As argued below, the proper exercise of these powers could significantly enhance public-private interactions in the provision of potable water to urban and rural households in Ghana.

TECHNICAL AND INSTITUTIONAL PROBLEMS FACING WATER SECTOR

Background studies on the rehabilitation of the Ghana water sector point to several technical, economic, political, and social problems in the efforts to meet the water quantity and quality needs of rural households (Ghana 1986). From a technical perspective, there is a need to keep water systems operational. A survey conducted prior to the initiation of the rehabilitation program in 1986 showed that only 66% of borehole pumps, 70% of other pumps, 80% of electric motors, 46% of diesel engines, and 70% of alternators were operational (Ghana 1986). The operation and maintenance of systems is hampered by the lack of spare parts and manpower, and a lack of transportation to reach systems located outside the main city centers.

The general economic conditions in Ghana in the 1980s adversely affected the GWSC. Persistent government budget shortfalls forced deep cutbacks in financial allocations to public enterprises. The effect of the government's retrenchment policy was reflected in the GWSC's inability to address the spare parts and transportation problems discussed earlier and to provide adequate personnel to remedy the problems. A management improvement study of the GWSC revealed that, out of approximately 7,000 total employees for the whole country, there were only 16 engineers (civil, electrical, and mechanical), one accountant, one auditor, and no economists, store managers, data processors, legal assistants, or administrative officers (Ghana 1986). Furthermore, several of the skilled personnel, especially the engineers, were leaving to join the private sector due to low salaries and poor working conditions.

Over the years, the GWSC has operated under a political and social environment that emphasized centralized control of the decision-making process both in the relationship between the central government and the GWSC, and between the GWSC and its regional offices. A centralized system of administration that existed during the preindependence era was retained and reinforced in the postindependence (post-1957) period under a socialist strategy to development. The new government treats access to services such as water supply, health, and education as a basic right of the people without regard to the ability or willingness to pay for the services. The absolute political control over the activities of the GWSC means that the supply of water to households does not follow any known public utility principles whereby the corporation could respond to market signals. Decision-making and action on decisions are subject to lengthy bargaining between politicians and GWSC officials. The socialist form of organizing economic activity also affects the relationship between the GWSC and its regional offices. All regional offices of the GWSC have to seek clearance from headquarters before any decisions can be made. When one considers that the GWSC headquarters has to seek clearance from the government in the making and implementation of decisions, it becomes clear how the system can be crippled by delays, political pressure, and inaction.

Probably the most significant problem facing the GWSC is its ability to collect enough revenues to cover the cost of operations. Direct charges for water is a relatively new concept, introduced under Act 310 in 1965. Section 2(2)(f) of the Act empowered the GWSC to "determine adequate rates, charges, or fees, and effective methods of collection thereof for water and sewerage services furnished to all classes of users." Since the mid-1970s, two primary forces have combined to bring cost recovery to the forefront of water issues. The first is the extension of services to both urban and rural

populations without any consideration of recovering costs until after the fact. This is especially true of the activities of the churches, charitable organizations, and international donors. In the north and Brong-Ahafo regions, charitable organizations have built water systems through communal labor and small contributions. These systems ultimately become the responsibility of the GWSC.

In the rural areas, international donor activity increased markedly in the 1970s with the drilling of wells and boreholes across Ghana. The most significant of these drilling activities is the 3,000 Wells Programme under the auspices of the government of the Federal Republic of Germany. Also, the Canadian government, working through the international agency CIDA, has a water supply program in the upper region of Ghana. The management of these wells and boreholes has been transferred to the GWSC once donor activities and funding end. In the absence of prior charges, several villages have refused to pay for the maintenance of these wells and boreholes. In the urban areas, the GWSC expanded supply to households through private connections and public standpipes which were financed by the central government with only partial tariffs imposed on households. Obviously this expanded responsibility has created an imbalance between expenditures and receipts in the GWSC budget.

The second force that triggered interest in the user charge principle was the adverse economic conditions in the country in the 1980s, which brought the activities of the GWSC to a virtual standstill. The GWSC's budget problems were exacerbated by the decision of the government of Ghana to cut back on government subsidies to public corporations in 1985 as part of the structural adjustment program still ongoing in Ghana. The Economic Recovery Programme (ERP) was initiated in April 1983 under the World Bank and International Monetary Fund (IMF) guidelines. Under the ERP, public corporations must be able to maintain themselves financially, and private-sector participation in the economy is elevated. For the water sector, the relevant aspects of the ERP are: (1) A progressive shift away from the direct controls and intervention toward greater reliance on market forces; (2) the rehabilitation of the economic and social infrastructure; and (3) the undertaking of structural and institutional reforms to enhance the efficiency of the economy and encourage the expansion of private savings and investment (World Bank 1991). The decision by the government to withdraw subsidies led to requests for less political control over water prices. A few years ago, the corporation submitted a request to the government for a relaxation of ministerial (political) control and the implementation of public utility pricing principles. Part of the process would involve decentralizing the corporation's services to give existing regional authorities control over water resources and accountability by the GWSC for meeting its expenses.

The government has accommodated the GWSC's request for rate increases and, under current policy, the GWSC may increase water tariffs up to 25% without further approval from government. Rate increases above 25% must first receive approval from the central government before implementation. The GWSC has been raising water tariffs in mild doses (Table 1), but whether this accommodation will eliminate the recurrent deficit of the GWSC remains to be seen. Given the poor record of water rate collection in rural communities, the new authority given to the GWSC may not have its desired effect without adding some additional innovative enforcement mechanisms to Act 310.

TABLE 1. GWSC Water Tariffs Since 1987

Type of service (1)	Time period (2)	Rate per 1,000 gal. (in cedis (¢)) (3)	% Increase (4)
Metered premise	1987	125	
	Jan. 1988	140	12
	April 1988	155	11
	July 1988	160	3
Minimum charge, 0-3 gal.	Jan. 1988	305	11
	April 1988	320	2
Unmetered premise	1987	250	
	Jan. 1988	275	10
	April 1988	305	11
Standpipes, flat rate per house	1987	125	
	Jan. 1988	140	12
	April 1988	155	11
Mostly rural but some periurban areas	July 1988	160	3
	1987	75	
Boreholes/Wells, flat rate per house	1987	75	
	Jan. 1988	85	13
	April 1988	90	6
Primarily rural	July 1988	95	6

Source: GWSC Tariff Rate Circular, March 1988.

OPTIONS FOR EXPANDING PRIVATE SECTOR ROLE

There exists a rich and extensive literature on strategies for privatizing public services in both developed and developing countries (Prospects 1987; Cowan 1983; Pirie 1988). There seems to be a consensus that the primary interest in public-private partnerships is the perceived efficiencies in economic performance made possible by private sector participation; improved reliability in the provision of services; depoliticizing economic decisions, and the lessening of pressures on government budgets (Hanke and Walters 1987). These rationales have served as a basis for expanded private sector roles in the provision of public services in developing countries (World Bank 1991). Roth (1987), for example, examined the possibilities in developing countries for expanded private sector roles in providing strategic public services such as water and sewerage, health, education, communications, and transportation. In each case, he found a reliable and useful role for the private sector. This section combines some of the ideas put forth by Roth with recommendations made by Madsen Pirie of the Adam Smith Institute to analyze the options for expanded private-sector involvement in the water sector in Ghana. The following options are discussed: (1) Selling the GWSC by issuing public shares of stock; (2) setting up regional utilities under regulated prices; (3) contracting the services previously provided by the GWSC to private business; (4) charging for the cost of services offered by the GWSC; and (5) private and community-level water distribution.

Selling GWSC

One option available to the government of Ghana is to sell the GWSC, "lock, stock, and barrel." One way to effect a sale is to sell to a private

entity such as a corporation. The government would simply put a price tag on the assets and contractual rights of the GWSC and then transfer the assets and rights to the highest bidder. Alternatively, the government may simply sell shares in small denominations to citizens, then have the shareholders elect a board to run the corporation. Even though the corporation may still be regulated by the government, either approach would mean that potable water supplies would be totally in the hands of private entities. In both cases, government regulations should not prevent adequate return on investment. Roth offered several reasons why this approach is not commonly used. Reasons include the absence of property rights to water, the critical importance of water in times of war, the difficulty of collecting payments, and the magnitude of the resources required to operate a viable nationwide water supply program. Along similar lines, Pirie suggested that "activities involving regulation or those which make transfer payments cannot be privatized by selling the whole of the activities to the private sector."

Some of the arguments presented by Roth and Pirie are relevant to explaining public-private partnerships in the Ghana water sector. One problem is the absence of private property rights to water resources in Ghana. As one author has observed, "under customary law, water, in its viable and natural forces of sea or streams or lakes etc. is essentially public property which cannot be claimed by any individual even though he may be the riparian owner. This rule is very rigidly adhered to, particularly in areas where water is scarce" (Ofori-Boateng 1977). Communal ownership of water resources does not permit individuals to internalize the costs and benefits of their investments. Thus, it will not support private production and distribution of potable water. One response to the communal-ownership constraint is for the utilities not to make any claims to ownership of water and in effect charge not for the water but for the delivery of service. Another consideration is for rights in water resources to be created by some permitting or adjudication procedures. However, these procedures have never been used in Ghana, and are usually very expensive to design and implement. Aside from the costs, the information requirements for efficient operation of a permitting system may preclude its use in a developing society.

A second problem is the magnitude of resources required to operate a national private water project assuming the government does not pursue a decentralized public utilities strategy. It may be possible to raise some of the required capital from outside sources, but the history of domestic and foreign private investment credit in the Ghanaian economy has not been too impressive. In a recent survey, 89% of all firms in Ghana and 91% of small firms identified the availability of credit as the major constraint to new investment in the country (Steel and Webster 1991). Even where the investment credit is available, the cost of credit may discourage investors from applying resources to a sector like water where it may take a long time for an investor to realize the returns on investment.

Despite the property rights and investment credit problems, the sale of the GWSC to the private sector could solve one of the most difficult rural development strategy problems—equity in the allocation of resources between the rural and urban sectors of the economy. Historically, providing water for household and irrigation uses has been a major component of the Government's rural development policies. Since the central government apparatus is located in urban centers, the impression is created that the urban center is subsidizing the rural sector. However, the rural sector in fact may be subsidizing the urban center through the imposition of high

taxes on agricultural products originating from the rural sector. A private-sector-driven water market will reduce the cross subsidies in the water sector since the provision of water will no longer be dependent on a centralized government-controlled account. If the central government responds to the reductions in its obligations by reducing export duties, producers of agricultural export products would benefit and, in effect, help improve the rural economy.

On balance, however, the historically extensive involvement of the government in the water sector, the absence of stable private property rights to water resources, the difficulties in attracting capital resources, and the absence of precedents on the nature of private involvement in the provision of critical public services may weigh against a total selling of the GWSC to the private sector.

Regional Utilities and Regulated Prices

The management, financial, and technical problems facing the GWSC may be minimized by encouraging water production and distribution by decentralized regional utilities. Each of the nine regions in Ghana, or combinations of regions, would develop its own water production and distribution system to meet regional demands. The prices charged by these regional utilities would be regulated by government in order to prevent excessive monopoly prices but to generate a reasonable return. Since the GWSC currently operates regional offices throughout the country, the decentralization strategy could be put into effect by allowing each region to purchase or lease existing plants and equipment.

A decentralizing regional utilities strategy has several advantages. The strategy would reduce the resource requirements for operating a national water supply program and also enhance accountability for decisions concerning water availability. Regional public policymakers would be put within reach of the people they serve and would no longer be able to deflect regional concerns to a central authority located in the capital city. Another advantage:

TABLE 2. Domestic Consumers and Population Served by GWSC

Region (1)	ESTIMATED POPULATION SERVED				RURAL			
	By House or Yard Connections		By Standpipes		Piped Supply		Hand Pumps	
	Popula- tion 1,000	% of regional total	Popula- tion 1,000	% of regional total	Popula- tion 1,000	% of regional total	Popula- tion 1,000	% of regional total
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ashanti	173	52	162	48	224.2	16	605	43
Brong-Ahafo	24	16	127	84	199.4	23	162.4	19
Central	47	25	144	75	383.0	46	171.7	21
Eastern	49	26	138	74	235.5	19	335.3	28
Greater Accra	757	100	0	0	100	43	5.3	2
Northern	53	32	155	68	61.8	7	—	—
Upper	15	58	11	42	12.0	1	356	32
Volta	13	48	14	52	232.3	24	143	15
Western	44	29	106	71	233.4	27	274.2	32

Adapted from Ghana (1986).

is the potential efficiency gains from tailoring water supply to identifiable effective demand. Table 2 shows that current distribution of water facilities in regions is uneven. Regional utilities are in the best position to identify regional needs and to respond to those needs. This view was echoed in the government's decentralization initiative: "district authorities are better placed to lead initiatives at the local levels and can thus directly affect the quality of life in communities throughout the country" (Ghana's National Programme for Economic Development in 1987). Finally, a decentralized strategy would minimize ethnic tensions and the often heard political accusation of central government bias in the allocation of national resources.

The successful implementation of a decentralized regional water utilities strategy depends on the government's ability to resolve critical economic, political, and social issues. Regional utilities may not be able to finance the supply of water to the households who need it. Currently, only three of the 10 regions are able to meet their recurrent costs, but these are the regions, with large industrial, commercial, and government users. These are Accra-Tema (the capital and port city), Kumasi (second largest city), and Sekondi-Takondi (second port city). Even though a more rigorous water-user fee-collection program may improve regional utility revenues, the wide disparity in the distribution of income and employment opportunities may still be major barriers' ability to pay for water in some regions.

The major problem facing a decentralized regional utility strategy is political. Prior to independence in 1957, a referendum was held to determine whether Ghana should adopt a unitary or federal form of government that would give broad autonomy to regions. The federalism proposal was defeated. The issue resurfaced in political discussions when the country rewrote its constitution in preparation for a civilian-led government. There exists significant hostility toward regional autonomy, and the government would have to proceed cautiously in any strategy to give broad powers to regions. The fear may be that autonomous regional utilities is only the first step toward eventual federal state. Such a perception would derail any strategy emphasizing significant regional control of resources.

Contracting out Service to Private Business

Contracting out public services to private businesses involves keeping the finances of water systems in the public sector, but moving production over to the private sector (Pirie 1988). There is considerable variation in contracting out activities in Africa. For example, in the Ivory Coast, the management of the publicly financed water supply system has been contracted out to the private sector (Roth 1987). In Lesotho, on the other hand, the repair of water pumps has been contracted out to the private sector. The Lesotho approach is not contracting out in the strictest sense because the repairmen, called "waterminders," are paid by the villagers whom they serve and not by the central water authority. The waterminders are trained and supplied with tools for repair work by the government. The training and tools are supplied free of charge and are considered a component of the overall rural development strategy of the government. The Lesotho program has minimized the dependence on central authorities for dealing with mundane repairs and has contributed to remedying rural unemployment and generating rural incomes (Roark et al. 1987).

An examination of the organization and operations of the GWSC shows that considerable opportunities exist for public-private sector interaction. As currently organized, the GWSC plans, implements, and manages all

water development projects in Ghana. The corporation maintains its own drilling units, workshops for repairs (vehicles, carpentry), purchasing and stores, a hydrogeology unit, a quality control unit, and a research and communications system. There are a total of 626 senior staff (management, technical, administration professionals, and supervisors), and 6,200 junior staff (clerical, laborers, waterworks operators, and watchmen). Personnel costs constitute 20% of GWSC finances; third after chemical purchases (22%) and electricity (21%) (Ghana 1986).

The usual motivation for contracting out is to drive down cost. However, there are no hard and fast rules for determining what services and activities should be contracted out to the private sector. Following Pirie (1988), the GWSC may serve as overall wholesaler responsible for finances, administration/policy, quality control, setting performance standards, information gathering and distribution, consumer protection, and research. Even though the GWSC makes decisions about supply of water, the performance of most services would be contracted out to the private sector. For example, the corporation would no longer operate its own drilling units, workshops for repairs, hydrogeological surveys, and so on. In the area of research, for example, the corporation may explore ways of encouraging the private sector to work more closely with existing research institutes, such as the Water Resources Research Institute (WRI) and the three universities in Ghana. The encouragement may be in the form of tax credits or specific requirements in requests for project proposals for private individuals to delineate measurable milestones as to how they plan to work with national research institutions.

The proposed contracting out option has potential to significantly reduce personnel costs facing GWSC. It would mean, for example, retaining only the 626 senior staff, while releasing the 6,200 junior staff to private sector control. Even though the strategy may sound dramatic, the GWSC itself admits to "considerable numbers of redundant employees accumulated in the lower operation and service levels of staff" (Ghana 1986). As part of its restructuring activities, the corporation was considering retrenchment of some 2,000 redundant personnel at a savings of nearly N C 1,400 million, the equivalent of about \$4,000,000 U.S. dollars (Ghana 1986). One problem with the release of personnel to the private sector is the potential to add to the country's unemployment roll. There is reason to believe, however, that the release of personnel to the private sector may actually lead to an expansion in employment. Several areas in Ghana do not have adequate water supplies and, given the profit motive, private individuals may become water retailers and are likely to seek out these areas as potential markets for their services. Aggressive competition for markets implies more training, workshops, drilling, purchasing, and hydrogeology surveys. These activities require personnel. To improve living conditions in rural areas, all phases of a contracting out strategy must be consistent with governments' announced policy to expand water supplies to rural areas in Ghana. This would mean that with a leaner and more efficient bureaucracy the GWSC, as the primary decisionmaker regarding water quantities, will respond to the new demands made possible by private participation.

The key to any successful contracting out strategy followed by the GWSC is to introduce competitiveness in the provision of water services by encouraging private firms to compete against each other for the right to participate in the water sector (Pirie 1988). Contracts must be advertised, selection criteria clearly specified, and performance measures must be suf-

ficiently defined in order to minimize the opportunities for corruption. It is also important in this process to encourage regional contractors to participate in the contracting out market to prevent a monopoly of the market by a few elite firms in the capital city. Contractor selection criteria could include, for example, showing the extent of regional integration of the activities of the contractor. These arguments suggest that an effective policy may entail an indepth analysis of the integration between privatization and decentralization.

Charging for Services

User charges for public goods and services involves taking the finance into the private sector while leaving the production in the public sector (Pirie 1988). The user charge concept is a subset of the broader concept of "cost recovery," which is "any mechanism by which funds for the installation and maintenance (and operation where applicable) costs are raised" (Roth 1987; Ghana 1986). Cost recovery has been a policy in Ghana ever since water-supply systems were introduced to the country. The mechanism used to recover costs was a general tax on private economic activity. Soon after independence, the general tax approach was abandoned in favor of a policy that entailed charging households for the quantity of water they used. In its unadulterated form, the current user charge policy means that water is supplied to households willing to pay for it.

Saunders and Warford (1976) have identified several problems that may hinder the implementation of an effective water user charge policy. Three of these problems are especially relevant to the conditions in Ghana. First, a user charge policy is operationalized through metering or some form of user tax, which is expensive to implement in developing countries. Given the financial difficulties facing the GWSC, a policy of free metering may be difficult to justify. If metering costs are added to the cost of water, most rural households may be excluded from consuming the resource, which defeats the government's goal of making good water available to the people. Furthermore, the infrastructure in rural areas, including the physical structure of houses, may not be suitable for installation of meters. GWSC charges a one-time meter installation fee of N ₵ 7,000 (\$20). Most rural households consider the fee too high and expressed no interest in having their homes metered (Boadu, 1992).

A second problem is the source of water supply in rural areas. As Table 2 shows, the overwhelming majority of households rely on standpipes for their source of water supply. Unlike house connections, standpipes are difficult to meter. Saunders and Warford (1976) offer an example from Kenya, where private water vendors have been used to deal with the problem of collecting user charges for water delivered via standpipes. The possibility of private participation in the collection of user charges in rural areas in Ghana is viable and has been explored in greater detail in the section headed "Private Water Vending (with Regulation of Prices)."

A third problem is the determination of the rate to be charged. Water rate determination is a problem in both the urban and rural areas of Ghana. In a survey of selected rural areas in Ghana (Boadu, 1992), the presence of a large subsistence agriculture sector made the determination of household income difficult. The inability to accurately measure income in turn makes the determination of appropriate water rates difficult. In addition to these problems, the survey showed that villagers were generally unwilling to pay even the small water fee currently being charged by the GWSC. The

conclusion to be drawn is that a user charge policy will be difficult to implement in rural areas in Ghana and, even where possible, the rate would have to be so low that it would be inadequate to finance the recurrent cost of supplying water to villages.

Private and Community-Level Water Distribution

In Ghana, where there is no history of private-sector production and distribution of water, there may be lingering doubts about the ability of the private sector to provide the service. Under these circumstances, an important first step toward privatization is to demonstrate that private operators can perform an equivalent service (Pirie 1988). Even though the production of water is primarily the responsibility of the GWSC, the private sector has demonstrated a willingness and capability to distribute water. Other community-level institutions may be viable alternatives to the private sector. The current structure and operations of private and community-level institutions are described next. All the options described here are based on the GWSC acting as a wholesaler of water.

Village and Community-Level Organizations

A key rural development institution in Ghana is the Committee for the Defense of the Revolution (CDR). The CDR is a grassroots organization spreading to the national level (National Defense Committees), the highest coordinating body. The basic unit of the CDR consists of between 40 and 100 members. Between three and five unit CDRs constitute a block CDR; between three and five block CDRs make up a neighborhood CDR; and so on through the zonal district and regional levels to reach the national level (Republic of Ghana 1983). The CDRs perform an important role in the organization of village-level development activities. They are involved in basic data collection (number of houses, farms, etc.), conducting literacy campaigns, participating in primary health care activities, and community safety patrols.

The GWSC has sometimes relied on the CDR for providing safe drinking water to urban and rural areas. In the urban centers, like Accra, the CDR has been effective in the sale of water to periurban areas that are not currently served by piped water systems. The CDR purchases water from the GWSC and resells the water to areas where it is needed. The activities of the CDR are more pronounced in the rural areas because they participate directly in the building of community water projects and, in times of shortages, are involved in selling water to households. Prices charged by the CDR in villages are usually higher than the prices charged by the GWSC. The excess revenues go to the village community chest and are used for the development and payment for other village amenities—roads, clinics, and schools.

The GWSC does not have a clear policy regarding the role of the CDR in village water supply. To improve the efficiency of the water markets in rural and urban areas, the GWSC must publicize the rules and regulations governing water vending to check any tendencies toward monopoly. It is important to recognize that, as an arm of the central government, the activities of the CDR are aimed at the broader rural development objectives of the government. This broader objective must be reconciled with the GWSC's limited objective of providing safe drinking water to rural and urban households. It may be necessary, for example, for the GWSC to simply set the price at which to sell water to the CDRs for distribution and

leave the accounting, regulation, and control of CDR funds to the relevant central government agency.

Despite the positive contributions made by the CDRs to the country's rural development, there are some uncertainties regarding their future role and, in effect, their effectiveness as a conduit for supplying water to rural and periurban areas in Ghana. The uncertainty arises from the fact that the CDRs are a creation of a military regime that is currently preparing the country for a civilian, popularly elected government. It is not exactly clear whether the CDR as an institution will be maintained under a civilian regime, especially if the elected civilian government happens to be run by individuals who have openly discussed their dislike for the military regime and its institutions. Given their proven record of contributions to rural and periurban water supplies, a dismantling of the CDR based solely on political expediency could be quite costly to the society.

A related concern that needs to be addressed in order to chart a role for the CDR is the question of power. It is not exactly clear who holds residual power in rural communities, the traditional chiefs or the CDR. The military government that created the CDR did not intend to usurp the power of the chiefs. Unfortunately, during the formative years of the CDR, major mistakes were made that created the perception that the local chiefs had lost control of the power to make economic development decisions. For example, some CDR units had their own town crier, who beat a gong-gong to summon people to meetings. By tradition, only a chief may order the beating of a gong-gong to inform or summon households for a village meeting. The central government quickly put a stop to this practice, but the impression had been created that the CDR considered itself a parallel authority to the village chiefs. Depending upon how an elected civilian government leans, some village chiefs may prefer not to have a CDR in their villages at all, seeing it as a menace and being suspicious of the organization's aspirations for power. The positive contributions to improving village and periurban water supplies may not be enough to insure the survival of the CDR as an institution if the question of power becomes significant enough in the forthcoming civilian regime.

Private Water Vending (with Regulation of Prices)

An analysis of private water sales in one village in Ghana shows that the viability of private-sector distribution of potable water to rural and periurban areas should be further investigated. This analysis is based on water purchases and sale records for two vendors (A&B). Water is purchased by vendors from the GWSC, the wholesaler, using tankers (2,000 gal. capacity), and transported to the village where it is sold. Table 3 shows the revenue, costs, and profits made by vendors in one year. Identical calculations using the GWSC water price figures are also shown in the table.

Table 3 shows that vendors make considerable profits from the sale of water to households. Total revenue (column 6) for the two vendors is ₵175,000 and the total cost to the vendors (column 5) is ₵25,170. Total profits to the vendors are ₵149,830. The profits are overestimated because they do not include labor costs. However, given the low wage rate in rural areas, the overestimate may not be very significant. This simple illustration supports our earlier suggestion that private vendors could play an instrumental role in implementing a metering policy for standpipes in rural areas. It may be useful to establish a few pilot programs around the country to further explore the viability of this option.

TABLE 3. Revenue Calculations for Water Vendors in Aboransa

Vendor.. (1)	Capacity (gal.) (2)	Water cost (GWSC) (in cedis) (3)	Transport cost (in cedis) (4)	Total cost (in cedis) (columns 3 and 4) (5)	Total revenue $Q \times P^*$ (column $2 \times \text{€ } 5$) (6)	Profits (column 6 - col- umn 5) (7)
A	3,000	480 ^b	0	480	15,000	14,520
A	2,000	480	0	480	10,000	9,520
A	3,000	720	0	720	15,000	14,280
A	1,000	240	0	240	5,000	4,760
A	2,000	480	0	480	10,000	9,520
A	4,000	960	0	960	20,000	19,040
A	2,000	480	2,130	2,610	10,000	7,390
A	2,000	480	2,130	2,610	10,000	7,390
[Total]	19,000	4,320	4,260	8,580	95,000	86,420
B	2,000	480	2,130	2,610	10,000	7,390
B	2,000	480	2,130	2,610	10,000	7,390
B	2,000	480	2,130	2,610	10,000	7,390
B	2,000	480	1,290	1,770	10,000	8,230
B	4,000	480 ^b	2,130	2,610	20,000	7,390
B	2,000	480	2,130	2,610	10,000	7,390
B	2,000	480	1,290	1,770	10,000	8,320
[Total]	16,000	3,360	13,230	16,590	80,000	63,410
A + B	35,000	7,680	17,490	25,170	175,000	149,830
GWSC price of € 240/ 1,000 gal.	—	7,680	17,490	25,170	8,400	-16,770

*Price of water charged by private vendors is € 5 per gal.

^bThese figures are given by the GWSC. In the case of Vendor B, for example, GWSC charged an amount of € 480 even though the water quantity varied.

Private water vendors are currently functioning in an environment of considerable uncertainty. The uncertainty arises from the fact that the policy on private participation in the water sector is unclear and dispersed. The GWSC recognizes the importance of the vendors in the water distribution network, but has not developed any coherent policy on how to formalize the relationship between the corporation and private individuals. The private water vendors are able to collect the water fee that has eluded the GWSC due to manpower and hardware constraints. As in the case of the CDRs, the GWSC may want to examine ways of using the private sector as a conduit for getting households to pay for the water they use. This may be accomplished by selling the water to the vendors at a price that fully equals the marginal cost of producing the water, that is, unsubsidized water. The problem with this approach is a political one. The central government may not authorize the GWSC to deny water, a vital resource to households who cannot afford the higher price. For a number of small rural villages, potable water priced at its marginal cost may mean a retreat to the old contaminated sources of supply. Finally, to improve private participation, rules governing private participation in the water sector must be widely publicized in order to check the tendency toward monopoly. Given the

performance of the sector in the area of water distribution, it may be useful to explore other potential areas such as repair of rural pumps that may be reasonably performed by private individuals.

Just as in the case of water production, the distribution of water exhibits the "natural monopoly" problem. That is, given the sizes of a majority of villages in Ghana (usually population less than 500), it may be more efficient to use one supplier to a village or several villages. The problem with natural monopolies is that a way must be found to monitor the prices charged to consumers. This is especially important in developing countries where rural household incomes are generally low and households' ability to pay for water is correspondingly low. Unless water is made available at affordable rates, households may use contaminated water sources, which in turn cause diseases and losses in productivity. Table 4 gives a summary of the prices charged by private vendors relative to prices charged by public utilities. The ratios for Ghana, even though high, are not inconsistent with the pattern observed for other developing countries.

Currently the rates charged by water vendors are not regulated in any way by the government. Neither are the vendors licensed by the government. For planning purposes, the current rural water market condition is unacceptable in the sense that the vendors should be licensed and recognized as natural monopolies. In turn the government, acting through the GWSC, may consider monitoring the rates being charged to rural households for water. Even though the rural water markets in Ghana are fairly undeveloped, the experience of developed countries in the area of direct regulation of rates charged by natural monopolies for services suggests caution in

TABLE 4. Ratio of Price Charged by Private Vendors to Price Charged by Public Utility in Selected Cities, Mid-1970s to Early-1980s

City (1)	Private vendor price (2)	Price ratio (3)
Accra (Nima, Newtown), Ghana ^a	₵ 6-10	6:1-10:1
Winneba (Central Region), Ghana ^a	₵ 6-10	6:1-10:1
Mankesim (Central Region), Ghana ^a	₵ 10+	10:1
Aboransa (Central Region), Ghana ^a	₵ 20	21:1
Kampala, Uganda ^b	—	4:1-9:1
Lagos, Nigeria ^b	—	4:1-10:1
Abidjan, Ivory Coast ^b	—	5:1
Lome, Togo ^b	—	7:1-10:1
Nairobi, Kenya ^b	—	7:1-11:1
Istanbul, Turkey ^b	—	10:1
Dhaka, Bangladesh ^b	—	12:1-25:1
Tegucigalpa, Honduras ^b	—	16:1-34:1
Lima, Peru ^b	—	17:1
Port-au-Prince, Haiti ^b	—	17:1-100:1
Surabaya, Indonesia ^b	—	20:1-60:1
Karachi, Pakistan ^b	—	28:1-83:1

Note: Ghana figures were based on results of our survey.

^aWater vending is almost absent in the Ashanti Region (Kumasi area). The GWSC charges ₵ 240 per 1,000 gallons of water.

^bWorld Bank (1988).

recommending rate regulation. Almost invariably, direct rate regulation approaches end up as a cost-plus rule and the tendency is for firms to drive up costs (Hanke and Walters 1987).

An interesting and potentially useful approach to foster competition in the private market for water is to use what Hanke and Walters have described as the Chadwick Approach. Under this approach, an auction is held for the right (franchise) to supply water to a village or several villages. As the authors explained, "the crucial point is that the bidding for the monopoly franchise should not be in terms of a sum to be paid for the franchise but in terms of the prices that the franchisee would charge and the services the franchisee would provide the public on award of the right to be the exclusive seller." This means, basically, the bidder who promises the lowest price in combination with the best quality of services. Hanke and Walters have discussed the information requirements for the auction market to work efficiently and the cost of operating the system.

On balance, the Chadwickian strategy is preferable if the only other alternative so far is a direct regulation of rates. There is reason to believe that the experience from the auction system used to deal with the country's foreign exchange problems under the government's world bank-supported Economic Recovery Program (ERP) may be transferred to deal with the auction system for water supply franchises. Under the foreign exchange auction system, private individuals were asked to bid on a weekly basis for foreign currency (hard currency) in terms of local currency. The highest bidders were issued foreign currency, which was then used for imports and the purchase of capital items. The International Monetary Fund (IMF) has documented the success of the auction strategy in dislodging the black market for foreign exchange that was ruining the economy in Ghana. The suggestion being made here is that auction markets are not new in Ghana and may be a useful approach for selling water-supply franchises to interested private parties.

CONCLUSIONS AND POLICY IMPLICATIONS

This paper examined five public-private sector partnership options that could be applied to rationalize the water market in Ghana. The options included: (1) An outright sale of the GWSC by public share issue; (2) a regional utility system with regulated prices; (3) contracting out water production and distribution services to the private sector; (4) charging water user fees; and (5) encouraging alternative institutions such as community-level organizations and private water vendors.

The conclusion which emerges from the case study is that pilot programs and further studies need to be undertaken to shed light on the viability of private participation in the Ghana water market. The wide disparity between public and private price of water in several areas in Ghana (Table 4) points to the need for better information on the institutional and economic framework necessary to support a successful private water-supply distribution program in Ghana. It is especially important to understand differences in private distribution of water on a regional basis in order to formulate an overall coherent policy on public-private partnerships in the water sector. The admittedly limited case study presented in this paper, however, points to several hypotheses that may be explored in an expanded study of this topic.

The absence of clearly specified property rights to water and the lack of credit in the country pose significant difficulties for an outright sale of the

GWSC. However, a combination of decentralized regional utilities systems contracting out services, charging user fees, and the involvement of community-level institutions and private vendors may be a more realistic alternative to explore. A decentralized regional utility system will increase competition in the water sector and help tailor supply to demand. Private vendors have demonstrated an ability to collect the user fees that have eluded the GWSC since independence. Contracting out services to the private sector has the potential to help trim the bloated GWSC bureaucracy and make it more efficient in terms of the services delivered per unit of human and capital input. The participation of the CDR in the water sector is subject to several uncertain scenarios. A major uncertainty is how the traditional chiefs interact with the CDR in a postmilitary administration.

The success of any option or combination of options depends on a proper organization of the environment within which the private sector would function. It is important to set out clearly the "rules of the game" with respect to private participation. The rules must define the relationship between the GWSC, the private institutions, and the consumers. Private parties will take risk only if there is recognizable and enforceable security of expectation with respect to the benefits accruing to their efforts. In the absence of clearly defined rules, decisions are made on an ad-hoc basis, are unpredictable, and will raise the cost of supplying water to rural and urban households.

The existing legal-institutional framework within which the GWSC is functioning provides adequate authority for defining the rules for the water market. The ongoing decentralization exercise triggered by the Economic Recovery Program should further strengthen the GWSC and its regional affiliates in designing the rules that encourage market participation. The depoliticization of the GWSC should also contribute to the operation of the corporation under known public utility principles as required by Act 310.

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APPENDIX. REFERENCES

- Birdsall, N. (1983). "Strategies for analyzing effects of user charges in the social sectors." *Country Policy Department Discussion Paper 1983-9*, The World Bank, Washington, D.C.
- Boadu, F. (1992). "Contingent valuation for household water in rural Ghana." *Journal of Agricultural Economics*, (September), 458-65.
- Cowan, G. L. (1983). "Divestment and privatization of the public sector: case studies of five countries." *Rep.*, USAID, Washington, D.C.
- Ghana Water and Sewerage Corporation (GWSC). (1986). *Five-year rehabilitation and development plan*. Accra, Ghana.
- Ghana: *adjustment and growth, 1983-1991*. (1991). International Monetary Fund (IMF). Washington, D.C.
- Republic of Ghana. (1983). *Ghana: two years of transformation, 1982-83*. Accra, Ghana.
- Prospects for privatization*. (1987). S. H. Hanke, ed., The Academy of Political Science, New York, N.Y.
- Hanke, S. H., and Walters, S. J. K. (1987). "Privatizing waterworks." *Prospects for*

- privatization*, S. H. Hanke, ed., The Academy of Political Science, New York, N.Y.
- Jimenez, E. (1987). *Pricing policy in the social sector: cost recovery for education and health in developing countries*. The World Bank, Washington, D.C.
- Ofori-Boateng, J. (1977). "Environmental law: Ghana water laws." *The Review of Ghana Law*, 9(1), 11-27.
- Pirie, M. (1988). *Privatization*. Wildwood House, Ltd., Aldershot, England.
- Roark, P., et al. (1987). "Privatization study of the village water and sanitation (VWSS) project." *Washington Field Rep. No. 215*, Washington, D.C.
- Rosenberg, H. (1987). "Five-year plan for rehabilitation and development, 1987/91." *Rep. on the Water and Sanit. Conf.*, Accra, Ghana.
- Roth, G. (1987). *The private provision of public services in developing countries*. Oxford University Press, Washington, D.C.
- Saunders, R. J., and Warford, J. J. (1976). *Village water supply: economics and policy in the developing world*. World Bank, Washington, D.C.
- Steel, W. F., and Webster, L. M. (1991). *Small enterprises under adjustment in Ghana: Tech. Paper Number 138*, World Bank, Washington, D.C.
- Tan, J.-P., Lee, K. H., and Mingat, A. (1984). "User charges for education: the ability and willingness to pay in Malawi." *Staff Working Paper 661*, The World Bank, Washington, D.C.
- Thobani, M. (1983). "Efficiency and equity implications of user charges in social sector services: the financing of education in Malawi." *Staff Working Paper 572*, The World Bank, Washington, D.C.
- World Bank. (1988). *World development Rep., 1988*. Washington, D.C.
- World Bank. (1991). *World development Rep., 1991*. Washington, D.C.