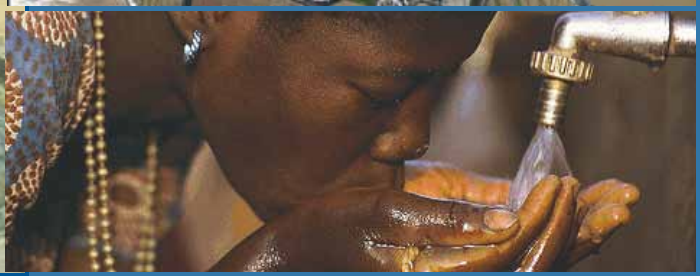
Opportunities and Challenges for Small Scale Private Service Providers in Electricity and Water Supply

Evidence from Bangladesh, Cambodia, Kenya, and the Philippines

Judy L. Baker, Editor



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PPIAF
PUBLIC-PRIVATE INFRASTRUCTURE ADVISORY FACILITY

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: feedback@worldbank.org

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EXECUTIVE SUMMARY

This study provides an in-depth look at Small Scale Private Service Providers (SPSPs) of electricity and water and is based on a recent firm-level survey conducted in Bangladesh, Cambodia, Kenya, and the Philippines. On the whole, SPSPs play an important role in service provision in areas that utilities do not reach in the countries studied, and a significant proportion of these services reach the poor. An estimated 40–70 percent of SPSP customers are poor, depending on the country and type of service provided. The existence, success, and continued viability of SPSPs in the near to medium term is, therefore, important for the provision of services to certain segments of the population in the four countries studied.

The findings of the survey analysis reveal a relatively diverse group of small enterprises with different ownership structures, business models, and levels of profitability. Services range from well-organized networks such as electric mini-grids and small private water networks (SPNs), to mobile distributors of water (tankers), and smaller operations such as battery charging stations, water kiosks, and standpipes. From the analysis of the different types of service providers, it is possible to identify some of the specific challenges facing the SPSPs and explore where substantial opportunities exist for scaling up.

Some of what is learned from the surveys is contrary to existing perceptions. For example, a majority of operators, particularly in the water sector, hold some type of license. Customer demand is reported to be relatively strong despite what appears to be mixed results on technical and quality standards. The most common reported requests by clients were for longer operating hours for the mini-grids, battery recycling services for the battery charging stations, more water and improvements in pressure for the SPNs, and more consistent supply and faster delivery times for the point source and mobile distributors.

Prices vary greatly depending on the type of service and market conditions. In general, prices are higher than those charged by the utilities (which typically reflect some subsidy), though the magnitude of difference depends greatly on the cost of delivering services. For example, water truckers charge as much as 10–15 times more per unit volume than the price of public utilities, which reflects the substantially higher cost of delivering water by truck.

SPSPs report being generally satisfied with their businesses despite facing substantial financial challenges. Many SPSPs, particularly mini-grids and some of the small private networks, are unprofitable. Financial losses are notable for the mini-grid operators in Kenya and the Philippines and for the small piped water networks in Kenya.

The major perceived constraints for the electricity SPSPs and the small private water networks were access to financing and access to electricity. For the point source and mobile distributors, the main constraints were the reliability and cost of fuel, and unfair competition.

Perceptions of future prospects were relatively positive for many of the SPSPs with the exception of the point source and mobile distributors, whose perceptions were more mixed despite generally being quite profitable.

The future potential for SPSPs varies significantly depending on the type of service provided, the country context, and the business model and profitability of specific SPSPs. Broadly speaking, providers of network services (mini-grids and small piped networks), particularly the more successful businesses, have substantial room for growth. Most mini-grids and small piped network SPSPs in the survey reported unmet demand in their existing service areas. In rapidly urbanizing countries, SPSPs will also have a critical role to play for the near to medium term as utilities try to keep up with the increasing demand for services. SPSPs might also remain the most viable approach to service delivery over the long term in remote rural areas.

When considering the policy issues related to SPSPs, the obvious goals involve ensuring quality and safety standards for the services provided, at affordable prices. Given the diversity of SPSPs, however, approaches to achieving these goals will vary greatly depending on specific country conditions and the type of provider. A few areas emerge from the findings of the study and the existing literature that would address some of the opportunities and challenges for small private service providers in electricity and water supply. These are summarized below and discussed in greater detail in the study.

- ***Recognizing and legitimizing SPSPs.*** In many countries, SPSPs are not formally recognized as part of the electricity or water sector despite a substantial proportion holding some kind of license. In some cases, they are seen in a negative light as a result of perceptions of high prices, poor quality, and informal operating practices. Formally recognizing and legitimizing SPSPs

will ultimately contribute to the goals of improving quality and affordability of services by providing better opportunities for accessing finance, ultimately lowering costs, and the cost savings could be passed on to consumers. Other potential benefits include decreasing uncertainty and risk, decreasing corruption, and creating a more favorable business environment.

- ***Ensuring an enabling business environment.*** Policies that promote a positive business environment have many known benefits. The areas that can be particularly beneficial for SPSPs include policies that support a more stable operating environment, effective institutions, access to credit markets, business development services, and that permit competition in the market to spur cost and price reductions as well as service quality improvements, which are ultimately passed on to consumers.
- ***Providing a "light" regulatory framework for SPSPs to ensure quality and safety standards without increasing costs to operators.*** In countries where quality, safety, and environmental standards of operators are low, it may be appropriate to design and implement regulations for SPSPs. For such countries, an approach favorable to small scale operators might include "light" regulation, which would involve some flexibility in service rules, working with SPSP associations to set and enforce standards, and where relevant, creating a business environment that allows for competition.
- ***Partnering with utilities.*** It is anticipated that existing utilities will eventually be able to expand services to new areas that will likely include SPSPs' current operating areas. SPSPs operating network services could benefit from new opportunities through partnerships with utilities. This may involve negotiating formal service contracts as subconcessionaires, which could include ensuring a fair bulk rate and access to utility financing for additional capital investments to improve or extend service. Such agreements would also lower risks for the operators.
- ***Supporting technical assistance.*** Vey few SPSPs report having access to any sort of training despite reported technical and quality problems. Many SPSPs would benefit greatly from technical assistance and training in a number of key areas. Such training could be provided effectively through SPSP associations, with a substantial role for donors in facilitation.
- ***Facilitating the development of associations of providers.*** In a few cases, associations of SPSPs have been very effective in helping operators by offering training and technical assistance, and in accessing finance. Such groups could also play a role in ensuring market competition, enforcing operating and quality standards through some kind of accreditation system, negotiating bulk rates with utilities, negotiating reduced taxes or duties on equipment, devising collective purchasing or investment for members, and advocating for SPSPs.

ABBREVIATIONS

BCS	battery charging station
CBO	community-based organization
EDC	Electricité du Cambodge
GNI	gross national income
HCV	handcart water vendor
KIO	water kiosk
kW	kilowatt
kWh	kilowatt hour
lcd	liters per capita per day
m^3	cubic meters
MHP	micro-hydropower
MIME	Ministry of Industry, Mines, and Energy (Cambodia)
MW	megawatt
NGO	nongovernmental organization
PNO	private network operator
PPWSA	Phnom Penh Water Supply Authority
REE	rural electricity enterprise
SHS	solar home system
SME	Small and Medium Enterprises
SPN	Small Provider Network
SPSP	Small Scale Private Service Providers
THO	tap and hose operator
TRK	water trucker
WRS	water refilling station

1.

INTRODUCTION

Many developing countries are falling short on delivering basic infrastructure services to their populations. An estimated 1 billion people are without safe water, and 1.6 billion are without electricity (Joint Monitoring Programme 2006; IEA 2004). The poor, who have limited resources and often live in remote areas, peri-urban neighborhoods, or crowded slums, are most affected by the lack of clean, safe, reliable, and affordable services.

The role of water and energy services in poverty reduction and economic growth is well known. These services raise productivity, lower production and transaction costs, create opportunities at the household level for income generation, improve agricultural efficiency, contribute to improved health and education, and free up time for other productive activities.

The majority of investments in water and sanitation and electricity have been traditionally financed by the public sector. Private investments have also played a major role, but these investments are currently inadequate to meet existing demand, leaving a gap that is expected to grow, particularly in rapidly urbanizing countries.

In some developing countries, part of the gap in service delivery has been filled by Small Scale Private Service Providers (SPSPs). SPSPs are defined as independent entrepreneurs who finance, develop, and manage the delivery of small scale services to their client base. Such entrepreneurs are also referred to as Small Scale Independent Providers, Small Independent Providers, and Small and Medium Enterprises in the literature. In water, their services range from small handcart vendors and standpipes, to tankers and private networks of all sizes. In electricity, services range from battery charging stations to solar home systems, isolated mini power grids, and the resale of electricity bought

in bulk. SPSPs also have a niche in other infrastructure sectors such as sanitation, solid waste, transport, and broader energy services, and many of the issues may be similar to those covered in this study.

The existence of SPSPs and their potential role in scaling up service delivery in water and electricity has gained the attention of the development community. SPSPs are recognized for providing essential basic services, often in low-income communities where larger providers might not go. In some areas, SPSPs may be the only viable service providers. Other recognized opportunities for SPSPs in service delivery include the potential for helping governments meet the Millennium Development Goals, the scope for individual operators to scale up over time, and the untapped private sector financing that is potentially available.

Despite their fulfillment of unmet demand, in many countries there has been a lack of recognition of SPSPs and uncertainty in how to work with them. This is attributed primarily to the following perceptions: (i) SPSPs are seen largely as temporary providers; (ii) many SPSPs are perceived to be working outside the formal sector; (iii) electricity and water are seen as "monopoly" sectors (preferred by some governments so that they have to interact with and regulate fewer entities); (iv) water supply is seen as a public good and thus not appropriate for private provision; and (v) the quality of services provided by SPSPs is perceived to be inferior.[1] As a result, in some countries SPSPs are not formally recognized by utilities or local governments. Some of this reluctance and uncertainty stems from a lack of accurate information on SPSPs—how they operate, the quality of services they provide, and the demand for their services. There is also a perception that the services they provide are priced substantially higher than market prices.

This study intends to (i) enhance what is known about SPSPs in water supply and electricity based on an extensive survey of SPSPs in four countries—Bangladesh, Cambodia, Kenya, and the Philippines; and (ii) explore emerging policy issues for countries with substantial SPSP presence to consider drawing from the broader literature and country cases.

The firm-level survey attempted to identify, map, and quantify the role of SPSPs in the water supply and electricity sectors in the four countries studied, and characterize their business models to illustrate the scale and level of importance of these providers. The survey was commissioned by the World Bank; financed by the Public-Private Infrastructure Advisory Facility, the Energy Sector Management Assistance Program, and the Water and Sanitation Program; and carried out by the firm Economisti Associati in 2005–06 under a separate initiative. The countries were selected based on a previous literature

1. *See*, for example, Kariuki and Schwartz (2005).

review (Kariuki and Schwartz 2005) that identified a subset of countries with sufficient numbers of SPSPs and country interest. Country-level case studies were also prepared and are included in appendix II.

In total, approximately 660 interviews of SPSPs were carried out, 400 for a large-scale survey and 260 for a qualitative survey of a more explanatory nature. About 200 of the surveys were of electricity SPSPs (82 battery charging stations [BCSs] and 120 mini-grids) and the remainder, were water providers (245 small provider networks and 215 point source and mobile vendors). The field surveys used face-to-face interviews with SPSP owners or managers based on typology-specific questionnaires covering a range of structural, operational, and financial issues. The same survey was used in all four countries with small country-specific alterations. For the large-scale surveys, an attempt was made to develop typology-specific sampling by identifying the SPSP "population" and selecting appropriate stratification criteria. Two sampling approaches were used: single-stage stratified sampling in Cambodia,[2] and two-stage stratified sampling in Kenya and the Philippines (Economist Associati 2007b).

The surveys used a relatively small sample size for each type of SPSP, particularly at the country level. In the case of electricity, some important SPSP operations (for example, solar home systems) were not included in the survey and are often the main alternatives to utility grids. For example, in Bangladesh and Kenya, more people are served by solar home systems than by mini-grids or BCSs. Also, given that these are firm-level surveys, data on key issues such as customer satisfaction and service quality are only available from the perspective of the operators and not from the customers themselves. However, the compiled database is reasonably large and diverse enough to permit exploratory analysis and provide a first illustrative look at the operations of small scale providers in four diverse countries.

This chapter provides an overview of small scale providers based on the literature, and presents a framework for the analysis of SPSPs. Chapter 2 looks at the issues in the electricity sector particularly related to mini-grids and BCSs from the four-country survey. Chapter 3 provides an analysis of small private water networks, and chapter 4 analyzes SPSPs of point source and mobile water service. Chapters 2, 3, and 4 are structured similarly and discuss the prevalence and role of SPSPs in each of the subsectors, key characteristics of the SPSPs, performance and service standards, their financial situation, challenges and constraints, and future prospects. Some differences in the data, country coverage, and sectoral contexts require variation in approach. Chapter 5 concludes with a summary of key findings, discusses

2. In Cambodia, stratification was based on the licensing status of operators, considered a reasonable proxy of their degree of development.

the opportunities and challenges for SPSPs in the delivery of water and electricity, and presents a set of emerging policy issues for countries with substantial SPSP presence to consider.

What Do We Know from the Literature?

Interest in the role of small scale providers has been growing in recent years as has the literature on the topic, particularly for the water sector, which reflects the stronger presence of SPSPs in that field. Their profile has been raised for a variety of reasons—the growing prevalence of SPSPs in many countries, interest in the potential role that SPSPs can play in meeting the Millennium Development Goals, and awareness that local private providers can be more efficient than utilities at reaching certain segments of the population.

The most widely cited work on small scale providers is Kariuki and Schwartz (2005), which is based on an extensive review of the literature through 2003. Other research on small scale providers includes studies by the Asian Development Bank on small water providers in a number of Asian cities (McIntosh 2003; Conan and Paniagua 2003); work published by Building Partnerships for Development on small scale providers in water in Africa and strategy work (Valfrey-Visser et al. 2006; Schaub-Jones forthcoming; Paniagua 2008); case studies financed by the Water and Sanitation Program in Africa (Mehta and Virjee 2003) and Manila (WSP 2004); a study of informal water vendors and the urban poor by the International Institute for Environment and Development (Kjellen and McGranhan 2006); and others. Ongoing work in Africa is looking at a number of case studies in the water sector, and plans under a second phase to carry out standpipe audits, and some household interviews on the informal sector (Keener, Luengo, and Banerjee forthcoming). In electricity, the literature on the topic is much less abundant and is generally included in broader studies on energy services for the poor. These include a study commissioned for the Millennium Project Task Force (Modi et al. 2004), a study linking market structure and service options for the poor (Erhardt and Burdon 2001 , and a discussion in the context of energy services in rural areas in Asia and the Pacific (UN 2005).

Few of the studies are based on systematic data of SPSPs, which is difficult to collect, though there is some quantification of the scope of SPSP coverage and discussion of the conditions under which SPSPs operate and of the main challenges and opportunities for scaling up SPSPs. Data on quality of services appears to be nonexistent. Main findings from the literature are summarized below.

SPSPs are defined as "independent owner or operator, with a significant share of capital financing (25% or more) provided or borrowed by the private entity, and on a commercial basis" (Kariuki and Schwartz 2005).

"Small scale" refers to the number of clients served, the threshold being 50,000 people or 5,000 customers in small settlements, whether urban, peri-urban, or rural. Owners and operators comprise nonprofit and profit-seeking businesses including sole proprietorships and family businesses, user associations and voluntary membership organizations, community-based organizations, and informal sector enterprises.

The typology developed by Kariuki and Schwartz (2005) for classifying the different kinds of SPSPs is based on two key parameters: (i) relationship to the source of water or electricity—*independent* or *dependent*, and (ii) the type of technology used: *networks* or *grids* (delivered to the household or point source); *point sources* (kiosks, standpipes, or dealers for water by container; or battery charging stations); and *mobile distributors* (tankers, solar panels, and diesel generator distributors). See table 1.1.

Table 1.1 Taxonomy of SPSPs

		Relationship to source	
		Independent (develop own source)	**Dependent (supplied by larger utility)**
Technology	***Grid or network***	Integrated production or generation with transmission and distribution	Purchase water or electricity and on-sell through mini-grid or network
	Point source	Fixed-location vendor, with own source	Fixed-location vendor, connected to utility
	Mobile distributors	Mobile vendor, with own source	Mobile vendor, connected to utility

Source: Kariuki and Schwartz 2005.

The existence of SPSPs is considered to be widespread. The literature review through 2003 (Kariuki and Schwartz 2005) estimated that 7,000 operators provided electricity in 32 countries, and 10,000 provided water in 49 countries; this likely only reflects a portion of the total number of SPSPs The level of SPSP activity was found to be high in about 15 of these countries, primarily in rural areas and small settlements. For the Asian cities of Cebu the Philippines; Ho Chi Minh City, Vietnam; Jakarta, Indonesia; and Manila, the Philippines, it was estimated that 20–45 percent of all households were getting their water from SPSPs (McIntosh 2003). In Delhi, India; Dhaka, Bangladesh; and Kathmandu, Nepal, this figure was estimated at 5–10 percent (McIntosh 2003). Similar estimates were not available for electricity.

The literature on the conditions under which SPSPs exist is relatively consistent. SPSPs are noted to be more prevalent where

- coverage levels are low;
- the main operator or utility does not provide service and technical conditions make expansion difficult or prohibitive (including remote rural areas and small towns where service provision is viewed as unprofitable, peri-urban areas that may be far from existing networks, and slums where there are concerns that residents do not have the ability to pay and issues of land tenure);
- there is strong user demand (identified through willingness to pay);
- local conditions (particularly hydro-geological) make it viable;
- there is local capacity for investment and management; and
- service areas are in weak or failed states or in postconflict countries.

The characterization of SPSPs in the literature describes much variety in operations, including a range of technologies, organization forms (both for profit and nonprofit), and capital needs. The operations tend to be relatively small with most having fewer than 10 employees. Their operations are cost effective, though few SPSPs provide both water and electricity services (despite potential economies of bundling for customer billing, meter reading, management, and electricity purchases for water pumping). Financing appears to mostly come from sources other than formal banks and includes own earnings and savings, loans from friends and family, and money borrowed from formal and informal lenders (Kariuki and Schwartz 2005).

The financing SPSPs obtain is generally more expensive and financing costs are passed on to consumers through higher tariffs. Typically, however, consumers do not pay high connection fees for service from SPSPs as is often the case with formal utilities. Also, with few if any alternatives, consumers appear to be willing to pay for service, especially if it is reliable.

Discussions of the constraints for SPSP operations include lack of legal status and a supportive regulatory framework; excessive government interference; difficulties in obtaining sufficient and affordable finance; low technical and managerial standards, resulting in comparatively poor service quality; land insecurity in peri-urban and slum areas; and in parts of Africa (Ghana, Mali, and Mauritania), a lack of autonomy in tariff setting (Valfrey-Visser et al. 2006).

The literature reviewed included little, if any, data on government perspectives of SPSPs. Much of what is discussed is anecdotal; this would be an important area for further investigation, particularly at the country level.

A Framework for Characterizing SPSPs in Water and Electricity

For the purposes of this study, SPSPs are defined using the characteristics cited above, which define "private" and "small scale" operations (Kariuki and Schwartz 2005). With regard to technology, the three broad categories—grid or network, point source, and mobile distributor—are used. The typology of this study results in six categories as described in box 1.1.

BOX 1.1

Basic Features of SPSP Categories

Private Network Operators. Private network operators supply water through fixed connections, using piped systems of varying length and complexity. Private networks were found to be operating in three countries: Cambodia, Kenya, and the Philippines. Water was sourced primarily from wells, springs, and rivers, with only a few operators relying on water supplied by utility companies.

Point Source Vendors. Water kiosks and standpipes are very simple operations, consisting of a pipe connecting the water source with the distribution point (tap or standpipe), where water is distributed to customers who fill their own containers. Water kiosks were studied in Bangladesh, Kenya, and the Philippines. In Bangladesh and Kenya, water is mainly sourced from public utility companies, whereas Filipino operators mostly rely on their own wells.

Mobile Water Vendors. This group includes two types of operators: (i) handcart vendors, who deliver small volumes of water using drums or barrels placed on carts or rickshaws; and (ii) water truckers, who deliver larger volumes over longer distances using trucks equipped with water tanks. In Cambodia, mobile vendors mainly rely on surface water sources or wells, whereas in Bangladesh, Kenya, and the Philippines, water is mainly sourced from public utilities or other private operators, such as water kiosks.

Value Added Water Vendors. This group includes two types of operators, the Filipino *water refilling stations* and the *treated water distributors* found in Bangladesh. These SPSPs combine some of the features of both water kiosks and mobile suppliers—water is sold on the spot in bottles or delivered to clients' homes or businesses using a variety of vehicles. However, the distinctive trait is the use of fairly sophisticated water treatment systems, which allows these operators to sell *purified water* to commercial clients and middle-class households at a multiple of the prices charged by other water SPSPs and utilities. Water is normally sourced from public utilities.

(continued)

BOX 1.1

Basic Features of SPSP Categories *(continued)*

Grid Operators. Grid operators in the electricity sector are the counterpart of the water sector's piped networks, distributing power through wired networks. The group includes (i) micro-hydropower schemes in Kenya and in the Philippines, as well as schemes making use of diesel generators, such as (ii) Cambodia's rural electricity enterprises, and (iii) Bangladeshi market electricity providers.

Battery Charging Stations. Battery charging stations are simple point source operations, charging automotive batteries used for light and power by people not connected to the grid. In Bangladesh, Kenya, and the Philippines, the bulk of BCSs rely on electricity purchased from public utilities, whereas in Cambodia they normally rely on diesel generators.

Source: Economisti Associati 2007a.

The size of the SPSP sector varies significantly across the countries in this study. SPSPs are most prevalent in Bangladesh and the Philippines, followed by Cambodia and Kenya. The difference in the prevalence of SPSPs is primarily linked to the level of service provided by the public utilities in those countries (Economisti Associati 2007a). Other factors include (i) hydro-geological conditions (which facilitate direct access to groundwater in Bangladesh); (ii) institutional issues (particularly in urban areas where working with public utilities is key); and (iii) cultural factors (areas with high social cohesion are more able to form community-based organizations capable of running complex schemes).

SPSPs supply proportionally more service in the water sector than in the electricity sector. This is attributed to two factors: (i) water is more of a necessity than electricity so the demand for service is greater; and (ii) power generation and transmission is more complex than water abstraction and distribution. The exception is battery charging, which does not present significant barriers to entry and therefore is quite prevalent (Economisti Associati 2007a). Thus, there are actually more SPSPs in electricity—but the vast majority are marginal providers, particularly BCSs, which run small operations on a part-time basis. Water operators tended to be primary operators, who are more well-established, mainly serve households, and are the chief source of water for their customers. SPSPs operate in both rural and urban areas in each country except Cambodia, where SPSPs are mainly found outside the largest cities.

The ownership and organizational features of the SPSPs in this study fall into two distinct groups (i) fully private, profit-seeking entities; and (ii)

community-based organizations (CBOs) that are run as commercial entities (without recurrent subsidies in operations). CBOs operate all of the small piped water networks and micro-hydropower schemes in the Kenya sample, and 12 percent of the small piped water networks (water cooperatives) and all the micro-hydropower schemes in the Philippines. In Kenya, the management of CBO networks is entrusted to an elected committee and the labor force largely comprises members of the CBO, often working on a part-time basis. Typically, CBOs received existing assets through initial grants and thus operate under circumstances different from those of fully private operators. This is reflected in the financial data on SPSP operations of CBOs, particularly in Kenya.

Country Context

The four countries included in the study are diverse (table 1.2), each with its own set of challenges in improving access to water and electricity. Case studies of the four countries are included in appendix II and describe the country context, provide an overview of the water and electricity sectors, and summarize the main findings of the small scale provider survey at the country level.

All of the countries have substantially improved access to water and electricity services in the past decade. Yet segments of their populations have not been reached. The underperforming utilities in the urban areas of Bangladesh are struggling to serve current customers and have limited ability to expand services into rapidly growing peri-urban areas. In rural areas, arsenic contamination has substantially reduced access to safe water.

In Cambodia, water and electricity services are concentrated in urban areas with rural areas primarily served by small scale private operators. The government has acknowledged the importance of the small scale operators and has designed programs to support their further development through a strategy to expand provision in rural areas (see box 5.1).

In Kenya, access rates to water and electricity are low, particularly in rural areas. Though access rates on the whole are substantially higher in urban areas, the average rates mask the very low coverage in poor urban neighborhoods. The government has initiated major sector reforms in both water and electricity over the past decade, but implementation has been slow with much demand for services remaining unmet.

Of the four countries the Philippines stands out, with per capita income two to three times higher than the other countries, and much higher rates of access to water and electricity. Yet coverage gaps persist, and with rapid urbanization the rate of access to improved water supply actually dropped two percentage points in cities between the late 1990s and 2003. Quality of service is also a major issue.

Table 1.2 Comparative Data from Country Cases

Indicator	Bangladesh	Cambodia	Kenya	Philippines
GNI per capita (Atlas method)	470	540	680	1620
Population (in millions)	158.6	14.4	37.5	87.9
Population below the national poverty line (%)	49.8	35.0	52.0	25.1
Urban population (% of total)	26	20	21	63
Urban population growth (annual %)	4	5	4	3
Surface area (thousands of square kilometers)	144	181	580	300
Infant mortality rate (per 1,000 live births)	52	65	79	24
Improved water source access (% of population)	80	65	57	93
Improved water source access, rural	78	61	49	88
Improved water source access, urban	85	n.a.	85	96
Electricity access (% of population)	43	15	16	77

Sources: Development Data Platform, World Bank, 2009.

The next three chapters review the operations of SPSPs and the role they play; discuss the characteristics of the providers and their businesses; analyze the technical and financial performance of SPSPs; and examine the challenges, constraints, and future business prospects of SPSPs in the four countries included in this study. The analysis reveals interesting findings that merit consideration in thinking about future opportunities and challenges for SPSPs.

2.

SMALL SCALE PRIVATE SERVICE PROVIDERS OF ELECTRICITY

Bringing modern energy services to the poor is an enormous challenge. Today, an estimated 1.6 billion people lack access to electricity. In most developing countries, efforts to develop innovative ways to deliver modern energy services to the poor confront formidable institutional and regulatory barriers. These barriers affect rural and urban areas alike. In rural areas, remoteness and low-density demand raise the costs of electrification to nearly prohibitive levels. In urban areas, rapidly growing unplanned slums and small towns pose substantial challenges to the energy sector. Both grid and off-grid solutions to provide electricity access require careful design and skillful implementation and a level of capacity that is frequently not available in the public sector of developing economies.

In some cases, small scale providers are better positioned than central utilities to deliver decentralized and small scale electricity services because they are usually managed by local entrepreneurs who are in proximity to end users, are typically more flexible in the use of technology based on locally available resources, and are well integrated into the local social fabric. There are, however, challenges in running these small scale operations. This chapter provides a close look at the opportunities and challenges for small scale service providers providing two types of electricity services, mini-grid and battery charging stations (BCSs), in Bangladesh, Cambodia, Kenya, and the Philippines.

Prevalence of SPSPs in Electricity

The prevalence of small scale private service providers (SPSPs) in the electricity sector varies from country to country but a majority in all four countries are BCSs. Bangladesh had more than 12,000 BCSs, but most operators pro-

vided limited services on a part-time basis. Grid operators play an important role in Cambodia, particularly in rural areas where they provide services to an estimated 42 percent of the rural population with access to electricity. Grid operators in Bangladesh are widespread, but mostly serve commercial clients, so the proportion of the population served is small. Table 2.1 summarizes the prevalence and coverage of SPSPs in electricity in the four countries in this study.

Table 2.1 Prevalence of SPSPs in Electricity

Country	Type of enterprise	Main source of power	Estimated number of SPSPs, 2005	Estimated number of people served	Estimated percentage of population served	
					Relevant population	Among entire population
Bangladesh	Market electricity providers	Own generators	2,000–3,000	30,000	< 1	< 1
	Battery charging stations	Public utility	12,200	360,000	2	1
Cambodia	Rural electricity enterprises	Own generators	300	100,000	42	4
	Battery charging stations	Own generators	8,000	> 400,000	> 20	15
Kenya	Micro-hydropower schemes	Gravity schemes	35–40	2,000–3,000	< 1	< 1
	Battery charging stations	Public utility	> 1,000	> 50,000	1	1
Philippines	Micro-hydropower schemes	Gravity schemes and reservoirs	60–65	2,000–3,000	< 1	< 1
	Battery charging stations	Public utility	Unknown, but small			

Source: Economisti Associati 2007.

Note: Relevant population refers to the population that allows for a meaningful contribution of a certain SPSP typology. For example, for the Bangladesh battery chargers, the relevant population is the total population without access to a stable form of electricity.

Key Characteristics of SPSPs in Electricity

This section discusses the main characteristics of SPSPs in electricity including the organizational features and sector experience, skills and employment of SPSP operations, the client base, and business infrastructure.

Organizational Features and Sector Experience

The electricity SPSPs in the countries in this study are run as private or as community-based enterprises. The majority of the private enterprises are sole proprietorships. In Cambodia and Bangladesh, all BCSs and mini-grids are private. Only the micro-hydropower schemes in Kenya and the Philippines are run by community-based organizations (Box 2.1).

Most SPSPs operate in informal or semi-informal markets, do not hold a license, and do not pay taxes. However, about half the service providers surveyed were inspected by licensing agencies in the previous year though this statistic was lower for BCSs and almost nonexistent for the mini-grids in Bangladesh.

About two-thirds of mini-grid operators consider their businesses a principal source of income. In the special case of the community-based electricity supply schemes in Bangladesh and Kenya, the services are stand-alone businesses and provide the main source of income for the operators. Only 40 percent of BCSs consider their business as a principal source of income. Among the SPSPs relying on alternative activities as the main source of income, the dominant business areas are retailing and trade for the BCSs (65 percent), and agriculture for the mini-grids (51 percent, particularly high in Bangladesh).

BCSs have been in business longer than mini-grids, with an average of 7 years of operation overall. In Cambodia, mini-grids have been in operation for 8.5 years on average and hydroelectric schemes for 5 years. Mini-grids in Bangladesh have been in operation for only 4.4 years. Business tends to be subject to seasonal fluctuations, particularly for mini-grids, mainly because of variations in demand. Nonetheless, the businesses operate throughout the year in urban areas and for at least 10 months of the year in rural areas.

Skills and Employment

Contrary to what might be expected, the direct employment effects of SPSP operations tended to be modest. Analysis of mini-grids shows that the most important determinant of employment was revenue, and the smaller the grid, the less staff needed. Because the customer-to-employee ratio for the grids tends to be comparatively low, larger and more efficiently operated grids would involve lower employment rates (per customer, per kilometer of network, and so forth). Battery charging is, by the nature of the business, a small scale undertaking with little scope for employment. The average number of full time staff is 1.3 for the BCSs surveyed (appendix tables IA.1, IA.2).

The SPSP operators reported relatively low levels of education with only about 20 percent having a technical secondary school or university degree. Skills development and capacity building were not raised as major concerns by most SPSPs when interviewed.

Clients

The majority of mini-grids (87 percent) and BCSs (71 percent) serve rural areas, with most clients at the household level. The exception is Bangladesh, where most clients are shops and other commercial premises. SPSPs reported that about one-half of their customers are poor, with an even higher share of poor for the micro-hydropower schemes and urban BCSs (appendix tables IA.3, IA.4).[3]

The customer base is relatively stable or growing, suggesting positive demand for service. Business satisfaction was also high among the SPSPs, although a number of providers, especially among the mini-grids, face severe financial difficulties and fail to break even (discussed below).

Business Infrastructure

Given that most operators are in the informal sector, it is not surprising that business accounting is weak. Only half of the operators reported keeping written records of expenses and revenues, and even fewer do tax accounting. Bookkeeping standards are particularly low among the BCSs. Most SPSPs have a mobile phone that facilitates their business operations. Only 7 percent have a computer.

The main electricity sources differ by type of operation. Most BCSs procured electricity from electric utilities. All mini-grids generated the electricity they supply with their own facilities (table 2.2). Most BCSs used AC chargers and charged, on average, four batteries per day in Bangladesh and the Philippines, 7 in Kenya, and 41 in Cambodia table 2.3). The comparatively high rate of daily charges in Cambodia is due to the widespread use of AC/DC generators.

The range of generation capacity was wide, with a low of 2.9 kilowatts (kW) for BCSs operating with their own generators, 10.4 kW for micro-hydropower schemes, to 146 kW for the Cambodian networks. Among mini-grids, installed generation capacity runs from 0.5k W to 850 kW. Most mini-grids consisted of low-voltage networks and the median length of the grids was four kilometer (km). Almost two-thirds of the mini-grids were subject to daily or weekly inspections.

Customer metering was rare except in Cambodia, where about half the connections were equipped with meters.

3. This estimation of poor clients is entirely subjective, based on the perceptions of the SPSPs interviewed.

Table 2.2 Business Infrastructure: Mini-Grid Operators

Country	Main source(s) of power	Installed capacity (kW)	Length of network (km)	Value of assets (US$)
Bangladesh	Own generators	20.0	0.7	2,000
Cambodia	Own generators	146.0	4.4	53,300
Kenya	Gravity schemes	5.8	2.6	28,000
Philippines	Gravity schemes and reservoirs	2.3	1.4	6,500
Total grids (mean)	n.a.	103.0	3.4	38,795

Source: SPSP survey 2006.
Note: n.a. = Not applicable.

Table 2.3 Business Infrastructure: Battery Charging Stations

Country	Main source(s) of power	Batteries recharged per day	Hours required to charge a battery	Value of assets (US$)
Bangladesh	Public utility	4	15.3	350
Cambodia	Own generators	41	6.5	1,200
Kenya	Public utility	7	17.4	800
Philippines	Public utility	4	14.0	2,100
Total BCSs (mean)	n.a.	14.2	13.5	626

Source: SPSP survey 2006.
Note: n.a. = Not applicable.

Almost one-half of the SPSP operators reported plans to invest in new assets in the coming year, particularly the micro-hydropower schemes (65 percent). The most frequently mentioned areas for investment include the following:

- Buying or refurbishing charging equipment (51.9 percent) and buying or refurbishing generators (25.9 percent) among the BCSs in all four countries,
- Buying or refurbishing diesel generators (73.7 percent) among the mini-grids in Bangladesh,
- Buying or refurbishing hydropower generation equipment (46.2 percent) and expanding or refurbishing of networks among the micro-hydropower schemes in all four countries, and
- Expanding or refurbishing networks (85.4 percent) among the mini-grids in Cambodia

Performance and Service Standards

Many of the mini-grid operators reported that they fail to meet national service standards, yet when judged by network losses and customer density, performance is comparable to the standards of utilities. In Kenya, for example, the performance of the mini-grids resembles that of the public utility, as measured by both network losses and customer density. The mini-grids' most challenging feature from a business perspective is that they tend to serve extremely small loads, with a very low ratio of customers to employees. This has implications for profitability, as discussed later in this chapter.

The number of battery charges per day for BCSs varied greatly, from 1 to 80 with a median of 5. The median charging period was 10 hours, and the number of weekly charges per customer was less than one (0.8).

Reliability of supply is a problem, but only to a limited degree as is indicated by the reported failure rates of equipment. Only about 7 percent of the BCSs and 17 percent of the mini-grids reported being exposed to "frequent" or "very often" failures. The biggest concern seems to be service duration, consistent with customers' reported priority improvement request for longer operating hours (see section on customer complaints later in this chapter).

Although the surveyed mini-grids generally do not live up to the service quality required by national standards and codes, this disadvantage does not seem to be a big concern for customers (though they have limited options) as reported by the operators.

Treatment of Waste

Almost three-quarters of the SPSPs reported that they generate some sort of waste with a majority reporting that the material is disposed of through waste collection companies or points. This is particularly challenging for BCSs confronted with the problem of used batteries, though most report that they are stored safely or recycled. The data imply that about 20 percent of battery chargers dispose of waste in a hazardous way although this may have improved since the time of the survey because of increased lead prices.

Safety

A small proportion of the mini-grids (6 percent) and a larger share of the BCSs (13 percent) reported that accidents have injured their employees. Most of the accidents were related to battery charging (battery explosion and acid injuries). Injury to customers was relatively low (7 percent), and most occurred in Cambodian mini-grids. None of the reported accidents were fatal. Assuming that the reported mini-grid accidents were single events on a per year basis, the sample accident rate would be 1.5 per 100 staff, which compares well with industry statistics (see, for example, Eurelectric [2001]).

Problems with Equipment

The equipment used by the SPSPs appears to be reasonably reliable. About 13 percent of the SPSPs had problems "frequently" or "very often." The most common problems for the mini-grids were engine breakdowns and broken or stolen conductors, and for the BCSs, failures of the charging equipment and the generators. Accessing spare parts was reported to be a problem for about one-third of the SPSPs.

Network Loads and Customer Ratios

The most distinguishing features of the mini-grids were their comparatively low customer-per-employee ratios and the small average loads served (measured by customers per kW installed), which suggests that electricity sales per employee are also very low. The number of customers per km of network (customer density) varied significantly, from a high of 208 in rural Bangladesh to a low of 37 in rural Philippines. Network losses ranged from 5–70 percent but were, on average, 28 percent. These losses are rather high and tend to be greater when larger loads are served. Table 2.4 summarizes the performance of mini-grids on key indicators.

Table 2.4 Sample Performance Indicators for Mini-Grids by Country

Country	Area	Network losses (%)	Customers per km	Customers per employee	Customers per kW installed
Bangladesh	Urban	9.0	183	63	5
	Rural	9.4	208	135	7
Cambodia	Urban	38.3	116	73	3
	Rural	32.7	104	108	3
Kenya	Urban	n.a.	n.a.	n.a.	n.a.
	Rural	19.0	48	38	19
Philippines	Urban	n.a.	n.a.	n.a.	n.a.
	Rural	17.5	37	46	15

Source: SPSP survey 2006.

Note: n.a. = Not available.

For comparative purposes, table 2.5 presents data on the performance of selected electric utilities operating in the four survey countries as well as in Nepal (poor performance) and in Thailand (excellent performance). While the comparative data are interesting, there are substantial differences between the operations and performance of large scale utilities and small scale providers. However, the following observations stand out:

- In Kenya, the mini-grids' reported network losses are similar to the national average for Kenya Power and Lighting Company (KPLC). In Cambodia and the Philippines, the losses significantly exceed those of comparator utilities, although the comparison with MERALCO, a well-managed urban-area utility, is not quite fair. Conversely, the losses reported by the Bangladeshi mini-grids are lower than those recorded for DESCO (Dhaka), most likely as a result of the small loads served by the Bangladeshi mini-grids.
- In Kenya and Cambodia, customer density for the mini-grids is somewhat lower than that for the national utilities. In Bangladesh, however, the mini-grids' customer density is higher than in the greater Dhaka service area (supplied by Dhaka Electric Supply Company [DESCO]). In the Philippines, the low customer density of the mini-grids is not comparable with that of the urban utility MERALCO.

Table 2.5 Performance Indicators of Selected Utilities

Utility	Network losses (%)	Customers per km	Customers per employee	Customers per kW installed	MWH per employee
DESCO Bangladesh	13.4	131	445	0.70	2.4
EDC Cambodia	12.1	144	104	0.97	418.0
KPLC Kenya	18.7	43	129	0.14	904.0
MERALCO Philippines	10.1	2.7	728	0.42	4.2
NEA Nepal	26.2	28	168	2.26	263.0
PEA Thailand	4.9	33	480	0.50	2.9

Sources: Data on performance of utilities came from recent annual reports—KPLC: www.kplc.co.ke; DESCO: www.desco.org.bd; MERALCO: www.meralco.com.ph; PEA: www.pea.co.th; NEA: www.nea.org.np; EDC: www.edc.com.kh.

Note: MWH = Megawatt hour.

Further analysis was carried out to classify the performance patterns of the mini-grids; the analysis confirmed the challenge of low customer-per-employee ratios and small average loads.[4] The results suggest that the Cambodian mini-grids are the worst performers with respect to network losses and that the mini-grids in rural Kenya and in the rural Philippines rank lowest with regard to customer density. Also, there is evidence that service areas with high shares of residential consumers and large proportions of poor households tend to have comparatively high network losses and low customer density.

Customer Complaints

Data on customer complaints are reported from the perspective of the electricity SPSPs in all four countries. About 45 percent of the providers reported customers' complaints to be "rare" or "very rare," and only 16 percent reported frequent complaints. The main complaints include

- low or unstable voltage or brownouts (25 percent),
- shortage of electricity supply (15.6 percent, but only for micro-hydropower schemes),
- inaccurate metering (9.4 percent, but only in Cambodia), and
- duration of supply or operating hours (9.4 percent, but only for mini-grids in Cambodia).

More than half of the SPSPs (58 percent) reported that their customers asked for additional services, particularly for the hydroelectric schemes (70 percent). These requests to the mini-grids were primarily for longer operating hours (75 percent), but also for wiring services (41 percent), renting of electrical appliances (18 percent), and battery charging (12 percent). For the BCSs the top requested additional services were battery recycling (42 percent), battery renting (29 percent), and home collection and delivery of batteries (26 percent).

Financial Situation

The discussion on the financial situation of electricity SPSPs looks at findings on service pricing, payment discipline, competition facing SPSPs, sources of finance, costs, sales revenue and profit margin.

4. Principal components analysis was carried out on the following variables: network losses, customer density (customers per km), customers per employee, and customers per kW. Principal components is a standard statistical procedure that can be applied in an attempt to "explain" the behavior or structure of observed variables through a smaller set of components and their loadings (correlation coefficients), which are computed as linear combinations of the observed variables.

Service Pricing

The approach used by the electricity SPSPs in setting fees depends on the service. All BCSs charge a flat rate depending on the battery's storage capacity. The micro-hydropower schemes and the mini-grids in Bangladesh charge a monthly flat fee or flat rates based on the number and type of electric appliances. In Cambodia, charges are based on metered or estimated consumption. Only SPSPs in Kenya apply connection charges.

Prices are set at the discretion of the service providers. Cost-based pricing is the preferred method for the majority of the mini-grids (70 percent) and BCSs (58 percent). The BCSs tend to be more sensitive to customers' ability to pay, with a third reporting that they would consider what customers could afford to pay, twice the proportion of mini-grid operators who would consider ability to pay.

The data provide little information on tariffs and costs per kilowatt hour (kWh) sold or delivered for the mini-grids. In Cambodia, per unit tariffs are charged only if actual consumption is metered. For those cases for which data were available, the average rate for residential customers was 0.71 US$/kWh (2,923 Cambodian riels/kWh), which is about 50 percent higher than the Cambodian mini-grids' reported unit costs (US$0.46/kWh), and more than three times the tariff at which electricity is sold by public utilities (US$0.22/kWh).[5] The tariffs charged by utilities, however, reflect some subsidization.

The average monthly flat fees charged by mini-grids that did not use meters ranged from US$1.70 (Bangladesh) to US$2.00 (Kenya). Data on actual generation and sales were not available, but considering the average generation capacity installed per customer (0.5 kW in Kenya and 0.17 kW in Bangladesh) and assuming a load factor of 0.15, the flat fees would translate into US$0.37/kWh for the Kenyan mini-grids and US$0.09/kWh for the Bangladeshi mini-grids. These per unit rates exceed those levied by public utilities by a factor of 1.90 in Kenya, 1.52 in Cambodia, and a factor of 1.14 in Bangladesh.

The price differential between battery charging fees, expressed on a per -kWh basis, and electricity tariffs charged by public utilities tends to be much larger than the spread between tariffs charged by mini-grids and public utilities (appendix table IA.5).

Payment Discipline

Two-thirds of the SPSPs, both BCSs and grid operators, reported that most customers pay their bills on time. The exception was Bangladesh, where 45 percent of the mini-grid operators complained that most customers do not pay on time. Overall, the ratio of bad debt (losses) to sales revenues tends to be low (3 percent). It is highest for the micro-hydropower schemes (12 percent).

5. The reported unit costs do not include depreciation.

Almost all of the SPSPs charge no late payment fees. About 60 percent of mini-grid operators said that they would respond to nonpaying customers by disconnecting them immediately or after a reasonable period. The average disconnection rate (as a proportion of the customer base) was 6.6 percent overall, lowest in urban Cambodia (0.2 percent) and highest in urban Bangladesh (11.8 percent). Disconnecting nonpaying customers appears to be instrumental in collecting revenues: 71 percent of the customers disconnected settled their bills and were reconnected.

Competition

BCSs operate in a more competitive environment than mini-grids, with more than two-thirds reporting competition with other service providers. Only about a third of mini-grid operators face competition. Little competition occurs between BCSs and mini-grids, confirming the view that BCSs do not operate in areas supplied with grid-based electricity. Most SPSPs reported that they face no competition from public utilities, simply because they operate in service areas not covered by public or private utilities. The SPSPs generally did not indicate any interest in establishing special partnership arrangements with existing public utilities when asked in the survey.

Intra-sector business competition is strong among BCSs because the battery charging market can be entered (and exited) easily. In contrast, almost two-thirds of the surveyed mini-grids face no direct competition. This does not come as a surprise, because setting up parallel grid-based supply structures is not efficient, and because switching to the alternative of stand-alone electricity generation would not be cost-effective (unless the load is sufficiently large or the load cannot be met by on-grid supply). In principle, there might be potential for competition with off-grid solutions (for example, solar home systems) when there are new customers or new service areas (grid extension), but these scenarios were not covered in this study.

Overall, the survey results corroborate the view that SPSPs tend to perform gap- filling energy services. However, the presence of SPSPs does not seem to be a simple function of the size of service gaps. Kenya has the lowest electrification rate (about 15 percent) of the surveyed countries, but the mini-grid population is relatively small and the financial performance of Kenyan mini-grids is as dismal as that of the hydroelectric schemes in the Philippines, where the electrification rate is highest (81 percent).

Sources of Finance

Most SPSPs rely on own funds (67 percent) for investment finance, and in planning for future investments more than half the SPSPs reported that they would use own funds. Most SPSPs have no checking or savings accounts.

Only a small proportion received a credit line from a financial institution (15 percent) and another 15 percent borrowed from an informal lender. Grant financing was counted on by 13 percent.

Whether the large proportion of own funds used in investment financing reflects a preference of the SPSPs or is a result of constraints is unclear. Some SPSPs (notably in the Philippines) report that limited access to and the high costs of debt finance pose a major obstacle. For the mini-grids this perception is validated by a strong correlation between gloomy business prospects and concerns about the cost of finance. For the BCSs the survey data show a negative correlation between profit margins and perceived borrowing constraints (high cost of finance). At a minimum, these findings suggest that the cost of finance is deemed a bigger problem than access to finance.

Costs

The main operating cost for diesel-based mini-grids was fuel (83 percent of the operating costs in Cambodia and 68 percent in Bangladesh). The largest cost component of the mini-hydropower schemes was labor (51 percent in Kenya) and maintenance (49 percent in the Philippines). The largest expense for BCSs was for generating or purchasing electricity, which accounted for 44 percent of total costs in Kenya and the Philippines, 57 percent in Bangladesh, and 94 percent in Cambodia.

Sales Revenue

Annual sales revenue ranged widely, with median revenues of US$4,750 for mini-grids and US$610 for BCSs. Rural and urban area average revenues differed only slightly except for mini-grids in Cambodia, where sales revenues in urban areas were three times higher than in rural areas.

Analysis of the main factors influencing sales revenue shows total revenue for the mini-grids can be explained by grid size, the number of customers, the installed generation capacity, and the number of employees, all of which are related to the size of the network.[6] For BCSs, revenue is positively associated with the share of household customers, but there is no relation between revenue and the share of poor households.

Profit Margin

While more than 90 percent of BCSs reported making profits, a large number of mini-grids (41 percent) suffer financial losses, particularly in Kenya and

6. Stepwise regression is performed by backward elimination of variables that are insignificant (as per t-tests), that is, by keeping the variables according to the strength of their correlation with the criterion variable. While the procedure has a number of flaws if used for model building or selection, it is effective for data mining (that is, to identify a variable with a statistically significant impact.

in the Philippines.[7] The average profit margin (ratio of profits to revenue) was highest for rural BCSs (28.9 percent), followed by urban BCSs (27.4 percent), urban grids in Bangladesh (26.1 percent), rural grids in Bangladesh (20.3 percent) and rural grids in Cambodia (3.7 percent). Exploration of the data did not turn up significant variables explaining the differences in profitability. It can be concluded, however, that profitability seems to be decisive in determining SPSPs' perception of a successful business.

The key to profitability for the BCSs is in the large differential between the battery charging prices and the purchase cost of electricity (appendix table IA.5).[8]

Challenges and Constraints

The surveys asked SPSPs about their perceptions of 17 business constraints. The most frequently cited business constraints (classified as "severe" or "very severe") were electricity-related problems and financial constraints. Other commonly mentioned constraints are listed below. Of the 17 constraints listed in the questionnaire, the only one not chosen by the SPSPs was the customer's poverty level. The following were ranked as "severe" or "very severe" business constraints by SPSPs:

- Electricity, which includes concerns such as cost of electricity or fuel and load shedding (49 percent);
- Access to finance (37 percent), notably in the case of micro-hydropower schemes (79 percent), whereas in Bangladesh, 65 percent of the mini-grids, 58 percent of the micro-hydropower schemes, and 57 percent of the BCSs do not consider access to finance as a constraint;
- Macroeconomic uncertainty (34 percent), particularly for micro-hydropower schemes (63 percent);
- Cost of finance (34 percent), particularly for micro-hydro schemes (53 percent); in contrast, 90 percent of the mini-grids in Bangladesh consider the cost of finance as no obstacle;
- Transport (20 percent);

7. Data on profits and losses generated by SPSPs are based on the difference between reported sales revenues and reported cash operating expenses, adjusted for asset depreciation, which was calculated by the interviewers. The data on profitability is somewhat incomplete; it covers only 67 BCSs and 88 mini-grids. There is no information available on whether and to what extent the SPSPs surveyed receive subsidies. In the case of BCSs it is safe to assume that the businesses are subsidy-free. Mini-grids are more likely to enjoy financial support through special funds, donor money, or direct budget transfers, but the role of subsidies cannot be put into perspective because of the lack of data.

8. Average battery charging fees are expressed in $/kWh and have been inferred from the battery charging rates for different storage capacities, assuming a discharge rate of 90 percent.

- Crime and theft (17 percent);
- Telecommunications (14 percent);
- Licensing and permitting procedures (13.4 percent);
- Anticompetitive behavior (10.4 percent); and
- Labor regulations (10 percent).

Future Prospects

Almost three-quarters of the electricity SPSPs interviewed were "very satisfied" or "fairly satisfied" with their business. The highest level of dissatisfaction was among the micro-hydropower schemes (35 percent in Kenya and in the Philippines), which is not surprising given that most of the schemes are suffering a loss. Generally, the SPSPs are positive about their prospects for the future, with close to 70 percent expecting that they will "probably" or "most probably" still be in business in two years.

There is also substantial room for growth, particularly by the mini-grid operators. Three-quarters of the mini-grid operators reported unconnected households in their service areas. While information on why potential customers have not yet been connected is not available, explanations may include that (i) mini-grid operators often only connect the core of a village (which is clustered enough to allow for good cost recovery) and the unconnected households may be outside the village core, or (ii) network expansion takes time. In any case, there are indicators of expanding services: 60 percent of the mini-grids with unconnected customers reported customer growth during the previous year, and 87 percent of the mini-grids with plans to undertake investments in the coming year are said to have a potential for new customers. Some areas might improve profitability by adding more commercial clients, which would improve the use of electricity during off-peak hours, thus increasing productivity.

Mini-grid operators who thought their business situation would deteriorate over the next two years reported that their businesses had already turned worse in the previous two years, that their share of household (versus commercial) customers was large, and that the cost of finance and lack of skills were strong constraints. Thoughts of future business deterioration are also negatively correlated with macroeconomic uncertainty, suggesting that macroeconomic instability is deemed to have an adverse impact on future business. Perceptions of future prospects were comparatively worse in urban areas. Operators of BCSs who believed their business would deteriorate tended to have low shares of household clients and low profit margins, and saw a decline in the past two years.

Those SPSPs that make losses reported being dissatisfied with their businesses. Yet a relatively small number—only 15 percent of the SPSPs inter-

viewed—were "fairly" or "very" dissatisfied with their business, and only 10 percent feared that they would "probably" or "most probably" be out of business in a two-year time span. Judged by business perceptions, the short-term outlook for most SPSPs in electricity appears to be favorable.

Box 2.1

The Role of Community-Based Organizations in the Provision of Electricity in Rural Kenya

Micro-hydropower schemes in Kenya are typically run by community-based organizations and are small operations. The literature discusses several successful cases in remote areas of Kenya that were initiated with technical assistance through nongovernmental organizations. In the Tungu Kabiri Community, a small grant ($64,000) was given by the Small Grants Program of the Global Environment Fund to Intermediate Technology Development Group–Eastern Africa to set up a hydropower scheme. Some 200 households came together to form a commercial enterprise to own and operate the plant. Each individual purchased a share in the company, with the maximum share having a value of approximately $50. The 200 members contributed free labor and participated in building a run-of-the-river, "penstock" type micro-hydropower system, dedicating one day per week for over a year. In addition, government involvement was sought from the start, and the Ministry of Energy provided technical support throughout the project. The community acquired one acre of land from the government, upon which they built a micro-enterprise center that now receives power through the project. A 10-member community power committee manages the day-to-day operations of the plant and conducts community consultations to decide upon additional uses for the power generated by the system. In this way, the power committee is also playing the role of a village development agency.

The electricity has been accessed by households, a community center, and a health clinic, and is used commercially for grain milling and for household-level microenterprises (for example, a barbershop, a beauty salon, a welding unit, and a BCS).

The Ministry of Energy, having been involved in this project from the start, has initiated a process with the Kenya Bureau of Standards to establish standards and a code of best practice for the small hydro sector, including standards related to transmission poles, wires and accessories, and general installation. Data on the financial sustainability of this scheme are not available.

Source: GEF and UNDP 2007

3.

SMALL PRIVATE WATER SUPPLY NETWORKS

For roughly 3 billion people in the developing world, access to improved water through piped water supply with in-home connections is still out of reach (JMP, 2006). Some 1.1 billion of these people lack access to any form of improved water supply, relying instead on surface water sources, unprotected wells, or water delivered by vendors. The other 1.8 billion have access to shared taps or bore wells, protected springs, or dug wells. While generally providing a safe source of supply, these types of service often require considerable investments of time and effort from household members. Point-of-use water treatment also appears to reduce the incidence of diarrhea in children significantly, whereas source treatment and community connections have little effect on health outcomes (World Bank 2008). A bore well located one kilometer away from the home, for example, is still considered "improved water supply" by internationally accepted standards.

While access to improved water supply continues to expand globally, access to water supply through house connections increased from just 26 percent to 30 percent in rural areas between 1990 and 2004, and actually decreased from 80 percent to 78 percent in urban areas (JMP 2006). This reflects the relatively higher per capita cost of individual connections relative to standpipes and other shared services. At the same time, evidence suggests that health benefits from piped water supply are maximized when households have sufficient volumes of water for personal hygiene, and this level of supply is only feasible when the water source is within a few yards of the dwelling. In addition, a considerable literature exists suggesting that, at least in some settings, households are often willing and able to pay for individual water supply services.

Prevalence and Distribution of Small Provider Networks

It is estimated that 2–3 percent of the populations of Cambodia, Kenya, and the Philippines are served by small private water supply networks (SPNs), that is, some 3 million persons across the three countries.[9] SPNs are a somewhat less prevalent form of Small Scale Private Service Providers (SPSPs) as compared with point sources (for example, kiosks) and mobile distributors (for example, tankers). SPNs face relatively higher capital costs and require land security, yet they serve greater numbers of customers and provide higher volumes of water.

Table 3.1 Prevalence of Small Private Water Supply Networks, 2007

Country and sample size	Estimated number of SPNs	Estimated number of people served by SPNs	Location (percentage of SPNs operating in rural and small town communities and in urban areas)	Estimated percentage of population served by SPNs	
				Among relevant population with access to improved water supply	Among entire population
Cambodia (*n* = 75)	280	70,000	Rural and small town: 93 Urban: 7	9	2
Kenya (*n* = 85)	525	215,000	Rural and small town: 97 Urban: 3	11	3
Philippines (*n* = 85)	515–715	270,000–380,000	Rural and small town: 35 Urban: 65	3	2

Source: Economisti Associati 2007a.

In both Cambodia and Kenya, SPNs play an important role in advancing water supply services in rural areas and small towns. In these countries, roughly 10 percent of those with access to improved water supply in rural and small town areas are served by an SPN. In the Philippines, by contrast,

9. SPNs were not found to be operating in Bangladesh and thus were not included in the survey.

the majority of SPNs are located in urban areas, often established to serve residents of new housing developments.

The distribution of SPNs is explained by market opportunities. Across all three countries, SPNs locate in areas with higher population densities, and not in areas where poverty rates are very high. Hydro-geological factors are also important in the decision of where to operate, with regard to both source water and the availability of substitute supplies for potential customers. In Cambodia, SPNs are more prevalent in communities near rivers because of their high reliance on surface water sources (see below). In Kenya, SPNs are prevalent in areas where deep bore wells are needed to abstract groundwater and it is not feasible for individual households to install hand-dug wells.

Key Characteristics of SPNs

The key characteristics of SPNs are discussed below including organizational features and sector experience, technologies and service levels, the size of SPSP operation, employment and skills and pro-poor practices.

Organizational Features and Sector Experience

Contrary to common perceptions and to the situation for small networks (mini-grids) in the electricity sector, most SPNs appear to be formal enterprises, with more than three-quarters holding an operating license issued by a government agency. All SPNs in Kenya self-identify as community-based organizations (CBOs). Many of the SPNs interviewed were established through donor-supported programs implemented by the Ministry of Water and Irrigation, then subsequently handed over to communities for ongoing operation and management. As discussed in chapter 1, certain aspects of the operations of CBOs differ from those of purely private operators, typically reflected in the financial data.

The Philippines has a mix of commercial and nonprofit SPNs, with 12 percent self-identifying as fully private firms and another 12 percent self-identifying as CBOs or self-help groups. All of these entities reported being stand-alone water suppliers. Another 76 percent of Philippine SPNs are registered as cooperatives, 70 percent of these which are multipurpose entities also supplying services such as electricity and microfinance. Many SPNs are operated by homeowners associations established by real estate developers. Across all categories, roughly half of respondents (owner/operators or managers) said that supplying water constituted their family's principal source of income (appendix table IB.1).

By contrast, all of the SPNs in Cambodia self-identified as private firms, and all but one were dedicated exclusively to providing water supply services. Among the owners and managers interviewed, the majority (79 percent) said that their water supply business was the principal source of income for their families.

On average, SPN providers have been working in their current water business for 7 to 8 years in Cambodia and the Philippines, and 10 years in Kenya.

Technologies and Service Levels

Within the networks they operate, almost a quarter of Filipino cooperatives have some public taps on their networks, and a similar proportion of SPNs in Kenya have kiosks. All the network operators interviewed in Cambodia, as well as the CBOs and private firms in the Philippines, have only household taps (in-home or yard). As discussed below, management and pricing for these mixed systems can be challenging, particularly if they are used to administer cross-subsidies across customer groups.

Water sources varied significantly. In Cambodia, a majority of SPNs pumped surface water (75 percent), whereas in the Philippines, a majority of SPNs relied on ground water (69 percent) for their operations. In Kenya, most operators had gravity systems fed by springs. Because virtually all of the SPNs in Cambodia and Kenya were based in rural areas or small towns where utilities are not operating, there was no resale of water. By contrast, some Filipino SPNs (13 percent) resold water purchased in bulk from public utilities or private suppliers.

Table 3.2 SPNs: Water Sources, Abstraction, and Storage

	Principal source of water in "normal" season (percent of SPNs)			Water abstraction and storage (percent of SPNs)		
Country and sample size	Deep bore wells	Surface water	Resale of municipal or privately supplied water	Use motorized pumps	Use electricity	Use storage tanks
Cambodia (n = 75)	26	73	1	97	93	100
Kenya (n = 85)	21	78	1	27	27	64
Philippines (n = 85)	69	18	13	73	81	93

Source: SPSP survey 2006.

Size of Operation

Almost all of the SPNs in these countries had a noncommercial (household) customer base, and most served only a few hundred households. Cambodian SPNs were generally smaller operations with total investment in the network seven to eight times less than that of operators in Kenya and the Philippines (appendix table IB.2).

The average network length for SPNs in Kenya was four times greater and meters-per-client values were two to five times higher than in Cambodia or the Philippines. These data reflect the predominance of gravity-fed schemes with long transmission lines in high-altitude regions of Kenya. In the Philippines, network length per customer was considerably lower than in Cambodia or Kenya, mainly attributable to the density of communities served by the 35 percent of Filipino SPNs operating in urban areas.

Sales by the SPNs ranged from a median of 5 cubic meters (m^3) per month in Cambodia (where all clients were households) to 13 m^3 in Kenya and 17 m^3 in the Philippines (where one-quarter of operators reported serving at least one nonhousehold client). Private firms and cooperatives in the Philippines sold more water both overall and per client compared with Filippino CBOs.

Employment and Skills

One-half of SPNs included in the sample employed fewer than three full-time equivalents; 90 percent had nine or fewer full-time employees. In Cambodia, where one-third of SPNs reported collecting fees from users on a daily, weekly, or biweekly basis, the median staff-to-connection ratio was, not surprisingly, the highest of all three countries. The staff-to-connection ratio for private firms and CBOs show no specific trend.

Existing literature suggests that "a well functioning utility may have a staff-to-connection ratio of 4:1000 or below" (Kariuki and Schwarz 2005), a staffing efficiency level achieved only by the Phnom Penh Water Supply Authority among the utilities for which data were available. Staffing rates for public utilities in the Philippines and Kenya were 7 and 11 per 1,000 connections, respectively. The relevant (median) comparable figures for the SPNs in the study range from 11 (in the Philippines) to 17 (in Cambodia) per 1,000 connections (appendix table IB.3).[10]

10. In some communities one piped water connection can serve multiple families. It would thus be preferable to calibrate this indicator by the average number of persons served per connection; however, available data did not permit this calibration.

Variation in staffing is associated with size and capitalization of the network. Networks with higher revenues, and those with greater network length per connection values, also had higher staff-to-connection ratios. At the same time, networks with a larger number of clients had lower staff-to-connection ratios, all else held constant.

Operators were generally confident about their technical abilities, with some 75 percent of SPNs reporting that they almost always fix technical problems with their systems themselves. Between one-half (in Kenya) and two-thirds (in the Philippines) of operators said that the technical skills of their employees were "not at all a constraint" to their operations. At the same time, subsets of SPNs reported technical challenges such as water source management (Kenya) that may be beyond their capacity to address.

Many SPNs appear to be receiving technical training, particularly in Cambodia (96 percent), and to a lesser extent in the Philippines (56 percent) and Kenya (33 percent). Training in administrative issues was also widespread, particularly in the Philippines (80 percent). The bookkeeping practices of Filipino SPNs appear to be particularly good. It is also notable that in Cambodia, where SPN performance on tariff setting, billing and collections, and cost recovery is strongest, self-reported attention to record-keeping was the lowest across all three countries. More detailed information on the type of training and who it is delivered by is not available but would be highly relevant.

Pro-Poor Practices

Although small scale private water providers are "often willing to invest in areas that are unattractive to the international private sector" (Kariuki and Schwarz 2005), this observation may be less true for small network operators, who typically put a larger capital investment at risk than other types of water providers (for example, tankers or kiosk operators). About one-half of the SPNs reported that their customers are "poor" or "very poor" (slightly higher in Kenya).[11] Operators of CBOs in the Philippines reported that 80 percent of customers are poor. Analysis with census data in these countries, however, suggests a significant negative correlation between poverty incidence and SPN prevalence (Economisti Associati 2007a).

A variety of strategies for increasing access to reliable, affordable water supply among poor households have been documented. Those relevant to SPN analysis include connection-fee financing, the provision of discounts

11. The determination of poor is based on the perception of the SPNs and is entirely subjective.

for connection or service fees to poor households, and the collection of fees on a submonthly basis (under the assumption that low-income households find it challenging to manage monthly bills).

Implicit financing of connection fees by SPNs was common in Cambodia and Kenya. About half of the SPNs that charged connection fees allowed them to be paid in installments, typically over a period of 3 (Cambodia) to 12 (Kenya) months. In the Philippines, where the typical connection fee was a mere US$4, financing was uncommon. It is not known whether all customers who request installment payments are allowed this option, or if the SPNs use some criteria to decide which customers are entitled to connection-fee financing. Nor were data collected on the extent to which SPNs offer discounts on either connection or service charges to poor households or other disadvantaged groups.

SPN Performance and Service Standards

Virtually all SPNs interviewed reported servicing customers year round, with little seasonal variation in sales. In Kenya and the Philippines, SPNs reported offering water supply services 24 hours per day, comparable to the level of service provided by public utilities. In Cambodia, most SPNs provided only 13–14 hours of service per day.[12] This, however, was not reported as a principal constraint from the perception of network operators.

The average average number of service interruptions reported in Cambodia and the Philippines was less than one per month (table 3.3). Kenya had a high rate of service interruptions in an absolute sense, with 25 percent of SPNs reporting at least one interruption per week. However, once this indicator is calibrated by network length, the Kenyan networks actually have a lower average rate of interruptions per kilometer of pipe than the other countries. Data on pipe breaks (which do not necessarily lead to widespread service interruptions) for public utilities in Cambodia and the Philippines seem generally in line with those of the SPNs, although it is clear that a handful of small networks in each of the three countries has a high rate of interruptions.

12. The only public utility data point available for comparison is the Phnom Penh Water Supply Authority (PPWSA), which is known for its high service quality in the region (Stokstad, 2008).

Table 3.3 SPNs: Service Delivery and Interruptions

Country and sample size	Median and mean hours of service per day	Median and mean hours of service per day among public utilities[a]	Median and mean number of interruptions per month[b]	Median and mean number of interruptions per km of network per year[b]	Median and mean number of pipe breaks per km of network per year among public utilities[a]
Cambodia (*n* = 75)	13.0 14.4	24.0 24.0 (*n* = 1)	0 1.8	0 22.8	5.0 5.0 (*n* = 1)
Kenya (*n* = 85)	24.0 19.4	19.5 17.3 (*n* = 3)	1.5 4.2	0 11.0	—
Philippines (*n* = 85)	24.0 21.4	24.0 21.0 (*n* = 46)	0 2.3	0 34.6	7.2 12.0 (*n* = 41)

Source: SPSP survey 2006.

Note: — = Not available.

a. Computed with available data; not all public utilities are represented. The number of data points for each country is reported in parentheses.

b. Ordinal values converted to numeric values as follows: "Daily or almost daily" = 30; "Frequently; one or more times per week" = 7; "Not so frequently; one or two times per month" = 1.5; "Rarely; less than one time per month" = 0.

Water Quality

Considerable variation exists among the SPNs regarding awareness of national water quality standards and water treatment practices. In Cambodia, 63 percent of operators said they knew what the relevant standards were; approximately half of these carried out various types of physical, biological, and chemical treatment of their raw water before delivery to customers and believed that they were in compliance. Roughly half of all SPNs in the Philippines said they meet the standard and use chlorination as their only treatment. In Kenya, awareness of water quality standards was low (38 percent) and none of the SPNs interviewed treats the water they sell to customers. Unfortunately, comparative data on water treatment practices in public water utilities in these countries could not be obtained.

Table 3.4 SPNs: Water Quality Treatment and Awareness of Standards

Country and sample size	Percentage "aware" of national water quality standards	Among those aware, percentage who say that they meet standards "fully" or "almost fully"	Percentage who report using indicated water treatment practice				
			Coagulation	Flocculation	Sedimentation	Filtration (sand)	Chlorination
Cambodia (*n* = 75)	63	26	31	23	23	28	27
Kenya (*n* = 85)	38	10	0	0	0	0	0
Philippines (*n* = 85)	75	53	0	0	0	1	46

Source: SPSP survey 2006.

Despite the limited extent of water treatment documented, only 1–3 percent of SPN operators interviewed said that their customers had suffered any health problems resulting from consumption of water supplied through their networks. Neither water quality test data nor input from customers was available to corroborate these claims.

Customer Complaints

A minority of SPN operators reported receiving customer complaints "often" or "very often." In Cambodia, this proportion was 7 percent, and was 21 percent in Kenya and 13 percent in the Philippines. However, SPNs

reported that customers across all three countries request more water and improvements in pressure. Among those operators who did report having dissatisfied customers, the principal complaint in Cambodia was tariffs, not surprising given that the unit price for water supply is 22–87 percent higher than that of customers in Kenya and the Philippines. In Kenya and the Philippines, the main reported complaint was the limited availability of water (appendix table IB.4). This finding seems at odds with the fact that SPNs in these countries typically provide service 24 hours per day; perhaps low or variable pressure results in customers receiving less supply than they desire.

Financial Situation

The discussion in this section on the financial situation covers pricing for services, non revenue water, metering and billing, financial sustainability, operating margin, profit margin, and competition.

Service Pricing

Recognizing that variations in hydrologic conditions, population density, and other factors within a country can translate into important differences for cost of service provision, a comparison of the tariff structures and levels of the SPNs with those of public utilities operating in the same countries is useful. With regard to initial connection fees, most SPNs in Kenya and the Philippines charge new customers, whereas most operators in Cambodia do not. This finding is particularly notable given that all Cambodian SPNs self-identified as fully private ventures. At the same time, with incomes in rural areas and small towns estimated to be in the range of US$300 per year in Cambodia, water connection fees would substantially limit expansion of the customer base. For those SPNs in Cambodia that do charge a connection fee, the charge was equivalent to almost a full month's income, prohibitive to many.

In Kenya, most SPNs charged households obtaining individual connections a median initial fee that was substantially higher than those in Cambodia and the Philippines. It was also high in an absolute sense at US$139. The cost partly reflects the higher capital investment per customer among SPNs in Kenya as compared with the Philippines and Cambodia (appendix table IB.5).[13]

With regard to monthly service prices, about 10 percent of SPNs in each country used a two-part tariff that included a fixed fee and a volumetric tariff, which would generally be considered "best practice" in water tariff design.

13. Kariuki and Schwarz (2005) found that "at the global data level, the differential of connection charge, between the utility and the PNOs [private network operators] is 3 percent which is fairly insignificant. Whereas, for EAP [East Asia and the Pacific] the differential is 101 percent, indicating a greater presence of PNOs in EAP."

The majority (85 percent) of SPNs in Cambodia and the Philippines used volumetric (consumption-based) pricing. The main approach for billing in Kenya was flat monthly fees, used by about two-thirds of SPNs. Some Kenyan networks (13 percent) did not collect regular tariffs at all and instead relied on "collection campaigns" to raise funds as needed for operations, maintenance, and repairs (appendix table IB.6).

The prices charged by SPNs using volumetric tariffs were broadly consistent with existing literature on small networks. Most SPNs are charging between US$0.20 and US$0.70 per m^3 of water, as compared with US$0.13 to US$0.56 among the public utilities for which data could be obtained.

The unit prices charged for water at public taps in the Philippines and kiosks in Kenya were considerably higher than those charged to households with in-home connections, which reflects in part the higher unit cost of providing such services. At the same time, it is unlikely that these prices cover the full cost of providing service, given that such point sources have high labor costs (attendants) and limited sales. In many countries, mixed private connection–tap systems are designed to use part of the connection fees paid by households seeking individual service to cross-subsidize the taps or kiosks that are intended to serve lower-income households, but this does not seem to be the case in Kenya or the Philippines (appendix table IB.7).

A major challenge, particularly in communities where flat monthly fees are charged to all customers, is that households can easily undercut the price per jerrican charged at the kiosks if they are willing and able to sell to other households without individual connections. Obtaining water supply from neighbors often takes less time than traveling to and queuing at a kiosk, and may have other attractions, such as the potential for "supplier credit" during times when cash is scarce.

Nonrevenue Water

Self-reported water losses among the SPNs were comparable to those of larger public utilities in Cambodia and the Philippines and considerably lower than public utilities in Kenya (although metering is uncommon among Kenyan SPNs, as discussed below). Physical leakage was identified as the principal source of nonrevenue water (NRW) in Kenya and the Philippines. In Cambodia, where the typical SPN supplies water only 12 to 13 hours per day, inaccurate metering was blamed by 30 percent of network operators for the bulk of their NRW. Meter accuracy problems are common in systems with intermittent supply. Water theft is thought to be a negligible part of NRW in each country, which is consistent with the notion that smaller, community-based networks may offer advantages in monitoring and enforcement (appendix table IB.8).

Metering and Billing

The SPNs in Cambodia and the Philippines reported very high rates of metering. In Kenya, only one in five operators said that all their customers had metered connections, and the typical system had no metering at all. This is consistent with the use of flat monthly fees by a majority of Kenyan SPNs (appendix table IB.9).

Most operators collected fees from their customers monthly and about two-thirds reported that a majority of clients pay on time. In Cambodia, 30 percent of operators collected fees on a daily, weekly, or biweekly basis, which can be helpful to low-income households. In Kenya, one of every five SPNs reported substantial problems with late payments.

Financial Sustainability

Given that some of the SPNs included in the study are striving to operate under commercial principles while others were established largely as social service organizations, financial performance should be evaluated in the context of these organizational objectives. All the SPNs in Kenya and 12 percent in the Philippines self-identified as community-based or self-help organizations. All Cambodian SPNs, and 88 percent of those in the Philippines, identified themselves as fully private firms or cooperatives. Although imperfect proxies for organizational mission, these classifications are used here to compare networks that generally operate on a nonprofit basis and prioritize affordability and access, with those that operate under commercial principles.

Operating Margin

The median operating margin[14] for SPNs from which relevant data could be obtained was 26 percent in Cambodia, 47 percent in Kenya, and 34 percent in the Philippines. In the Philippines, those SPNs under private management had a median operating margin of 35 percent, while CBOs' median value was 27 percent (appendix figure IB.1).

Between 7 percent and 9 percent of SPNs in each country were not covering their operating costs. Regression analysis yielded no significant associations between having a negative operating margin and organizational form, size of operation, length of time in business, or other variables.

Profit Margin

Whereas most SPNs in the sample appeared to be covering their recurrent costs, once depreciation charges are included in the analysis, the financial picture changes dramatically, for Kenyan SPNs in particular. For Kenyan

14. *Operating margin* is defined as the difference between an SPN's revenues and operating costs, expressed in percentage terms relative to total revenues. The operating margin was adjusted to take into account the value of unpaid customer bills.

networks, the median profit margin[15] for the year prior to interview was minus 51 percent, as compared with positive 8 percent in Cambodia and 16 percent in the Philippines. These results relate to the fact that the typical Kenyan SPN had a capital investment per client ratio much larger than those among counterparts in the other countries (appendix table IB.10).

One in every eight SPNs that provided information on profits had a negative profit margin in the year prior to interview. These networks tended to be older and had greater asset values per client, both of which characterize many SPNs in Kenya. All else held constant, SPNs that self-identified as private firms or cooperatives were four times more likely to have positive profit margins as compared with community-based or self-help organizations (appendix table IB.11). Rural SPNs were nine times more likely to have negative profit margins as compared with urban networks. These results are largely consistent with expectations both that urban operators would benefit from economies of scale or higher revenue potential (or both), and that profit motive would drive better financial performance in private firms as compared with CBOs.

Competition

Enhancing competitive pressures can spur both cost and price reductions and service quality improvements. A substantial fraction of SPNs in each country felt that they had no direct competition for customers. Unlike point sources and mobile distributors of water, SPNs tend to enjoy some degree of geographical monopoly for service delivery that limits the scope for direct competition from other network providers. In such settings, sharing of standardized performance information with customers could help the customers benchmark their service provider and, perhaps, exert greater demands for changes in prices or services.

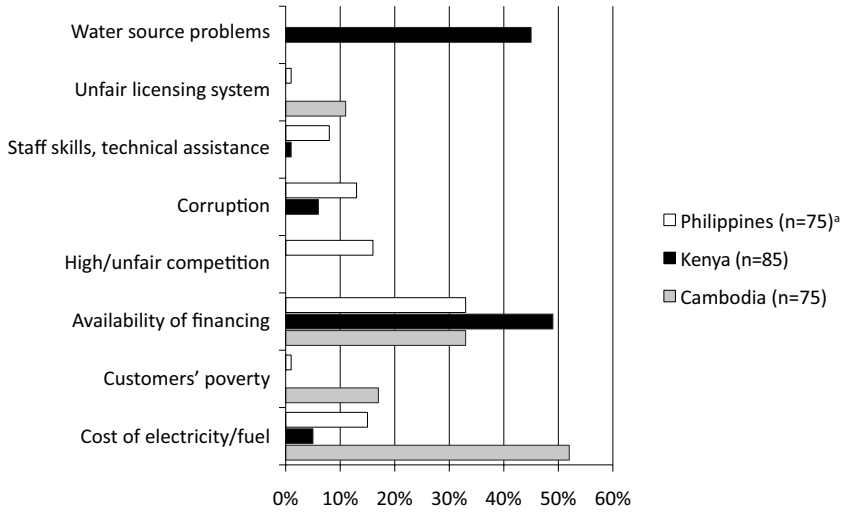
Among SPNs that reported competition for customers, most identified a public utility as the principal source of competition. Within urban areas (where the most profitable SPNs operate), 33 percent of respondents in Kenya and 40 percent in Cambodia said that it was likely that the utility would begin operations in their service area in the two years following their interview. Such expectations are likely to influence SPNs' behavior (for example, capital investment), particularly in settings with uncertain regulatory frameworks.

15. The gross profit margin was calculated as the operating profit less depreciation charges, expressed in percentage terms relative to revenue. Following other studies on SPSPs (for example, Van de Berg [2002]; Mohamed [1999]) average depreciation rates for the small network operators were used (rather than item-specific rates). For SPNs this rate was 5 percent across all countries.

Challenges and Business Constraints

SPN operators identified a number of constraints they face in running and growing their businesses (figure 3.1). Between a third (in Cambodia and the Philippines) and a half (in Kenya) of respondents identified lack of access to financing as the first or second most pressing constraint for their business. In Cambodia, half of operators said that the cost of electricity was their binding constraint, and 45 percent of operators in Kenya named "water source problems" (unspecified) as a main challenge.

Figure 3.1 SPN Constraints: Percentage Selecting Indicated Challenge as First or Second Most Pressing Problem for Business



Source: SPSP survey 2006.

Note:

a. Data available only for private firms and cooperatives in the Philippines.

The items not selected as main constraints by the SPNs are also interesting. Availability of technical assistance or staff with good technical skills was not viewed as a major problem by respondents. Corruption and "unfair" licensing practices were identified by about one-tenth of the operators in Cambodia and the Philippines. Poverty of customers was challenging for almost one-fifth of SPNs in Cambodia, but for virtually none in the other countries.

Table 3.5 SPNs: Most Commonly Cited Problems with Equipment or Network (Percentage Reporting)

Country and sample size	Most frequently reported problem	Second most frequently reported problem	Third most frequently reported problem
Cambodia (*n* = 75)	Problems with "other" equipment, for example, tanks, engines, and the like: 32	External problems, for example, voltage fluctuations: 29	Problems with pumps, for example, blown fuse, blockage, and the like: 17
Kenya (*n* = 85)	Pipe break or leak: 56	Leaking equipment: 19	Problems at water intake, for example, siltation: 10
Philippines[a] (*n* = 75)	Pipe break or leak: 61	Problems with pumps, for example, blown fuse, blockage, and the like: 17	External problems, for example, voltage fluctuations: 14

Source: SPSP survey 2006.

Note:

a. Data available only for private firms and cooperatives in the Philippines.

Network operators were generally confident in their ability to manage technical problems with their systems. See table 3.5 for a description of those problems. The majority of SPNs (75–86 percent) reported that they fix the problem themselves. Between 6 percent (the Philippines) and 18 percent (Kenya) said that they "often" need outside technical assistance to solve problems with their networks. Among those who said they need outside help, 16 percent said they often had trouble finding good help in Cambodia, and 6 percent said so in both the Philippines and Kenya.

Spare parts availability has often been identified as a culprit in unsustainable water supply services throughout the developing world. Among the SPN operators interviewed, 9 percent in the Philippines and 18 percent in Kenya said that they found it difficult to acquire spare parts. Virtually all of these providers indicated that physical availability, and not cost, was the principal constraint with spare parts.

Financing is often discussed as a major constraint for small-scale water service providers. Among SPNs in Kenya and the Philippines, only a handful of operators have received loans from either formal or informal sources; most capital investment is financed through savings or grants (appendix table IB.12). Typical monthly interest rates for these operators were 1.5 percent in the Philippines and 9 percent in Kenya. By contrast, in Cambodia almost half the SPNs have received informal loans, and another 17 percent have obtained loans or lines of credit from formal financial institutions. Cambodian SPNs were paying interest rates in the range of 2 percent per month.

Across all countries, loan finance played a negligible role in capital investment. Community-based SPNs in Kenya and the Philippines relied heavily on grant financing. By contrast, operators self-identifying as private firms typically used personal or family savings or retained earnings to finance new capital investments.

Future Prospects

Across all three countries, small network operators had generally high levels of satisfaction and very confident outlooks for future business prospects (appendix table IB.13). In Cambodia and Kenya, approximately two-thirds of operators reported that their businesses' current situation had improved during the two years prior to interview; only 2 percent said it had worsened significantly (appendix table IB.14). Similarly, 62–81 percent (Cambodia and Kenya) of operators felt that trends would continue to improve for their businesses over the next two years (appendix table IB.15). Indeed, 21 percent (Cambodia) and 46 percent (Kenya) of SPN providers said that they planned to make capital investments to expand their businesses within the next 12 months (appendix table IB.16). Less than 1 percent of respondents predicted that their SPNs would be out of business within two years. At the same time, one in every seven respondents in Kenya reported being "fairly" or "very" disappointed with the organization's current business situation; one out of eight Cambodian respondents felt that the business outlook for his or her SPN would be "somewhat" or "significantly" worse over the next two years (appendix table IB.15).

Planned Capital Investment

Across all three countries, a substantial fraction of SPNs reported planning major capital investments in the year following their interview. The magnitude of these investments could be viewed as unrealistically ambitious, representing a median of 49–67 percent of the total investment in the SPNs to date. Moreover, in Kenya and the Philippines, such plans tended to hinge on the provision of grant funds, which are often unreliable (appendix table IB.16).

To explore variation in intent to make capital investments, further analysis was carried out that showed perceived constraints related to regulation, as well as access to land and other infrastructure (for example, electricity and roads), are significantly, negatively correlated with SPNs' willingness to make capital investments. By contrast, concerns about financing, taxes, and rule of law (for example, crime and corruption) are not significantly associated with intent to invest[16] (appendix table IB.17).

Networks with higher revenues were more likely to have investment plans, as were urban SPNs (although this second variable was not statistically significant). In addition, networks that self-identified as private firms or cooperatives were almost eight times less likely to have capital investments planned as compared with community-based or self-help organizations, all else held constant.

Box 3.1

The Challenge of Rapidly Urbanizing Areas and the Cost of Informality: Water Provision in Bangladesh's Slums

Bangladesh is rapidly urbanizing, which is putting pressure on already underperforming public utilities. The population in urban areas is growing at 2.5 percent a year, a rate twice as fast as the national rate. In the Dhaka metropolitan area, where one-third of the national population lives, the population is growing even faster, and is reported to be the fastest growing mega-city in the world, with some 300,000 to 400,000 migrants, mostly poor, moving to Dhaka every year in search of employment opportunities (World Bank 2007).

Water providers face major challenges in providing services in urban areas. Of the 309 urban centers in Bangladesh, only 102 have a piped water supply system (ADB 2007). The government does not provide services in informal areas (slums). To meet the rapidly growing demand in urban areas, alternative non-state service providers such as SPSPs have been filling the gap left by public providers.

(continued)

16. A binary logit model was fitted to the data. Principal components analysis was used to reduce the larger number of constraints (25) about which respondents were queried to six principal factors that impede conduct and growth of business: regulations, taxes, financing, infrastructure service, land, and rule of law. These six factors explain 69 percent of the variation within the constraint data. Direct interpretation of the parameter estimates is infeasible because the data used for each SPN is derived from principal component analysis and factor score analysis.

Box 3.1

The Challenge of Rapidly Urbanizing Areas and the Cost of Informality: Water Provision in Bangladesh's Slums *(continued)*

Many of these providers operate informally because of the high costs of formality, particularly for water kiosks in slums. To operate formally, most of them need an agreement with the utility company to connect to the mains and need to get bulk rate pricing. Getting such agreement is difficult, and can be costly, requiring unofficial payments. Some kiosk operators received fines for "charging excessively high prices," but they reported that procedures and bases for those fines were unclear. Public water utilities also lose from such informality because, in many cases, water distributed through kiosks represents nonrevenue water regardless of whether the kiosk pays for that water.

A World Bank project (2008) in Dhaka is working with the Dhaka water authority to increase water supply and sanitation for low-income communities by direct connections, and is working with support organizations and CBOs in slum areas. The project is subcontracting with intermediary service providers, including SPSPs (community water providers, vendors, and SPNs). The communities share part of the capital cost and bear the full costs of operation and maintenance. The water tariff will be paid at the usual utility rate, which is substantially lower than what residents paid in the recent past.

Sources: Bangladesh Country Case Study (appendix IIA to this book); World Bank, 2008, Dhaka Water Supply and Sanitation Project.

4.

POINT SOURCE AND MOBILE WATER SERVICE PROVIDERS

An in-home, piped water connection is the level of water supply service to which households across the globe aspire. Yet most of the gains in extending access to "improved" water supply services over the past 20 years have been realized by households' obtaining access to shared point sources such as public taps and bore wells (Joint Monitoring Programme 2006). Approximately 1.8 billion people in developing countries rely on such point sources for their water supply. Another unknown number receive their water from cart or tanker vendors, although this type of service is generally not considered an improved water supply service by the international community (Joint Monitoring Programme 2006).

The operations of small point source and mobile water suppliers are poorly understood, in large part because such small scale private providers have been viewed as elements of a transitory (and undesirable) service delivery system that would soon be replaced by public piped water and sewer networks. Attitudes have since evolved, with the growing realization that well-functioning piped water and sewer networks will serve only a minority of households in many developing countries for the foreseeable future. Moreover, many of the unfavorable characterizations of SPSPs—for example, their charging exorbitant prices for low-quality service—have been challenged by empirical study (Zaroff and Okun 1984; Solo 1999). It seems now that the appropriate question is not whether SPSPs are "good" or "bad" for the sector, but what are the conditions under which they can be part of an overall strategy to provide safe, affordable, and reliable services to users, particularly the poor.

Prevalence and Typology of Point Source and Mobile Small Scale Private Service Providers (SPSPs) of Water

This discussion draws on the typology of service providers in chapter 1, which suggests that the salient features of SPSP operation are (i) whether a provider resells water purchased from a utility or obtains water from other sources and (ii) whether the provider delivers water to individual households through a network, at a stationary point where customers fill containers and carry them home, or by use of a cart or vehicle. As discussed below, these elements of an SPSP are indeed associated with its cost structure; they bear less relation, however, to the provider's customer base, financial health, and perceived business constraints, all of which are important from programmatic and policy perspectives. For the purposes of this analysis, the providers are classified into four categories: standpipe or kiosk operators, purified water resellers, cart or rickshaw vendors, and tanker or "jeepney" vendors (table 4.1). The analysis covers Bangladesh, Kenya, and the Philippines, because no small scale point sources or mobile distributers in Cambodia were included in the survey.

Table 4.1 Point Source and Mobile Water Service Providers in Bangladesh, Kenya, and the Philippines

Country and sample size	Standpipe or kiosk operator	Purified water reseller[a]	Cart vendor	Water delivery via tanker or jeepney
Bangladesh (n = 40)	10 (25%)	20 (50%)	10 (25%)	0 (0%)
Kenya (n = 125)	95 (76%)	0 (0%)	10 (8%)	20 (16%)
Philippines (n = 50)	10 (20%)	20 (40%)	0 (0%)	20 (40%)

Source: SPSP survey 2006.

Note:

a. With or without delivery.

The point source SPSPs in Kenya generally conform to the stereotype of a standpipe or kiosk operator selling water by the 20-liter jerrican without additional treatment. Most of the customers served by these Kenyan providers are poor and live in urban slums beyond the reach of municipal networks.

By contrast, in the Philippines two-thirds of point source SPSPs are so-called water refilling stations, providing a service analogous to the bottled water industry in more developed countries. These providers purchase water from municipal utilities, use sophisticated treatment technologies to improve its safety and aesthetics, and sell it to customers in small volumes for very high unit prices. None of the owner-manager respondents of these operations consider the majority of their customer base to be poor; indeed, this service targets middle- and upper-income households dissatisfied with the level of water supply offered by their public sector service provider.

Table 4.2 Point Source and Mobile Distributors: Water Sales (m^3)

		Point source				Mobile distributor			
		Kiosk or standpipe		Purified water reseller		Cart vendor		Tanker or jeepney delivery	
Country	Measure	Per year	Per month per client	Per year	Per month per client	Per year	Per month per client	Per year	Per month per client
Bangladesh	Mean	964	1.4	987	0.8	234	1.2	n.a.	n.a.
(*n* = 40)	Median	950	1.4	807	0.6	230	1.1		
Kenya	Mean	1,152	3.1	n.a.	n.a.	371	2.7	1,956	53
(*n* = 125)	Median	673	1.4			275	1.5	490	30
Philippines	Mean	2,124	4.1	362	0.4	n.a.	n.a.	7,801	9.2
(*n* = 50)	Median	730	3.3	300	0.2			5,538	6.2

Source: SPSP Survey 2006.

Note: n.a. = Not applicable.

Among the mobile providers, similar distinctions can be made between the cart vendors delivering small and untreated volumes of water to local businesses in Bangladesh, tanker operations in Kenya supplying large volumes to relatively affluent households, and tanker companies in the Philippines that provide small volumes to low-income households in peri-urban zones. Grouping these into a single "mobile provider" category masks important differences in business organization and strategy, as well as the extent to which SPSP operations potentially benefit poor customers. See tables 4.2 and 4.3 for some of the important distinctions between the types of SPSPs.

Table 4.3 Characteristics of Point Source and Mobile Water Service Providers

	Water supply only	Value added services: purification	Value added services: delivery
Household customer base, low to middle income	Standpipe or kiosk operators: Bangladesh, Kenya, and the Philippines		Tanker trucks: the Philippines
Household customer base, middle to high income		Purified water resellers: the Philippines and Bangladesh	Tanker trucks: Kenya
Commercial customer base			Cart vendors: Bangladesh Jeepneys or pick-ups: Bangladesh

Source: SPSP survey 2006.

However, most providers share some common features. Virtually all SPSPs in the sample have an urban or peri-urban clientele. They are all full-time operations, offering services for six or seven days per week, 11 to 14 hours per day. Three-quarters of the firms have fewer than four full-time employees.

Prevalence

Because the sampling strategy used for the study was not meant to generate statistically representative samples of providers, it is difficult to estimate how many small providers are operating point source and mobile water services in the sample countries. Some rough estimates are provided in table 4.4. Given the sampling strategy used, the results presented here should be considered suggestive rather than representative.

Table 4.4 Point Source and Mobile Water Distributors: Prevalence

Country and sample size	Estimated number of SPNs in operation, 2007		Customer base	
	Point source	Mobile	Point source	Mobile
Bangladesh (*n* = 40)	200+	Hand carters: n.a. Tankers: 7,000–10,000	Low- (standpipe) and High- (resellers) income households	Commercial operations in urban areas
Kenya (*n* = 125)	Kiosks: 4,600	Tankers: 50 Hand carters: 100s	Households in urban slums	Middle- and upper-income households, businesses (tankers)
Philippines (*n* = 50)	Purified water resellers: 12,000+ Standpipes: n.a.	Hand carters: n.a. Tankers: n.a.	Low- (standpipe) and High- (resellers) income households	Households in peri-urban zones

Sources: Estimated number of SPNs: Economisti Associati 2007a.; SPSP survey 2006.
Note: n.a. = Not applicable.

Key Characteristics of Point Source and Mobile Water SPSPs

The key characteristics of Point Source and Mobile Water SPSPs are discussed below including the organizational structure and professional experience, water sources, and size and customer base.

Organizational Structure and Professional Experience

The enterprises in the survey are mostly characterized as private, stand-alone entities. All mobile water vendors and purified water resellers self-identified as private firms, while a handful of kiosks and standpipes surveyed in Kenya and the Philippines were operated by community-based organizations. Very few kiosk and standpipe operations held government registration or trade licenses; roughly one-third of mobile vendors were licensed. By contrast, 65 percent of Filipino purified water resellers, and 80 percent of such operations in Bangladesh, reported holding one or more trade licenses, and all were registered by at least one public agency. Similarly, the majority of mobile water firms held at least one trade or operating license.

Across all three countries, water SPSPs interviewed typically reported having been in business for three to six years (appendix table IC.1). Purified water resellers had less experience because this industry is quite young relative to the other business models.

Water Sources

Providers in Bangladesh and Kenya relied on public utilities to supply the water that is ultimately sold to customers. A substantial share of mobile distributors relied on groundwater, from one-half in Bangladesh to all in the Philippines. No provider reported using surface water in his or her operations.

Table 4.5 Point Source and Mobile Distributors: Principal Source of Water during "Normal" Season (Percentage of SPSPs Obtaining Water from Each Source)

	Point source		Mobile Distributor	
Country and sample size	**Kiosk or standpipe**	**Purified water reseller**	**Cart vendor**	**Tanker or jeepney delivery**
Bangladesh (*n* = 40)	Resale of municipal supply: 90 Own wells: 10	Resale of municipal supply: 45 Own wells: 55	Resale of municipal supply: 100	n.a.
Kenya (*n* = 125)	Resale of municipal supply: 91 Own wells: 9	n.a.	Resale of municipal supply: 100	Resale from private suppliers: 80 Own wells: 20
Philippines (*n* = 50)	Resale of municipal supply: 20 Own wells: 80	Resale of municipal supply: 100	n.a.	Resale from private suppliers: 100

Source: Economisti, 2007a.

Note: n.a. = Not applicable.

Size and Customer Base

Among point source operators, total capital investment to date ranged from a few hundred US dollars for kiosk and standpipe operators to tens of thousands of US dollars for purified water resellers in Bangladesh and the Philippines. Similarly, cart vendors had invested minimal amounts in their businesses as compared with firms offering water delivery by tanker or jeepney. Of interest,

the almost three-fold difference in median investment figures between Filipino and Kenyan tanker operators is not explained by difference in fleet size; in both countries a typical firm had one or two Japanese-manufactured tankers. (The Kenyan tankers were larger, with roughly twice the capacity as those used in the Philippines.) This difference in capitalization is reflected in profitability for tanker operations across the two countries.

Table 4.6 Point Source and Mobile Distributors: Mean and Median Total Estimated Capital Investment in Business to Date (US$)

		Point source		Mobile distributor	
Country and sample size	Measure	Kiosk or standpipe	Purified water reseller	Cart vendor	Tanker or jeepney delivery
Bangladesh	Mean	533	28,993	91	n.a.
(*n* = 40)	Median	524	32,043	95	
Kenya	Mean	2,210	n.a.	149	33,109
(*n* = 125)	Median	693		139	15,248
Philippines	Mean	4,375	15,365	n.a.	6,677
(*n* = 50)	Median	1,872	13,648		5,492

Source: SPSP survey 2006.

Note: n.a. = Not applicable.

All of the kiosk and standpipe operators had household client bases, and reported that at least two-thirds of their clients were poor (appendix table IC.4). In Bangladesh, virtually all clients are classified as poor. Purified water resellers had a mix of typically higher-income household clients and small enterprises such as restaurants and shops. Mobile distributors in Bangladesh and Kenya generally served small numbers of both household and commercial clients; in the Philippines, all tankers reported having household clients only. The SPSPs who served both commercial and household clients typically charged all users the same prices. In the few instances of differential pricing, households were charged more (10–20 percent) per unit volume of water as compared with household clients.

Performance and Service Standards

Among the SPSPs interviewed, only purified water resellers in Bangladesh and the Philippines reported treating the water they sell to customers. About one-quarter of kiosk and standpipe operators in Kenya and 30 percent in the Philippines claimed to meet national water quality standards (table 4.7). These tended to be firms reselling water purchased from a public utility rather than sourced from their own bore wells. Thus, only a minority of SPSPs operating kiosks, standpipes, carts, or tankers appear to be treating water as part of their operations.

Table 4.7 Point Source and Mobile Distributors: Awareness of Water Quality Standards (percentage reporting)

	Point source				Mobile distributor			
	Kiosk or standpipe		Purified water reseller		Cart vendor		Tanker or jeepney delivery	
Country and sample size	"Aware" of standards	Among aware, claim to meet standards	"Aware" of standards	Among aware, claim to meet standards	"Aware" of standards	Among aware, claim to meet standards	"Aware" of standards	Among aware, claim to meet standards
Bangladesh (n = 40)	0	n.a.	100	80	n.a.	n.a.	n.a.	n.a.
Kenya (n = 125)	31	76	n.a.	n.a.	n.a.	n.a.	20	5
Philippines (n = 50)	70	43	80	88	n.a.	n.a.	70	29

Source: SPSP survey 2006.

Note: n.a. = Not applicable.

Customer Complaints

While data were not available for all the types of point source and mobile providers, in Bangladesh, the operators reported receiving a relatively high number of customer complaints "often" or "very often"—44 percent for kiosks and 65 percent for purified water resellers. The main complaints were limited water supply and slow delivery time, respectively. In Kenya and the

Philippines, about 5 percent of point source providers reported complaints. Notably, none of the providers reported complaints regarding service pricing, despite their high unit prices relative to public utilities (appendix table IC.5).

Financial Situation

The discussion on the financial situation of Point Source and Mobile Water SPSPs looks at issues of service pricing and fee collection, and financial sustainability.

Service Pricing and Fee Collection

Poor data quality makes it difficult to thoroughly analyze the pricing strategies employed by the SPSPs in the sample. Simply dividing sales by volume of water sold per year demonstrates the wide variation in unit prices charged by the different types of provider, yet fairly consistent pricing appears within each group. Typical kiosk and standpipe operators charged between US$0.72 (Bangladesh) and US$1.95 (Philippines) per cubic meter (m^3) of water, prices that are two to five times higher than those of public water utilities supplying water through household connections.

Cart vendors charged between US$2.40 (Bangladesh) and $6.00 (Kenya) per m^3, while tankers and jeepneys typically received $2.80 (the Philippines) to $3.40 (Kenya). Purified water resellers' prices were an order of magnitude higher, with SPSPs typically charging US$25 (Bangladesh) to U$29 (Philippines) per 1,000 liters of treated water (appendix figure IC.1). Most SPSPs reported setting tariffs on the basis of their own cost estimations and individual perception of what their customers could afford. Collusion in price setting was only commonly reported among tanker operators in the Philippines, where 40 percent of those interviewed said that prices are set "in agreement with other operators."

Because most SPSPs collect money from clients at the point of sale, respondents reported generally good experience with on-time payment by customers. More than 95 percent of mobile vendors and purified water resellers agreed with the statement that "most of my clients pay punctually." By contrast, half of standpipe operators in Bangladesh—who typically collect monthly fees from their customers—reported delays in receiving payment from many of their clients.

Financial Sustainability

All but a handful of firms included in the study sample had reasonably healthy operating margins. Typical ranges for tanker and jeepney firms were 10–19 percent; for kiosk and standpipe operators, 21–43 percent; for purified water resellers, 22–35 percent; and for cart vendors, 45–64 percent (appendix figures IC.2 and IC.3).

Once depreciation is taken into account, the comparatively higher level of capitalization in Kenyan firms becomes apparent. Some 27 percent of Kenyan kiosk operators and 44 percent of tanker operators had negative

profit margins in the year prior to interview (appendix figure IC.3). These operators aside, most providers had not only positive, but rather substantial, profit margins. Of course, for smaller standpipe, kiosk, and cart operations, whose annual revenue is limited to a few hundred to a few thousand US$, profits were small in absolute terms.

Table 4.8 Median and Mean Profit Margin in Year Prior to Interview

Country	Measure	Kiosk or standpipe	Purified water reseller	Cart vendor	Tanker or jeepney
Bangladesh	Median	43	35	45	n.a.
(*n* = 40)	Mean	44	36	44	
Kenya	Median	34	n.a.	64	14
(*n* = 125)	Mean	15		67	-8
Philippines	Median	21	22	n.a.	19
(*n* = 50)	Mean	10	32		19

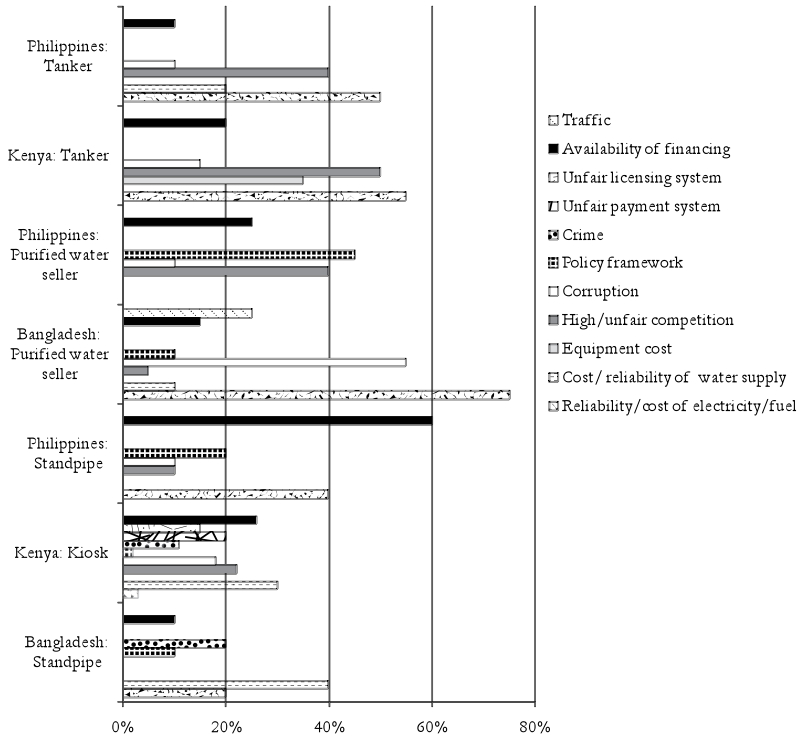
Source: SPSP survey 2006.

Note: n.a. = Not applicable.

Challenges and Business Constraints

When asked about the principal obstacles for their business operations, SPSPs cited the reliability and cost of fuel as well as high or unfair competition, consistently across provider categories. In addition, at least 10 percent of providers in each category identified the limited availability of financing as a leading constraint, and corruption was mentioned by 10 percent or more of providers, with the exception of standpipe operators in Bangladesh. Kenyan tanker operators were the only group to identify equipment cost as a major challenge, with 35 percent naming this as their first or second most pressing obstacle. A substantial proportion of SPSPs in the Philippines also named "poor government sector policies" as their principal concern, although additional information about the specific policies in question was not obtained. Fewer than 5 percent of providers named tax bureaucracy or burden, labor costs, technical or managerial capacity, or poverty level of customers as leading constraints. See figure 4.1.

Figure 4.1 Perceived Constraints of Point Source and Mobile Distributors: Percentage Citing Indicated Constraint as "Severe" or "Very Severe" Obstacle to Business



Source: SPSP survey 2006.

Equipment Maintenance and Repair

Providers were also queried about specific challenges with equipment functioning and maintenance. Technical capacity appears to be a constraint in Kenya, where more than half of providers interviewed said they "often" need external assistance to manage problems with their equipment. By contrast, the majority of SPSPs in Bangladesh and the Philippines said that they "usually" or "always" fix technical problems themselves (appendix table IC.6).

Approximately 20 percent of providers across all categories and countries said that it can be difficult to find external technical assistance when it is needed. Spare parts availability was not cited as a major challenge except for tanker operators in Kenya. About 42 percent of these SPSPs said that spare parts are hard to come by; the underlying explanations ranged from physical unavailability to high cost and poor quality.

Financing

Providers were also asked about their experience with financing for their firms (appendix table IC.7). With the exception of cart vendors, use of financing is not uncommon among the sample members. In Bangladesh, where the microfinance industry is thriving, 90 percent of standpipe operators and 60 percent of purified water resellers have availed themselves of business loans from either formal or informal lenders. In Kenya, 35 percent of tanker operators have previously received financing, as compared with just a handful of kiosk operators in that country. Among Filipino SPSPs operating standpipes and tankers, 20 percent have obtained prior financing, as have 35 percent of purified water resellers. Across all countries, monthly interest rates on loans from formal providers range between 1 percent and 2 percent. Among informal lenders, monthly rates of 7–11 percent were reported.

With the exception of standpipe operators in Bangladesh, virtually all SPSPs in the sample financed their firms' initial capital investment with their own savings or money borrowed from friends and family. In Bangladesh, a typical standpipe operator obtained 30 percent of his or her capital financing from a microfinance institution (appendix table IC.7).

Future Prospects for Point Source and Mobile Distributors

Provider perceptions of their firms' prospects in the coming years fall along country and technology lines. Kenyan SPSPs are generally more pessimistic than are service providers in Bangladesh and the Philippines. Operators of tankers and jeepney delivery firms are more pessimistic than are cart vendors or point source operators. Purified water resellers have the most optimistic outlook regarding their business prospects (appendix figures IC.4 and IC.5).

Providers' reported plans to make capital investments in their businesses within the year following their interview suggest a mixed picture. As might be expected, a minority of tanker firms had investment plans. Plans for capital investment appeared most aggressive in Bangladesh, where a majority of both standpipe operators and purified water resellers intended to expand their business in the coming year (appendix table IC.8).

Regression analysis on planned capital investment further underscores the enthusiasm for growth among Bangladeshi SPSPs—all else held constant, a provider in Bangladesh was 11 times more likely to report intent to invest in fixed assets as compared with SPSPs in Kenya and the Philippines. It is likely not a coincidence that SPSPs in Bangladesh generally did not view availability of financing as a principal constraint in their operations (appendix table IC.9). Indeed, 82 percent of purified water resellers said they planned to finance their expansions through commercial bank loans.

Across the entire sample, providers who had been able to secure a loan in the past were 3.8 times more likely to have capital investment plans as compared with those who were financed entirely through savings and grants.

Also interesting is the fact that the small number of SPSPs identifying as community-based organizations (who often rely on government or nongovernmental organization grants for funding) were 5.8 times more likely to cite investment plans, all else being equal, as compared with fully private firms bearing full commercial risk for their investments.

5.

SUMMARY AND EMERGING POLICY ISSUES

The analysis in this study, based on the survey of Small Scale Private Service Providers (SPSPs) in water and electricity in Bangladesh, Cambodia, Kenya, and the Philippines, sheds some light on the operations of such enterprises in the four countries, underscoring the broad diversity of these small scale operations and emphasizing the need for a range of approaches in designing policies. This examination further confirms the existing literature on the topic.

For policy makers, the obvious goals with regard to SPSPs include ensuring quality and safety standards for the services provided, at affordable prices. There is also an issue of the potential role for fostering certain types of SPSPs to facilitate access to basic services, particularly in areas utilities do not reach. In this context, this final chapter summarizes the main findings of the study, linked to findings from the existing literature, and discusses emerging policy issues for consideration by countries like those covered in this study.

Electricity: Main Findings

Small scale providers in the mini-grid and battery charging station (BCS) businesses play a relatively small role in Bangladesh, Kenya, and the Philippines, but a substantial role in Cambodia. About half of the SPSPs that provide electricity hold some type of license; this figure is lowest for the BCSs. The SPSPs predominantly serve rural areas, with the majority of their customers being households (as opposed to businesses). The proportion of low-income customers, as reported by SPSPs, is approximately 50 percent for both minigrids and BCSs.

A stable or growing customer base suggests a demand for services. Business satisfaction was high among the service providers, though a number of SPSPs, specifically among the mini-grids, face severe financial difficulties in that they fail to break even.

Technical and quality standards appear to be adequate. Basic safety procedures were reported to be followed by almost 90 percent of operators (with the exception of the micro-hydropower schemes in Kenya and the Philippines). Of the electricity SPSPs interviewed, 7 percent reported some type of accident experienced by customers (minor electric shocks, and explosions and burns caused by hot battery acid).

Mini-grids' performance, as measured by network losses and customer density, tended to be on par with public utilities. The mini-grids do, however, generally serve extremely small loads with a very low ratio of customers to employees. Reliability of supply was reported to be somewhat of a problem, but the bigger issue is limited service duration.

Prices for services were typically higher than those charged by public utilities: mini-grid charges were, on average, some two to four times higher, and BCS charges were about 7 to 10 times higher (although this is a difficult comparison to make). Cambodian mini-grid operators, whose fees were about three times the utility's price, were the exception.

Most of the BCSs (90 percent) were making profits. However, only 60 percent of the mini-grids in the survey reported making profits. Financial losses were notable for mini-grid operators in Kenya and in the Philippines.[17]

The major perceived constraints to business for electricity SPSPs appear to be access to financing (particularly for the mini-grids) and electricity (the cost and load shedding) though when analyzed by country, some differences are apparent. Constraints in financing were more severe in Kenya and the Philippines than in the two other countries, and problems related to power supply were a serious concern for almost 80 percent of operators in Bangladesh and close to 50 percent in Cambodia. Macroeconomic uncertainty was a major issue for about one-third of Kenyan, Filipino, and Cambodian SPSPs, while crime was a significant concern in Bangladesh.

The business constraints emerging from the survey were compared with results from small, informal enterprises in World Bank Country Enterprise

17. There is no information available on whether and to what extent the SPSPs surveyed receive subsidies. It is safe to assume that BCSs are subsidy-free. Mini-grids are more likely to benefit from financial support through special funds, donor money, or direct budget transfers, but the role of subsidies cannot be put into perspective because of the lack of data.

Surveys.[18] The findings reflect similar concerns with some differences in severity. In Bangladesh, SPSPs reported a much more severe constraint to their operations posed by power supply and by law and order than did the broader group of small and medium enterprises. In Kenya, SPSPs were generally more positive about the severity of business constraints such as access to and the cost of financing. Yet in the Philippines, SPSPs regarded these financing constraints as a much more severe concern than did the broader community of small, informal enterprises. Finally, in Cambodia, the SPSPs were more positive about crime and corruption, yet perceived financing and poor power supply as much more severe constraints.

Electricity: Discussion

The findings of this study highlight the broad diversity of SPSPs providing electricity services, from those delivering well-organized, capital-intensive network services to operators providing occasional battery charging services as a secondary activity requiring little overhead. As a whole, the SPSPs provide important services to areas that utilities do not reach. Their existence, success, and continued viability in the near to medium term is highly relevant for achieving development objectives.

Battery charging is a relatively successful business in a competitive market, with particularly good prospects in off-grid rural areas where the population is not highly dispersed and where many households have no access to electricity.[19] The business requires little investment or technical know-how. Waste appears to be handled responsibly and safety is not a major concern. Revenues are modest, though profit margins tend to be large. The willingness to pay for battery-stored electricity is high, and even though close substitutes are missing (which is why the battery-charging business is flourishing), strong competition occurs. Under these circumstances, it would seem that few if any government policy interventions would be required to achieve goals of quality, safety, and affordability.

Conversely, setting up and operating mini-grids is a complex undertaking with greater technical and financial risks. Most of the mini-grids surveyed appear to operate without major technical problems, though reported service quality and technical standards do not meet international benchmarks.

18. Comparisons are drawn from Economisti Associati (2007a) based on the country-specific results of World Bank Enterprise Surveys; Investment Climate Survey of Informal Enterprises, Bangladesh (2002); the Investment Climate Survey of Micro and Small Enterprises, Cambodia (2003) and Kenya (2003); Investment Climate and Productivity Study (Philippines, 2003). http://www.enterprisesurveys.org/

19. In off-grid locales where the population is highly dispersed, BCSs are not practical, given that the transport of batteries (for users) and diesel (for suppliers) is sometimes impossible or costly.

A bigger concern, however, is that a large number of mini-grids fail to break even financially. While this does not seem to pose an immediate threat of liquidation, it does undermine the ability to maintain or improve service quality and to expand business.

As the analysis has shown, the low load and customer densities, the lack of commercial electricity users, and the high share of low-income customers hinder the revenue-generating capabilities of small, isolated grids. These limitations contribute to limited cash flow that minimally covers operating costs (and in many cases does not), let alone the amortization of assets or debt (especially in the case of hydropower schemes). These drawbacks are inherent to mini-grids, rather than a special problem of all SPSPs. Under such circumstances, it would seem that action in a few policy areas—technical support, improving financial support, partnering with utilities to purchase electricity at bulk rates, and increasing the productive use of electricity by adding more commercial clients, which would maximize use during off-peak hours (see "Emerging Policy Issues" below)—could benefit mini-grids.

Water Supply: Main Findings

Water supply SPSPs also are a fairly diverse group, with substantial differences in their business operations and in financial sustainability. On the whole, water SPSPs, particularly small private networks (SPNs), play a significant role in service delivery in the countries examined. In Kenya and Cambodia, they serve about 10 percent of the relevant population.[20] The services provided by point source and mobile vendors are considered marginal compared with those of the SPNs, given that their client bases and quantity of water provided are smaller, though they are numerous. SPNs provide service in both rural (Cambodia and Kenya) and urban areas (the Philippines), whereas point source and mobile vendors generally operate in urban areas. Kiosk and standpipe operators reported having the highest proportion of poor clients, at about two-thirds, and SPNs reported that about 50–60 percent of their clients were poor.[21] The purified water resellers tended to serve higher-income clients at the household level and had a large share of commercial customers (restaurants and shops).

Prices for services varied considerably by type of provider. SPNs provided the least expensive services, generally comparable to utility pricing (with the exception of Cambodia). Point source and mobile vendors' prices were higher, which is not surprising given that it is much more expensive to distribute water by truck than by network. Typical kiosk and standpipe opera-

20. Relevant population refers to the rural population with access to an improved source of water, as estimated by household surveys.

21. The proportion of poor clients is reported by the SPSPs and based on their own perceptions.

tors charged two to five times more than the utilities while purified water resellers charged an order of magnitude higher than utility prices.

A majority of the SPSPs held some type of license and were registered with one or more government entities or regulatory agencies. The highest proportion of those with some kind of license was among mobile distributors, with close to 90 percent holding a permit for the sale of water, (sometimes also including special permits for water abstraction or water transportation, or both). The share of registered businesses is also very high—over 80 percent for SPNs and water truckers. The operators with the smallest proportion holding a permit are hand carters.

Technical and quality standards appear to be mixed. Water refilling stations in the Philippines and treated water distributors in Bangladesh reported close monitoring of water quality with daily tests. SPNs performed limited treatment and almost no treatment was reported by operators of kiosks, standpipes, carts, or tankers. Despite the limited treatment practices by SPNs, only a handful (less than 3 percent) reported cases of waterborne diseases, such as typhoid fever and amoebic dysentery, and customers' reported main requests were for more water and improvements in pressure.

The technical level of SPSP operations is likely to be somewhat affected by the owners' limited training. Fewer than 25 percent of operators had significant previous experience. Few initiatives aim at training SPSPs. Governments currently do not provide such services and there are few SPSP associations. Those that do exist tend to focus on lobbying. In Cambodia and the Philippines, some training courses for SPSP operators have been organized by nongovernmental organizations (NGOs).

Among SPSPs, SPNs on the whole had particularly high levels of satisfaction and very positive outlooks for future business prospects. This is somewhat surprising given that 7–9 percent of SPNs in each country were not covering their operating costs. When depreciation costs are included, the financial picture is substantially worse for many operators, particularly those in Kenya, whose median profit margin was negative 51 percent. Among the main business constraints reported by SPNs was financing. This was raised by about half of operators in Kenya and a third in Cambodia and the Philippines. Other major constraints included the cost of electricity (Cambodia), and water source problems (Kenya).

In contrast, perceptions of future prospects were more mixed for the point source and mobile distributors despite generally being quite profitable. Once depreciation is taken into account, with the exception of some Kenyan kiosk and tanker operators, most providers still have a positive, and rather substantial, profit margin. Absolute profits, however, for the smaller standpipe, kiosk, and cart operations can be minimal. The main business

constraints reported by the point source and mobile distributors were reliability and cost of fuel, and unfair competition in all provider categories. Only 10 percent of point source and mobile distributor SPSPs identified limited financing as a leading constraint. Technical capacity appears to be somewhat of an issue in Kenya, but less so for the other countries. Crime was a comparatively bigger issue for water kiosks, as were road conditions for water truckers.

Interactions with government agencies were categorized in a positive light in the survey, as "easy" for close to 60 percent of SPSPs (including energy SPSPs), and as "neither difficult nor easy" for another 17 percent (Economisti Associati 2007a). The negative perceptions are mostly from truckers and water kiosks in Kenya and Bangladesh. About one-half of the SPSPs received at least one inspection during the 12 months preceding the survey. The inspections were mostly on technical and safety issues and typically did not have any negative repercussions for the operators. Only three cases of temporary closure were reported in the survey.

Water Supply: Discussion

The findings of this study highlight the broad range of small private operators in the water sector. Taken as a whole, SPSPs provide important services in areas that utilities do not reach. Yet future prospects for water SPSPs, and their role in reaching the Millennium Development Goals, are somewhat limited and substantially depend on the type of service they provide and the area they serve (rural, urban, peri-urban). Among the point source providers, perhaps one-third have a customer base that relies exclusively on kiosk or standpipe service for their water supply. Only a quarter of the mobile providers serve low-income households who are likely not to have alternative supplies of water. Moreover, vended water is currently not considered by the international community to be an "improved" water source (Joint Monitoring Programme 2006).

A particular challenge in the provision of water is reaching rural areas. The economics of rural water supply—which includes sparse populations resulting in high per capita costs, low revenue potential, and the availability of low- or no-cost substitute water sources—make it less attractive for private entrepreneurs in areas where coverage rates are the lowest.

The market in poor urban areas in many countries is different. There appears to be much potential for scaling up business for SPNs and for the continued viability of water kiosks and standpipes. For the other types of operators—mobile water vendors and treated water distributors—prospects are limited to niche markets as utility services expand and improve. In providing services to the urban poor, it is important to recognize that allowing resale of water from house connections to neighbors can dramatically

reduce travel and queue times for users, and may also exert competitive pressure on the price of vended water (Crane 1994). Such arrangements also reduce regulatory burdens because the water is sourced from municipal supply and producer costs are standardized. In addition, the provision of connection-fee financing for poor households living near distribution networks can help these families jump from water use of just a few jerricans per day to in-home piped services, with an often minimal impact on monthly water expenditures (Davis et al. 2008).

Another main issue related to SPSPs is the substantial variation in organizational forms, objectives, and customer base conditions of operators, particularly among the SPNs because these factors affect their performance and sustainability in important ways. In Cambodia, fully private enterprises that provide the principal source of their owners' income are generally operated under solid financial principles; virtually all SPNs have universal metering, charge cost-recovering tariffs, and are committed to collecting fees regularly (even daily, if necessary) from their clients. The situation is similar among private firms and cooperatives in the Philippines (though less consistently), where enterprises are typically run on a commercial basis. By contrast, Kenyan SPNs all self-identify as community-based organizations, and only 13 percent of owners and managers reported water services as being their family's principal source of income. These community-based organizations are heavily dependent on grant financing and have the greatest per capita capital investment among the three countries. One out of seven SPNs in Kenya collects no regular tariffs from users, and three out of four have negative profit margins. This financial situation has implications for donor agencies and NGOs that are interested in creating SPSPs and devising programs to facilitate access to credit and other inputs.

The water SPSPs that perform most robustly are those originating from and operating under fully commercial arrangements. It could thus be argued that, from both policy and program viewpoints, facilitating new entry by new providers should focus on measures such as making market opportunities known to potential entrepreneurs and clarifying the regulatory framework so as to reduce uncertainty, rather than subsidizing inputs or trying to push service-delivery aspirations onto organizations created for other purposes.

Emerging Policy Issues

When considering policies that will contribute to the goals of affordable quality and reasonable safety standards for services provided by SPSPs, several areas emerge from the findings of the study, as well as from the existing literature. The broad variations in SPSP operations, financial situations, challenges, and country contexts highlight the fact that there is no single recommended policy approach, but rather a range of issues that countries,

donors, and NGOs may want to consider in addressing the role of SPSPs in the provision of electricity and water where demand exists.

Recognizing and Legitimizing SPSPs

In many countries, SPSPs are not formally recognized as part of the electricity or water sectors, despite the large proportion that hold some kind of license. In some cases, SPSPs are seen in a negative light resulting from perceptions of high prices, poor quality, and informal operating practices. While this may be the case for some operators, it appears to be a minority as the survey data demonstrate. Formally recognizing and legitimizing certain types of SPSPs, such as providers of network services, has a number of benefits that will ultimately contribute to the goals of improving quality and affordability of services. With more legitimately recognized businesses, SPSP operators would have better opportunities for accessing finance, ultimately lowering costs, the savings from which could be passed on to consumers. Other potential benefits include decreasing uncertainty and risk, decreasing corruption, and creating a more favorable business environment.

In recognizing or further licensing SPSPs, it will be important to ensure that the process does not result in higher costs to operators through taxes, registration fees, or enforcement of expensive quality standards. As it is, many enterprises are currently not very profitable and adding to their expenses would put them out of business. In fact, such a process may require simplification of existing procedures, and possibly provision of incentives to SPSPs, such as tax credits, or access to bulk utility rates. Box 5.1 discusses recent recognition of SPSPs in Cambodia.

Box 5.1

Recognizing, Licensing, and Fostering SPSPs in Cambodia

SPSPs play a key role in the provision of electricity and water in rural areas of Cambodia. The government of Cambodia has acknowledged their contribution and has made them part of its strategy to expand service coverage, particularly in rural areas. The 2001 Electricity Law establishes a licensing system that recognizes SPSPs as formal providers in small towns and rural areas. By 2005, the Electricity Authority of Cambodia, the sector regulatory agency created by the same law, registered 85 SPSP licensees in small towns and rural areas serving about 150,000 customers (World Bank 2006). In addition, the government has established the Rural Electrification Fund (REF), which supports small scale private sector provision in rural

(continued)

Box 5.1

Recognizing, Licensing, and Fostering SPSPs in Cambodia *(continued)*

electrification and renewable energy development. Specifically, the fund provides grant assistance to

- Rural Electricity Enterprises for installing up to 50,000 new connections;
- Solar panel firms for supplying up to 12,000 solar home systems; and
- Companies interested in developing micro-hydropower plants (average 50 kilowatts), mini-hydropower plants (average 0.75 to 5 megawatts), and other forms of renewable energy plants.

The REF finances 25 percent of the investment cost of selected projects. For 2008, REF support was set at US$45 per new connection, US$100 per solar home system, US$400 per kilowatt in new micro- and mini-hydropower plants; and US$300 per kilowatt of other renewable technology power plants.

In the water sector, the situation is somewhat different. Although Cambodia also encourages private participation in water supply, sector laws to govern such participation have not yet been enacted. In the absence of a general legal framework, the Ministry of Industry, Mines, and Energy (MIME) and provincial governments have promoted the formalization of SPSPs by issuing licenses. However, most licenses require further specifications given that they poorly define license conditions such as rights and duties of licensee and licensor, duration, and cost, among others.

MIME has also promoted private sector schemes to provide piped water at the rural village level by awarding contracts to local operators. Two kinds of contracts are used to recruit local private operators: a design-build-operate contract (DBO) or a design-build-lease (DBL) contract. In both contract types, the private operator prepares the final design of the water system, builds the system, and is obliged to operate the system for 15 years. The difference between those types of contracts is in the source of funding. In a DBO contract, a grant from the International Development Agency (IDA) subsidizes between 50 and 60 percent of the investment (up to US$500 per connection) while the local private operator provides the remainder. Customers are expected to pay a uniform tariff (US$0.50 per cubic meter) designed to cover operation and maintenance costs, taxes, and a return for the private operator. In a DBL contract, a credit from IDA finances 90 percent of construction of the water system while the local private operator

(continued)

Box 5.1

Recognizing, Licensing, and Fostering SPSPs in Cambodia *(continued)*

finances the remainder. Customers will pay a uniform full cost recovery tariff including a lease fee (to reimburse the IDA credit), taxes, and a return for the private operator. By 2007, six DBO contracts involving over 13,000 connections had been awarded and were being implemented. All benefited towns were located in Kampong Cham province. In addition, 12 DBL contracts were awarded covering over 13,000 connections.

Sources: Cambodia Renewable Energy and Rural Electrification (http://www.recambodia.org/reap.htm); Triche et al. 2006; Navarro and Tavares 2008.

Ensuring an Enabling Business Environment

Countrywide policies that promote a positive business environment will encourage enterprise development, ultimately benefiting the population through more and better goods and services, and through job creation and overall economic growth. Among the policy areas that are particularly relevant to small enterprises such as SPSPs are those that support a more stable operating environment, effective institutions, access to credit markets, and business development services, and that permit competition in the market to spur both cost and price reductions and service-quality improvements that are ultimately passed on to consumers. For certain services, particularly networks (mini-grids and SPNs) with little direct competition from other network providers, sharing of standardized performance information with customers could help customers to benchmark their service provider and perhaps exert greater demands for changes in prices or services.

Providing a "Light" Regulatory Framework for SPSPs to Ensure Quality and Safety Standards without Increasing Costs to Operators

Ultimately, the goal of enforcing a regulatory framework is to ensure quality, safety, and environmental standards at affordable prices in a setting that allows for competitive private entry. Yet some regulations come at a high cost, which could provide disincentives for SPSPs to operate. Given that many SPSPs operate with slim profit margins, raising costs through unnecessary regulation can put them out of business.

In designing and enforcing regulation it is, therefore, important to ensure that the benefits exceed the costs. The first step is to assess whether such a framework is needed. In countries where operators' quality, safety, and environmental standards are low, regulation may be deemed appropriate. For such countries, an approach conducive to SPSP operations might include

"light" regulation, which would involve allowing some flexibility in service rules, setting and enforcing standards in conjunction with SPSP associations, and where relevant, creating a business environment that allows for competition. Such a framework can be difficult to agree upon and implement in many countries. One approach might involve extensive consultation and a phased approach to implementation.

A few guidelines for a regulatory system aimed at ensuring quality of service are drawn from the literature.[22] These include setting standards that are based on customers' preferences and willingness to pay; a menu of service levels and standards that allows for variation across different categories and geographic areas; phasing in of enforcement of standards and associated penalties and rewards over time, in coordination with changes in tariff levels; and ensuring that the regulator has the legal authority to delegate or contract out quality-of-service monitoring and imposition of penalties to a third party subject to appropriate oversight.

Partnering with Utilities

In both Kenya and Bangladesh, most point source operators resell water purchased in bulk from public utilities. At least one-third of providers in both countries cited problems in their relationship with the utilities with respect to pricing, reliability of supply, or extortion. It is unclear how representative this is of all SPSPs, though better relationships with utilities would undoubtedly benefit both the utilities and SPSPs, and ultimately, consumers. See box 5.2.

It is anticipated that existing utilities will eventually be able to expand services to new areas that will likely include SPSPs' areas of operations. For SPSPs operating network services, this expansion could provide new opportunities through partnerships with utilities. Such partnerships may involve negotiating formal service contracts so that the SPSPs are subconcessionaires, with fair bulk rates and access to utility financing for additional capital investments to improve or extend service. Such agreements would also lower risks for the operators. The utilities would benefit from the extended service coverage and improved coverage targets, and possible reductions in network losses and unaccounted for and nonrevenue water. The experience of expanding water supply services to rural areas in Paraguay through small scale providers provides interesting insights into how such a relationship can work, and possible lessons on the legal, regulatory, and contractual arrangements (Drees-Gross et al. 2005). In Bangladesh, a similar approach is being planned for urban areas and will also provide important insights (World Bank 2008a).

22. *See* Reiche, Tenenbaum, and Torres (2005) and Tremolet and Junt (2006).

Supporting Technical Assistance

Many of the SPSPs would benefit greatly from training. For example, minigrids are in particular need of technical training to help improve performance. SPNs need training in water treatment processes and the consequences of consuming unsafe water. Kiosk and standpipe operators appear to be in need of capacity building in operations and maintenance and in accounting. Very few reported having access to any sort of training, a majority reported needing external help to deal with equipment problems, and the poor financial standing of water kiosks in Kenya indicates a lack of technical skills needed for improving overall operations. As mentioned below, such training could be provided effectively through SPSP associations, with a substantial role for donors in its facilitation.

Facilitating the Development of Associations of Providers

A few countries have had positive experiences with associations of SPSPs (particularly in the water sector), notably the Plurinational State of Bolivia, the Philippines, Mozambique, and Paraguay (Schaub-Jones, forthcoming). In Paraguay, the well-known *aguateros* (small private water companies) have formed associations that play a role in acquiring and defending legal rights, providing advocacy, arriving at some degree of self-regulation, accessing technical and other assistance, helping to access credit, and developing new business opportunities. The associations represent members in the water-sector dialogue, and serve as intermediaries between SPSPs and the utility, regulators, and policy makers.

Associations of SPSPs in other countries could potentially play an important role in helping individual operators improve business operations through offering training, technical assistance, and access to finance. Such groups could also help to ensure market competition, prevent collusion, enforce operating and quality standards and develop an "accreditation" system, negotiate bulk rates with utilities, negotiate reduced taxes or duties on equipment, facilitate collective purchasing or investment for members, and advocate in behalf of SPSPs. Donors' function would be to facilitate formation of associations.

Box 5.2

SPSPs and Water Concessionaires Partnering to Extend Water Services in Manila

Water is provided in Manila by two concessionaires, the Manila Water Company in the East Zone and Maynilad Water Services in the West Zone. The concessionaires are required to expand water service coverage, provide 24-hour water supply, and guarantee pressure for all connections. The concession contracts include incentives to work with SPSPs by allowing SPSPs' services to be counted when assessing coverage targets. As a result, a number of innovative partnerships between concessionaires and incumbent SPSPs have developed, such as allowing customers to pay connection fees in installments or through a higher water tariff, by reducing connection costs through sharing meters, and by using low-cost approaches such as hoses for establishing individual connections in informal settlements.

In one area, for example, the utility provides bulk water through a main line at the head of the road using a bulk meter to keep track of aggregate consumption. A local SPSP, acting as a "retailer" of the water supply for the community, pays for the meter, connects individual households to the main line, performs billing and collection, and maintains and repairs the network. This process is run as a community-based operation, thus, the retailer does not profit from the sale of the water and reports on the financial status of the business to the community.

Source: Water and Sanitation Program 2004.

Looking Ahead

The future role of SPSPs will depend on the type of service provided, the country context, and the business model and profitability of specific SPSPs. In rapidly urbanizing countries, as in Africa, SPSPs may have a critical role to play for the near and medium term as utilities try to keep up with urbanization and expand the provision of services. In other countries where utilities are expanding coverage, the demand for some SPSP services may decline. For remote rural areas, SPSPs may continue to be the most viable approach to service delivery and demand will continue. Table 5.1 summarizes prospects for the future by type of SPSP in the electricity and water sectors. The role for network services is likely to be greatest and offers much opportunity for scaling up.

There is also scope for additional analytical work on small scale providers. Because of the wide variation in small scale providers, country-specific studies can be extremely helpful in countries with substantial SPSP presence. Any further surveys would benefit from including coverage of all types of small scale providers within a sector; objective data on quality of services; and inclusion of perceptions of services, quality, and prices from the perspective of clients.

Table 5.1 Summary of Key Issues and Future Prospects by Type of SPSPs in Water Supply and Electricity

Type of SPSP	Key issues	Prospects
	Water supply	
Private network operators	Access to finance. Limited water volumes.	Much potential for scaling up successful businesses. Opportunities for partnering with utilities. Access to finance will be important for future growth.
Point Source Vendors: Standpipes and Water Kiosks	Limited value added in reselling water from public utilities.	Strong potential as long as utilities remain reluctant to go into informal areas (for example slums). Competition from other operators may reduce prices and returns.
Mobile water vendors	Inefficient, expensive delivery mode. Low profitability.	Likely to play a diminishing role in areas where utility services improve. Play an important role in times of scarcity. Opportunities (but limited) in niche markets.
Value added water vendors	Services are limited and not viable for meeting full water needs, but viable for small market.	Limited prospects for niche market.

Table 5.1 Summary of Key Issues and Future Prospects by Type of SPSPs in Water Supply and Electricity (*continued)*

Type of SPSP	Key issues	Prospects
	Electricity	
Grid operators	Very mixed experiences. Few profitable operations.	Much potential for scaling up successful businesses based on client demand. Opportunities for partnering with utilities. Opportunities for improving profitability by adding commercial and industrial clients where possible. Access to finance will be important to future growth
Battery charging stations	Modest profits. Secondary operation for most.	Limited profitability. Good potential in rural areas but business will remain marginal.

Source: Author

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APPENDIX I

TABLES AND FIGURES

IA
Tables for chapter 2, Small Scale Private Service Providers of Electricity

Source for all tables is the SPSP Survey, 2006

Table IA.1 Grid Operators: Size and Longevity of Business

Country and sample size	Workforce headcount	Full-time-equivalent workforce	Years in business
Bangladesh (*n* = 20)	2.2	1.4	4.3
Cambodia (*n* = 81)	3.6	3.2	8.6
Kenya (*n* = 10)	7.2	2.2	4.4
Philippines (*n* = 10)	4.3	1.0	5.6
Total Grids (mean) (*n* = 121)	3.9	2.7	7.6

Source: SPSP Survey, 2006

Table IA.2 Battery Charging Stations: Size and Longevity of Business

Country and sample size	Workforce headcount	Full-time-equivalent workforce	Years in business
Bangladesh (*n* = 20)	1.2	1.1	9.5
Cambodia (*n* = 20)	1.7	1.4	5.4
Kenya (*n* = 20)	2.1	1.6	4.8
Philippines (*n* = 22)	1.9	1.3	8.4
Total BCSs (mean) (*n* = 82)	1.7	1.3	7.1

Source: SPSP Survey, 2006

Table IA.3 Grid Operators: Client Base

Country	Average number of clients served[a]	Household clients as percentage of total	Poor households as percentage of all household clients
Bangladesh	111 (102)	9	10
Cambodia	374 (3)	99	51
Kenya	77 (4)	87	67
Philippines	36	100	80
Mean for all grids (n = 121)	278	83	n.a.

Source: SPSP Survey, 2006

Note:

a. Number of commercial clients, if any, in parentheses.

Table IA.4 Battery Charging Stations: Client Base

Country	Average number of clients served[a]	Household clients as percentage of total	Poor households as percentage of all household clients
Bangladesh	61 (31)	47	4
Cambodia	55 (3)	95	66
Kenya	58 (8)	90	54
Philippines	25	100	70
Total for all BCSs (n = 82)	66	82	n.a.

Source: SPSP Survey, 2006

Note:

a. Number of commercial clients, if any, in parentheses.

Table IA.5 Cost of Electricity and Battery Charging Fees

	Cost of electricity (US$/kWh)		Battery charging fee (US$/kWh)					
			50 Ah[a]		70 Ah		100 Ah	
Country	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Bangladesh	n.a.	0.08	n.a.	0.62	n.a.	0.48	n.a.	0.40
Cambodia	0.15	0.22	0.62	0.57	0.56	0.48	0.49	0.40
Kenya	0.15	0.19	1.06	1.30	0.76	0.93	0.64	0.70
Philippines	0.20	0.19	1.40	1.20	1.30	1.05	1.17	0.73

Source: SPSP Survey, 2006

Note:

a. Ah refers to Amp Hour

Analysis of Performance Indicators

The top issues that stand out are (i) an indicator of network losses associated with a low ratio of customers per kW installed (that is, a comparatively high load per customer); and (ii) a high customer density, which strongly correlates with a high customers-per-employee ratio. Figures IA1. and IA.2 rank the mini-grids based on their factor scores. The results suggest that the Cambodian mini-grids are the worst performers with respect to network losses and that the mini-grids in rural Kenya and in the rural Philippines rank lowest with regard to customer density. Also, there is evidence that service areas with a high share of residential consumers and a large proportion of poor households tend to have comparatively high network losses and low customer densities.

Figure IA.1 Mini-Grid Scores for Network Losses

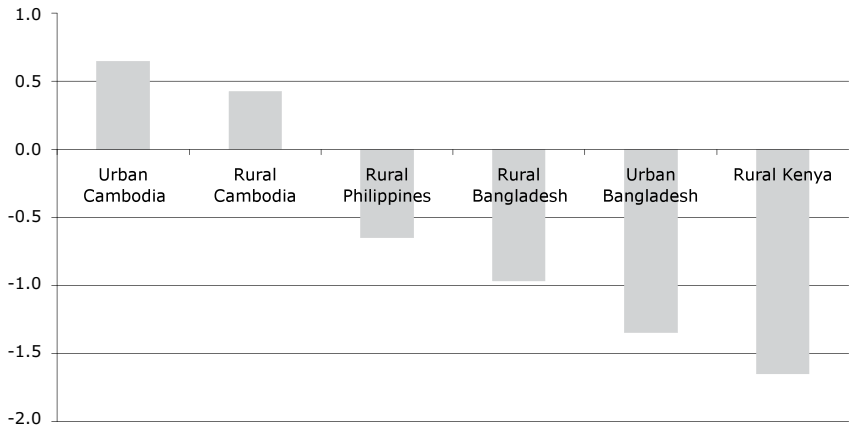
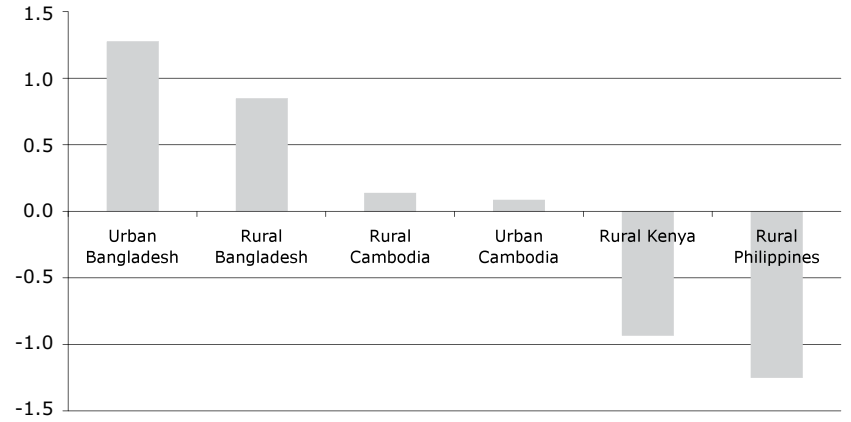


Figure IA.2 Mini-Grid Scores for Customer Density



Additional analysis (principal components) was carried out on a broader range of performance indicators (customer/kW, customer/km, and the like), financial indicators (profit margin, revenue), and other variables (share of households, share of poor households, rural-urban dummy). The findings show that the first factor is an indicator of (high) network losses, which strongly correlate with a high share of household customers and a high share of poor households and weakly correlate with a low customer density. The second factor is related to seasonal fluctuations in the business, which, in turn, is negatively correlated with customer density. Third, high revenues are positively correlated with urban areas and business experience. Fourth is an indicator of a large profit margin associated with a high customers-to-employee ratio.

IB
Tables for chapter 3, Small Private Water Supply Networks (SPNs)

Table IB.1 Organizational Structure of SPNs

Country and sample size	Percentage self-identifying as stand alone business	Percentage for whom water business is main source of income	Percentage self-identifying as private firm	Percentage self-identifying as a community-based organization	Percentage self-identifying as cooperative	Percentage holding a trade license	Percentage holding 1+ operating licenses issued by government agency
Cambodia (*n* = 75)	99	79	100	0	0	9	76
Kenya (*n* = 85)	100	13	0	100	0	19	86
Philippines (*n* = 85)	46	46	12	12	76	9	82

Source: SPSP Survey, 2006

Table IB.2 SPNs: Number of Clients, Network Size, and Capital Investment

Country and sample size	Measure	Number of household clients[a]	Number of total clients[a]	Total estimated investment in business to date (US$)	Total network length (km)	Meters of network per client[a]
Cambodia	Median	130	130	6,793	1.95	16.0
(*n* = 75)	Mean	249.0	249.6	49,351	4.43	20.8
Kenya	Median	297	302	55,450	7.65	33.6
(*n* = 85)	Mean	436.7	451.2	102,243	11.78	57.9
Philippines:	Median	354	380	51,669	2.00	5.36
Private firms and cooperatives	Mean	466.5	491.6	70,847	2.94	10.62
(*n* = 75)						
Philippines: CBOs	Median	119	129	15,549	3.02	9.62
(*n* = 10)	Mean	289.8	294.9	24,240	2.54	14.12

Source: SPSP Survey, 2006

Note:

a. Values refer only to individual connections; public tap and kiosk customers are excluded.

Table IB.3 SPNs: Staffing

Country and sample size	Measure	Community-based organizations		Private firms		Public utilities[a]
		Number of full-time-equivalent staff	Staff per 1,000 connections	Number of full-time-equivalent staff	Staff per 1,000 connections	Staff per 1,000 connections
Cambodia	Median	__	__	2	17	4
(*n* = 75)	Mean			2.7	27	4
						(*n* = 1)
Kenya	Median	2.9	12	__	__	11
(*n* = 85)	Mean	4.3	28			11
						(*n* = 3)
Philippines	Median	4.3	11	3.8	11	7
(*n* = 85)	Mean	4.9	18	3.6	12	7
						(*n* = 47)

Source: SPSP Survey, 2006

Note: __ not available

a. Computed with available data; not all public utilities are represented.

Table IB.4 SPNs: Customer Complaints

Country and sample size	Percentage reporting receiving customer complaints "often" or "very often"	Among those receiving complaints "very often," main reason for complaints (%)
Cambodia (*n* = 75)	7	High price of services (60)
Kenya (*n* = 85)	21	Limited water availability (78)
Philippines[a] (*n* = 75)	13	Limited water availability (86)

Source: SPSP Survey, 2006

Note:

a. Data available in the Philippines only for private firms and cooperatives.

Table IB.5 SPNs: Connection Fees for New Customers

Country and sample size	Percentage charging new customers a connection fee	Median, mean connection fee among those charging (US$)	Percentage requiring customer to cover piping costs separately, among those with connection fee	Median, mean connection fee (US$), among public utilities[a]
Cambodia (*n* = 75)	30	17 22	51	400 400 (*n* = 1)
Kenya (*n* = 85)	99	139 174	63	__
Philippines: Private firms and cooperatives (*n* = 75)	93	4 21	68	20 20 (*n* = 25)
Philippines: CBOs (*n* = 10)	90	3 16	89	

Source: SPSP Survey, 2006

Note: __ not available

a. Computed with available data; not all public utilities are represented.

Table IB.6 SPNs: Service Fees

Country and sample size	Percentage charging flat monthly fee	Percentage charging volumetric tariff or fixed fee + volumetric tariff	Percentage using "other" approach to billing	Price per m^3		
				SPNs charging volumetric fees (US$)	SPNs charging monthly fees[a] (US$)	Public utilities[a,b] (US$)
Cambodia (*n* = 75)	3	97	0	Median: 0.49 Mean: 0.45	0.43	0.24–0.36 (*n* = 2)
Kenya (*n* = 85)	67	20	13	Median: 0.67 Mean: 0.97	0.37	0.20–0.40 (*n* = 4)
Philippines: Private firms and cooperatives (*n* = 75)	1	99	0	Median: 0.21 Mean: 0.27	0.30	0.13–0.56 (*n* = 13)
Philippines: CBOs (*n* = 10)	10	90	0	Median: 0.19 Mean: 0.19	0.23–0.28	

Source: SPSP Survey, 2006

Note:

a. Imputed price where flat monthly fees are charged.

b. Computed with available 2004 data; not all public utilities are represented.

Table IB.7 SPNs: Comparison of Tariffs for In-Home Versus Point Source Service

Country and sample size	Price per m^3 for customers with in-home connections (US$)	Median price per m^3 for tap and kiosk customers (US$)	Factor difference
Kenya (*n* = 85)	0.37–0.97	1.39	1.3–3.8
Philippines: Private firms and cooperatives (*n* = 75)	0.21–0.30	0.73	2.4–3.5

Source: SPSP Survey, 2006

Table IB.8 SPNs: Nonrevenue Water (NRW)

Country and sample size	Median and mean NRW (%)	Median, and mean NRW among public utilities[a] (%)	Median and mean NRW (m^3/ km of network/ day)	Median and mean NRW (m^3/ connection/ day)	Causes of NRW		
					Physical leakage (% of SPNs reporting)	Theft and vandalism (% of SPNs reporting)	Inaccurate metering (% or SPNs reporting)
Cambodia	20	18	0.64	0.03	64	4	30
(*n* = 75)	24	18 (*n* = 2)	0.89	0.04			
Kenya	10	47	0.19	0.02	81	2	0
(*n* = 85)	17	46 (*n* = 4)	1.30	0.06			
Philippines:	10		3.66	0.06	95	3	0
Private firms and cooperatives (*n* = 75)	11	11 15 (*n* = 15)	6.96	0.09			
Philippines: CBOs	7		2.23	0.04	100	0	0
(*n* = 10)	6		2.17	0.03			

Source: SPSP Survey, 2006

Note:

a. Computed with available data; not all public utilities are represented.

Table IB.9 SPNs: Metering and Billing Practices

Country and sample size	Networks with full metering (%)	Over all networks, median, mean connections metered (%)	Collect payment from clients daily, weekly, or biweekly (%)	Collect payment monthly (%)	Report most (> 75%) customers pay on time (%)	Report most (> 75%) customers pay late (%)	Median, mean clients disconnected in prior year (%)
Cambodia (*n* = 75)	77	100 83	30	69	67	4	0 4
Kenya (*n* = 85)	20	0 20	0	87	61	20	3 13
Philippines: Private firms and cooperatives[a] (*n* = 75)	91	100 96	17	83	71	11	3 7

Source: SPSP Survey, 2006

Note:

a. Data available in the Philippines only for private firms and cooperatives.

Figure IB.1 SPNs: Operating Margin in Year Prior to Interview

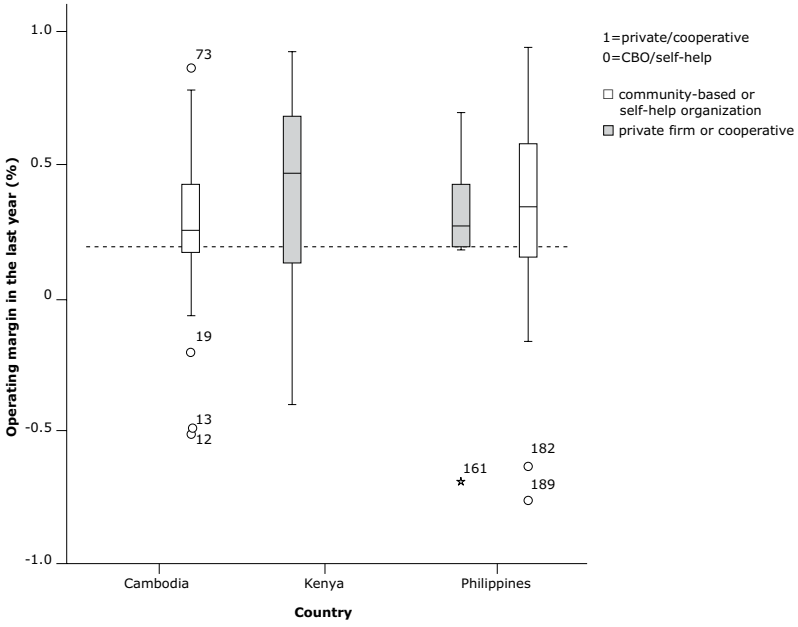


Figure IB.2 SPNs: Profit Margin in Year Prior to Interview

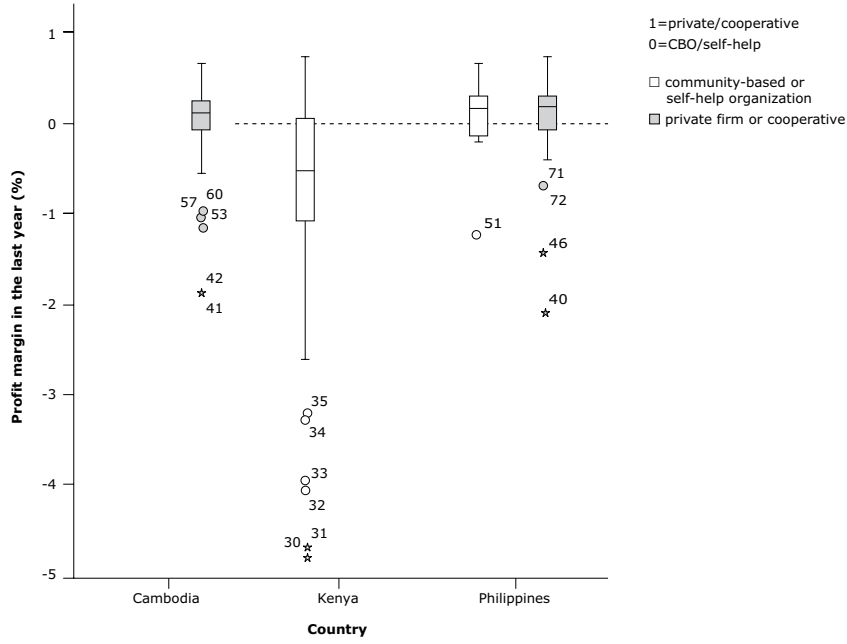


Table IB.10 Profit Margin in Year Prior to Interview for All SPNs

Type of SPN	Measure	Profit margin (%)
Rural, peri-urban, small town network	Mean	-58
	Median	-3
Urban network	Mean	12
	Median	7
Community-based organization or cooperative	Mean	-64
	Median	-6
Private firm	Mean	9
	Median	5

Source: SPSP Survey, 2006

Note: Includes all SPNs in sample (245) from Cambodia, Kenya, and the Philippines.

Table IB.11 Logistic Regression Analysis of Nonnegative Profit Margin in Year Prior to Interview

Model	ß	Standard error	Wald	Sig.	Exp(ß)
Private/Coop	1.349	0.610	4.886	0.027	3.855
Years in Business (log)	-0.234	0.304	0.593	0.441	0.791
# of clients (log)	0.822	0.270	9.301	0.002	2.275
Urban Dummy	2.164	1.092	3.929	0.047	8.710
Per-Client Investment (log)	-0.831	0.257	10.444	0.001	0.436
Constant	6.081	2.387	6.490	0.011	437.611

-2Log likelihood: 117.07
Quasi R^2: 0.19
N = 214

Source: SPSP Survey, 2006

Table IB.12 SPNs: Financing

Country and sample size	Reported having received loan or line of credit from informal source (%)	Reported having received loan or line of credit from formal financial institution (%)	Among those who received a loan, median and mean monthly interest rate (%)
Cambodia (*n* = 75)	44	17	2.0 2.3
Kenya (*n* = 85)	5	2	9.0 9.0
Philippines[a] (*n* = 75)	3	9	1.5 1.8

Source: SPSP Survey, 2006

Table IB.13 SPNs: Satisfaction with Current Business Situation (% reporting)

Country and sample size	"Very satisfied"	"Fairly satisfied"	"Neither satisfied nor disappointed"	"Fairly" or "Very disappointed"
Cambodia (*n* = 75)	47	33	15	5
Kenya (*n* = 85)	18	65	2	15
Philippines: Private firms and cooperatives (*n* = 75)	31	50	15	4
Philippines: CBOs (*n* = 10)	50	50	0	0

Source: SPSP Survey, 2006

Table IB.14 SPNs: Current Business Situation Compared with Two Years Ago (% reporting)

Country and sample size	"Improved significantly"	"Improved somewhat"	"Stayed the same"	"Worsened somewhat"	"Worsened significantly"
Cambodia (*n* = 75)	24	37	24	15	0
Kenya (*n* = 85)	32	39	22	5	2
Philippines: Private firms and cooperatives (*n* = 75)	43	28	23	7	0
Philippines: CBOs (*n* = 10)	30	30	40	0	0

Source: SPSP Survey, 2006

Table IB.15 SPNs: Expectations Regarding Change in Business Situation over the Next Two Years (% reporting)

Country and sample size	"Will be much better"	"Will be somewhat better"	"Will stay the same"	"Will be somewhat worse"	"Will be significantly worse"
Cambodia (*n* = 75)	36	26	26	9	4
Kenya (*n* = 85)	40	41	12	4	4
Philippines: Private firms and cooperatives (*n* = 75)	46	24	27	1	1
Philippines: CBOs (*n* = 10)	20	30	50	0	0

Source: SPSP Survey, 2006

Table IB.16 SPNs: Capital Investment Plans for Next 12 Months

Country and sample size	Reported plans for capital investment (%)	Among SPNs planning investment, share for indicated purpose (%)	Among SPNs planning investment, median amount as share of total investment to date (%)	Among those planning investment, intended source of financing (%)
Cambodia (*n* = 75)	39	Expand operations: 54 Improve existing operations: 46	50	Personal savings or retained earnings: 46 Loan from private commercial bank: 29 Loan from cooperative or microfinance org.: 8
Kenya (*n* = 85)	88	Expand operations: 53 Improve existing operations: 45 Other: 2	67	Grants (government, donor agency, or NGO): 70 Personal savings or retained earnings: 24 Loan from state-owned bank or agency: 3
Philippines (*n* = 75)	77	Expand operations: 56 Improve existing operations: 30 Other: 14	49	Grants (government, donor agency, or NGO): 61 Loan from state-owned bank or agency: 17 Personal savings or retained earnings: 17

Source: SPSP Survey, 2006

Note: Data available in the Philippines only for private firms and cooperatives.

Table IB.17 SPNs: Results of Logistic Regression of Plans to Invest

Question: "Are you planning to make any investment in fixed assets over the next 12 months?"						
Model	**ß**	**Standard error**	**Wald**	**df**	**Sig.**	**Exp(ß)**
Urban Dummy	0.778	0.705	1.217	1	0.270	2.177
Private Firm Dummy	-2.032	0.672	9.155	1	0.002	0.131
Volume/Sold/Year (log)	0.582	0.185	9.957	1	0.002	1.790
Regulation Concern	-0.563	0.246	5.229	1	0.022	0.570
Taxes Concern	-0.015	0.222	0.004	1	0.948	0.986
Financing Concern	0.315	0.229	1.882	1	0.170	1.370
Infrastructure Concern	-0.465	0.263	3.116	1	0.078	0.628
Land Concern	-0.508	0.255	3.968	1	0.046	0.602
Rule of Law Concern	-0.379	0.258	2.154	1	0.142	0.685
Constant	0.424	0.741	0.328	1	0.567	1.529
Likelihood ratio X^2 = 147.0 Cox & Snell R^2 = 0.31 *n* = 164						

Source: SPSP Survey, 2006

IC
Tables for chapter 4: Point Source and Mobile Water Service Providers

Table IC.1 Point Source and Mobile Distributors: Years of Operation

Country and sample size	Measure	Point source		Mobile distributor	
		Kiosk or standpipe	Purified water reseller	Cart vendor	Tanker or jeepney delivery
Bangladesh	Mean	6.0	3.2	5.6	__
(*n* = 40)	Median	6.5	3.0	6.0	
Kenya	Mean	5.4	__	7.7	6.0
(*n* = 125)	Median	4.0		5.0	5.0
Philippines	Mean	6.8	4.1	__	6.9
(*n* = 50)	Median	5.0	3.0		5.0

Source: SPSP Survey, 2006

Note: __ = not available.

Table IC.2 Organizational Characteristics of Point Source Distributors (percent)

Country and sample size	Stand-alone business	Business is main source of income	Private firm	Community-based organization or cooperative	Hold 1+ trade licenses	Hold 1+ government operating licenses
Bangladesh (n = 40)	100.0	40.0	100.0	0	20.0	10.0
Kenya (n = 125)	78.9	65.3	88.4	11.6	4.2	67.4
Philippines (n = 50)	76.7	40.0	90.0	10.0	43.3	80.0

Source: SPSP Survey, 2006

Table IC.3 Organizational Characteristics of Mobile Distributors (percent)

Country and sample size	Stand-alone business	Business is main source of income	Private firm	Community-based organization or cooperative	Hold 1+ trade licenses	Hold 1+ government operating licenses
Bangladesh (n = 40)	77	77	100	0	20	80
Kenya (n = 125)	80	80	100	0	70	65
Philippines (n = 50)	35	25	100	0	75	85

Source: SPSP Survey, 2006

Table IC.4 Point Source and Mobile Distributors: Median Number of Household and Total Clients

Country and sample size	Point source				Mobile distributor			
	Kiosk or standpipe		Purified water reseller		Cart vendor		Tanker or jeepney delivery	
	Household	Total	Household	Total	Household	Total	Household	Total
Bangladesh (*n* = 40)	58	58	30	115	0	16	—	—
Kenya (*n* = 125)	30	30	—	—	9	14	7	11
Philippines (*n* = 50)	35	35	70	85	—	—	78	78

Source: SPSP Survey, 2006

Table IC.5 Customer Complaints among Point Source and Mobile Distributors: Percentage of Providers Reporting Receiving Customer Complaints "Often" or "Very Often" and Main Complaint

	Point source		Mobile distributor	
Country and sample size	**Kiosk or standpipe**	**Purified water reseller**	**Cart vendor**	**Tanker or jeepney delivery**
Bangladesh (*n* = 40)	44 Limited water supply	65 Slow delivery time	n.a.	n.a.
Kenya (*n* = 125)	5 Various	n.a.	n.a.	0
Philippines (*n* = 50)	0	5 Slow delivery time	n.a.	0

Source: SPSP Survey, 2006

Figure IC.1 Service Pricing for Point Source and Mobile SPSPs

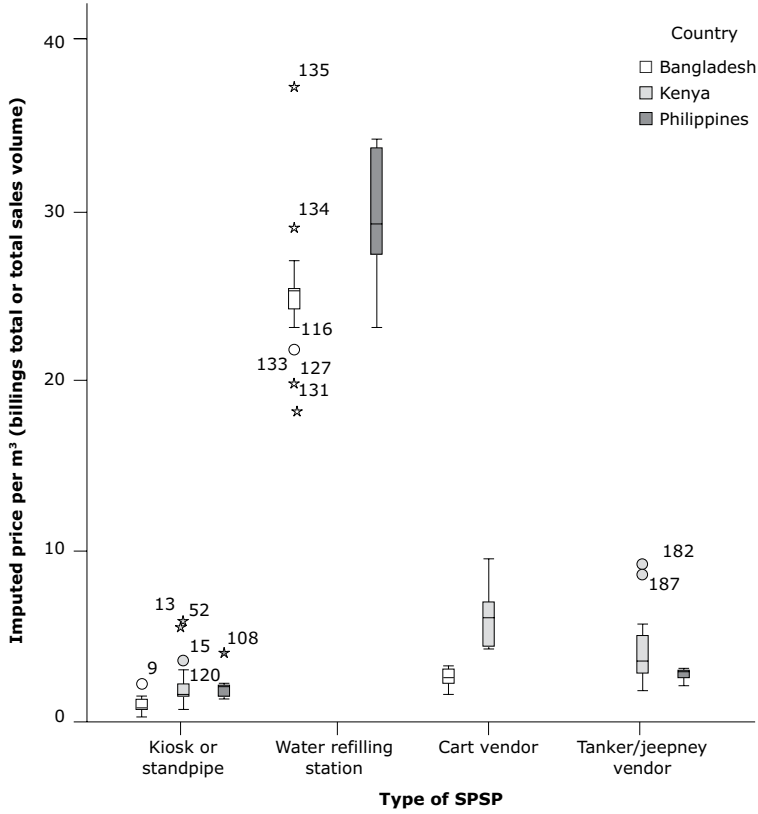


Figure IC.2 Point Source and Mobile Distributors: Operating Margin in Year Prior to Interview

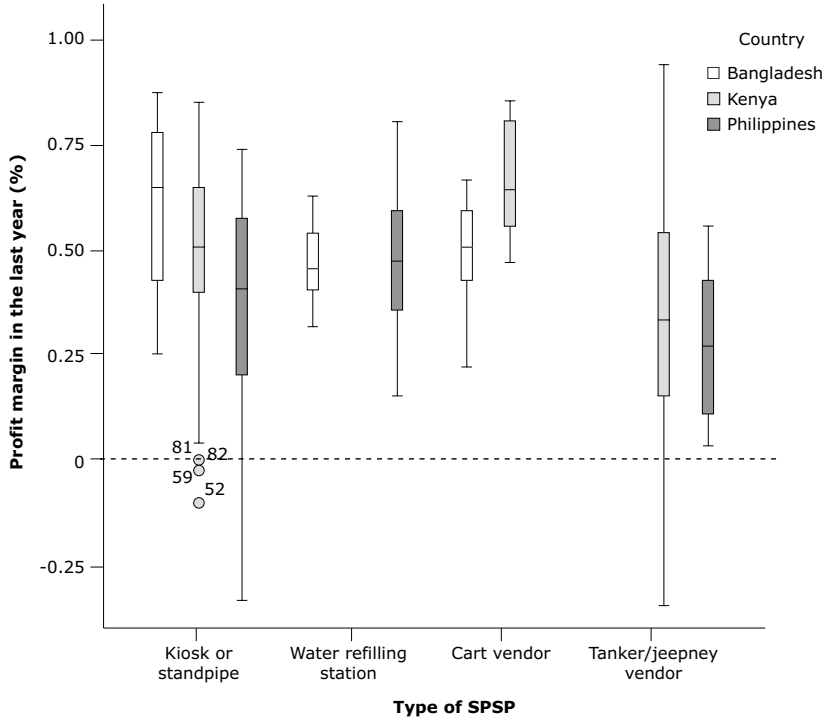


Figure IC.3 Point Source and Mobile Distributors: Profit Margin in Year Prior to Interview

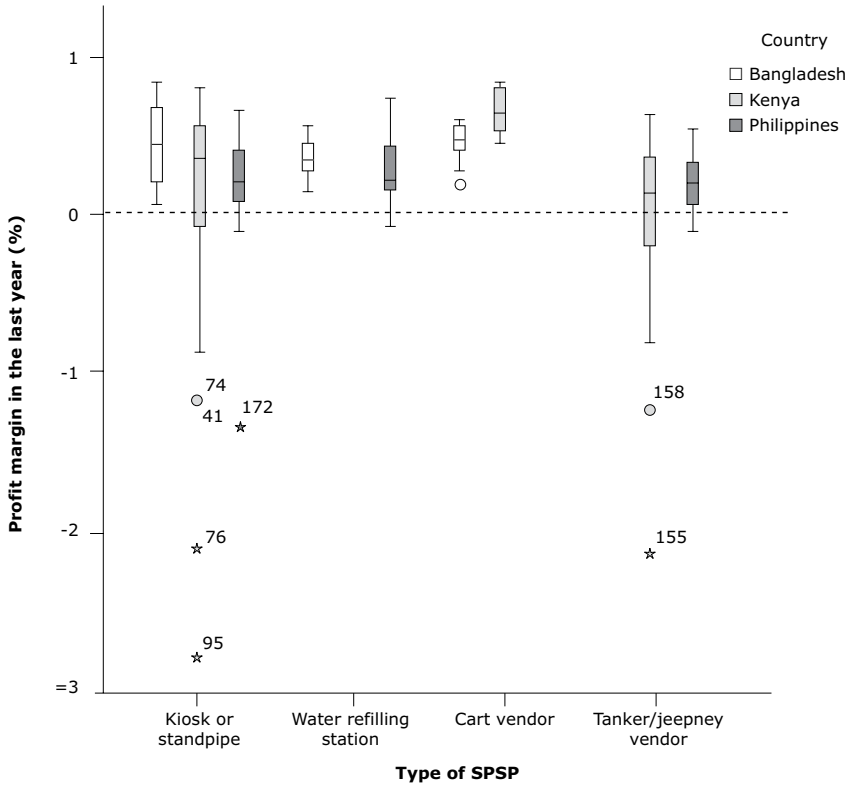


Table IC.6 Point Source and Mobile Distributors: Typical Response to Technical Problems with Equipment or Network (% reporting)

	Point source				Mobile distributor	
	Kiosk or standpipe		Purified water reseller		Tanker or jeepney delivery	
Country and sample size	Usually or always fix problem ourselves	We often need external help	Usually or always fix problem ourselves	We often need external help	Usually or always fix problem ourselves	We often need external help
Bangladesh (*n* = 40)	90	10	100	0	n.a.	n.a.
Kenya (*n* = 125)	40	60	n.a.	n.a.	47	53
Philippines (*n* = 50)	80	20	80	20	65	35

Source: SPSP Survey, 2006

Table IC.7 Point Source and Mobile Distributors: Financing

	Received loan or line of credit from financial institution (%)			Received loan or line of credit from informal source (%)			Among those who received a loan, mean and median monthly interest rate paid		
Country and sample size	Kiosk or standpipe	Purified water reseller	Tankeror jeepney	Kiosk or standpipe	Purified water reseller	Tanker or jeepney	Kiosk or standpipe	Purified water reseller	Tanker or jeepney
Bangladesh (n = 40)	70	35	n.a.	20	25	n.a.	1.6 2.0	1.4 1.5	n.a.
Kenya (n = 125)	7	n.a.	30	4	n.a.	5	1.3 1.3	n.a	0.9 1.0
Philippines (n = 50)	10	20	5	10	15	15	10.0[a] 10.0	6.7[a] 7.0	11.3[a] 7.0

Source: SPSP Survey, 2006

Note:

a. Informal lenders.

Figure IC.4 Future Business Prospects: Point Source and Mobile Distributors' Predictions for Business over the Next Two Years as Compared withToday (% reporting)

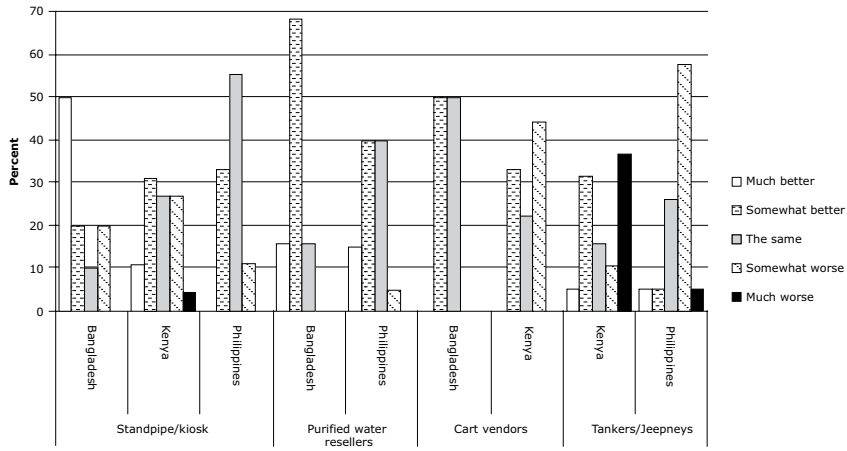


Figure IC.5 Owner or Manager Satisfaction: Point Source and Mobile Distributors' Rating of Current Condition of the Business (% reporting)

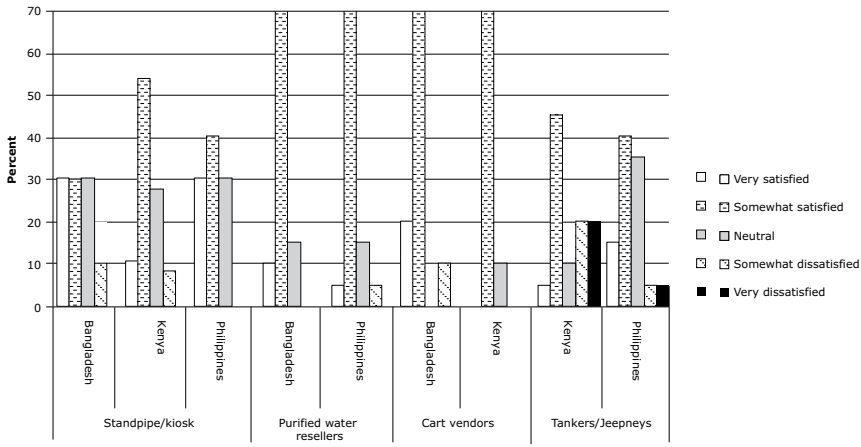


Table IC.8 Point Source and Mobile Distributors: Capital Investment Plans for Next 12 Months

Country	Have capital investment plans (%)			Among those planning investment, purpose for investment (%)			Among those planning investment, median amount as share of total investment to date (%)		
	Kiosk or standpipe	Purified water reseller	Tanker or jeepney	Kiosk or standpipe	Purified water reseller	Tanker or jeepney	Kiosk or standpipe	Purified water reseller	Tanker or jeepney
Bangladesh	60	85	n.a.	Expand business: 100	Expand business: 94 Improve operations: 6	n.a.	25	42	n.a.
Kenya	39	n.a.	30	Expand business: 69 Improve operations: 31	n.a	Expand business: 100	83	n.a.	100
Philippines	40	25	10	Improve operations: 100	Expand business: 60 Improve operations: 40	Expand business: 50 Improve operations: 50	85	33	157

Source: SPSP Survey, 2006

Table IC.9 Point Source and Mobile Distributors: Logit Regression of Plans to Invest

Question: "Are you planning to make any investment in fixed assets over the next 12 months?"					
Parameter	**ß**	**Standard Error**	**Wald***	**Df**	**Sig.**
Log of revenue/ year (US$)	0.47	0.18	1.63	1	< 0.01
Private firm (1) vs. CBO/coop.	-1.77	0.68	12.57	1	< 0.01
Tanker (1) vs. other	-0.65	0.77	0.72	1	0.40
Kiosk/standpipe (1) vs. other	0.94	0.93	1.01	1	0.32
Kenya	0.77	0.60	6.82	1	0.20
Bangladesh	2.46	0.69	8.02	1	< 0.01
Previous loan (1) vs. none	1.34	0.47	7.06	1	< 0.01
Constant	-4.03	1.85	4.75	1	0.03

N= 164
*Robust standard errors used

Source: SPSP Survey, 2006

APPENDIX II

CASE STUDIES

IIA
A Survey of Small Scale Private Service Providers of Water and Electricity in Bangladesh[23]

Over the last decades, Bangladesh has made significant progress on increasing access to safe water and electricity. However, access to those services is still far from universal, and in some rural areas access to safe water has declined because of arsenic contamination. In urban areas, underperforming public utilities are struggling to serve current customers and have limited ability to expand services into rapidly growing peri-urban areas. The demand not met by public utilities has created a market for alternative providers, a market in which small scale private service providers (SPSPs) and private shallow tube wells play an important role.

Although SPSPs provide an important service, particularly for the poor, they are often considered temporary solutions and, consequently, only cursorily studied in policy research and excluded from policy planning. In Bangladesh, not much is known about SPSPs and their operations. Most of the available information is anecdotal. This lack of knowledge hinders the government's ability to assess SPSPs' impact on service provision and the

23. This report was prepared by Ada Karina Izaguirre (Finance, Economics, and Urban [FEU] Department of the World Bank). Comments were provided by Md. Akhtaruzzaman (Water and Sanitation Program), Md. Iqbal (South Asian region at the World Bank), Judy Baker (FEU department), Marlon Lezama (Energy Sector Management Assistance Program), Maria Paniagua (consultant), and Meike van Ginneken (Sub-Saharan African region at the World Bank). The work was funded by ESMAP, PPIAF, WSP, and Finance, Economics, and Urban Department of the World Bank.

possibility to integrate them into national strategies to improve water and electricity provision.

Thus, the World Bank's Energy Sector Management Assistance Program, Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a survey of SPSPs in Bangladesh to better understand them and assess their ability to contribute to the provision of potable water and electricity. The survey in Bangladesh was exploratory, and provided qualitative rather than statistically significant results. It consisted of face-to-face interviews with 80 SPSPs who were point source providers (water kiosks and battery charging stations [BCSs]), mobile distributors (treated water sellers and handcart vendors), and network operators (market electricity providers). The survey was part of a larger study that included surveys in three other countries (Cambodia, Kenya, and the Philippines).

The purpose of this appendix is to summarize the main findings of the survey, point out some policy issues it raised, and make recommendations on future work. In short, the survey found that most interviewed SPSPs were simple operations, serving clients with low consumption levels, and operating with limited or no government supervision. These operators showed an ability to tailor their services to the demand, providing flexible service arrangements. They self-finance their operations and reported investment returns attractive in percentage terms but small in absolute terms. However, they charged prices that were many times higher than those of public utilities, and in some cases, higher than those affordable by the poor.

Among the surveyed types of SPSPs, water kiosks have the largest impact on the poor. However, the legal status of many kiosks is unclear while others are patently illegal. This lack of legal standing makes them prone to abuse by corrupt officials and does not provide an enabling environment for further investment. This appendix proposes that legalizing kiosks and recognizing them as formal water providers can produce a win-win situation—it can improve the ability of kiosk operators to provide services and enhance their access to finance.

The remainder of this appendix is organized as follows: The first section summarizes current provision of water and electricity services. The second section presents the predominant types of SPSPs, summarizes the survey methodology, and reports the main survey findings on SPSPs' size, customers, technical operations, prices, investment, financial performance, and funding sources. Finally, the third section provides recommendations, focusing on water kiosks, and possible future work.

Country Context

This section discusses the evolution of water and electricity access rates nationwide as well as across urban and rural areas. It also present status of service provision for those connected to public water and electricity utilities.

High Access Rates to Safe Water but Low Access to Electricity

Bangladesh has made good progress in increasing improved access to water. The percentage of households with access to safe water, which excludes arsenic-contaminated sources, grew from 55 percent in 1993 to 74 percent in 2004 (WHO/UNICEF 2006). The access rate for urban households (81 percent) is just 10 percentage points higher than that for rural households. However, more recent estimates report lower access rates to safe water, at 50 percent of the urban population (World Bank 2008).[24] Bangladesh's access rates are in the top third of low-income countries. Such access rates are impressive considering the country's socioeconomic conditions. In 2006, the GNI per capita was US$480 and about 75 percent of the 140 million inhabitants lived in rural areas.

Favorable hydrological conditions have facilitated those access rates. The installation of low-cost hand pumps (tube wells) is relatively simple and cheap (WSP 2000). Tube wells are the primary source of safe water for urban and rural households. The portion of households connected to piped networks is less than one-quarter in urban centers and nil in rural areas (table IIA.1). The use of tube wells to access safe underground water began as part of government and donor programs in the 1970s, but small scale private entrepreneurs caught up soon afterward and became the driving force behind access expansion through tube wells. Some estimates indicate that small scale private providers of hand pump equipment accounted for about two-thirds of all installed tube wells (WSP 2000).[25]

Nevertheless, access to safe water in slums is precarious. The Commonwealth Foundation (2003) reports that 50 percent of people living in slums do not have access to a formal source of water. Khondaker (2005) surveyed 510 households in Dhaka's slums and found that 30 percent of the slum households depend on unofficial utility supply, which are mostly illegally operated; 18 percent get water from the public utility under special arrangements through nongovernmental organizations (NGOs); 17 percent depend on privately operated tube wells; and 2 percent get water from vendors.

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24. Access rates to "safe" water in Bangladesh are rough approximations because of three factors: (i) lack of a systematic monitoring and data collection system, (ii) continued presence of arsenic contamination in many parts of the country, and (iii) continued reliance on private tube wells in many urban areas (World Bank 2008).

25. Other estimates indicate that 100 percent of hand pump equipment is provided by the private sector while two-thirds of hand tube wells are being installed by private owners.

Despite progress in the last two decades, access rates in electricity remain low, reflected in the low annual per capita electricity generation (165 kWh), which is among the lowest in the world. Only 43 percent of the population had access to electricity by 2005, a low access rate compared with those of many developing countries. Unlike in the water sector, electricity access is concentrated in urban areas, where 83 percent of households have electricity connections while only 31 percent of rural ones do (IDA 2008). The national access rate to electricity, however, reflects major progress given that the rate was just 31 percent in 2000. A large rural electrification program facilitated this progress, increasing the electrification rate in rural areas by 12 percentage points between 2000 and 2005, while in urban areas it rose by 3 percentage points (IDA 2008). The 70 rural electric cooperatives (Palli Bidyuit Samity) add between 350,000 and 400,000 new connections each year. There is also an active market for solar home systems (SHS), with over 250,000 SHS units installed as of 2008. Despite this progress, at the current electrification rate of 400,000 connections per year it will take more than 30 years to reach universal access in electricity (World Bank 2007b).

Table IIA.1 Household Access to Safe Water in Bangladesh by Source, 2004 (percentage of total households)

Source of water	Urban	Rural
Pipe inside dwelling (household connection)	23.3	0
Pipe outside dwelling	7.8	0.1
Tube wells	65.5	92.9
Deep tube wells	2.4	3.2
Shallow tube wells and other wells	0.2	1.5
Pond/tank/lake	0.8	1.9
River/stream	0.1	0.4
Total	100.0	100.0
Estimation of non-contaminated wells of all wells	50.2	71.0
Access to improved water source (deducted of 27 percent of arsenic contaminated wells)	81	71

Source: World Health Organization/UNICEF 2006.

Note: These statistics exclude arsenic-contaminated sources that affect 27 percent of tube wells, shallow tube wells, and surface and other wells. The effect is greater in the rural areas because they rely heavily on those kinds of wells.

Service Provision is Inadequate

The provision of potable water is deficient in most urban areas, and the quality of potable water inadequate. The Dhaka Water Supply and Sewerage Authority, the piped water provider for the Dhaka metropolitan area, faces serious challenges in providing adequate levels of supply and water quality. The piped water supply in Dhaka is characterized by high system loss (over 40 percent) caused by leaking pipes; heavy reliance on groundwater for water supply while the groundwater table is rapidly falling; and intermittent, low, and sometimes negative pressure supply to most areas (ADB 2006b). Furthermore, customers usually discharge wastewater into open drains along the roads where water pipes are frequently located. In these circumstances, even though the quality of the groundwater extracted could be good, major contamination of water occurs during transportation from wells to consumers and subsequently in storage facilities. Other urban centers also experience difficult situations. Of the 309 urban towns, only 102 have piped water supply systems (ADB 2007a). In most towns, deep tube wells are the source of water supply, and water pumps run only 10 to 12 hours per day. Consequently, there is an intermittent water supply of 2 to 4 hours at most per day.

Similarly, the provision of electricity is deficient, with household and business customers receiving poor and unreliable service characterized by frequent power outages and low voltage. According to the 2007 World Bank enterprise survey in Bangladesh, "virtually all firms experienced power outages (98% in metropolitan and 99% in non-metropolitan areas). Those very few who did not report outages were not connected to the public grid either because they relied fully on generators or did not require electricity" (IDA 2008, 57). It follows, then, that 77 percent of firms identify the lack of reliable electricity as a major constraint, more than half of firms own or share generators, and the estimated value lost from power outages was between 8 percent and 12 percent of sales. Pervasive electricity outages are estimated to reduce the country's GDP by 2 percentage points. The poor service provision results from insufficient electricity generation capacity as well as poorly maintained distribution networks.

The rapid urbanization process is putting further pressure on public utilities. Population in urban areas is growing at 2.5 percent a year, a rate twice as fast as the national rate. In the Dhaka metropolitan area, where one-third of the population lives, population is growing at a rate twice as fast as that of other urban areas (World Bank 2007b). Urban population growth is concentrated in slums, where 35 percent of the population lives. A recent World Bank study reports Dhaka as the fastest growing mega-city in the world, drawing an estimated 300,000 to 400,000 mostly poor migrants every year in search of employment opportunities (World Bank 2007b).

Small Scale Private Service Providers (SPSPs) and Their Role in Service Provision

Given the current conditions of potable water and electricity supply and the rapidly growing demand in urban areas, alternative nonstate service providers such as SPSPs are filling, at least partially, the gap left by public providers. The government of Bangladesh has recognized the SPSPs' capacity as service providers and has started to develop programs to expand water and electricity services through SPSPs in rural areas (Bridges 2007). The six pilots conducted under the Social Investment Program to provide piped water in arsenic-affected areas provide examples of such activity (box IIA.1). Another example is the Remote Area Power Supply System (RAPSS) program, through which concessions are granted to private operators to generate and distribute electricity of up to 10 MW in selected franchise areas.

Box IIA.1

Small Scale Rural Piped Water Projects

In rural villages with high population density, the government of Bangladesh is promoting piped water supply as a cost-effective solution to providing potable water in arsenic-affected areas. By 2006, the Department of Public Health Engineering had implemented 91 piped water supply pilots and various NGOs, the Rural Development Academy, and bilateral donors another 9 pilots. The World Bank is also promoting those pilots with an emphasis on private sector involvement and cost recovery tariffs. In 2003, the World Bank supported the Social Investment Program (SIP) in the development and implementation of six pilots for the delivery of piped water through private sector and community participation in arsenic-affected areas.

Under the scheme, private sponsors sign contracts with SIP to build, own, and operate piped water networks to serve a defined number of households in a given area. The operators, which are mainly NGOs, should recover operational costs from the community. SIP provides 50 percent of capital investment costs as grants that are disbursable in the Output-Based Aid framework (upon reaching construction and operational thresholds). The six SIP pilots are expected to generate 4,433 new household connections serving 26,000 people. The total investment cost in the pilots amounts to 39 million taka (US$615,000), of which the Social Development Foundation contributes 51 percent, private sponsors 39 percent, and benefited communities the remaining 10 percent. As of July 2007, 950 connections were installed and the rest were expected to be completed by December 2007.

(continued)

Box IIA.1

Small Scale Rural Piped Water Projects *(continued)*

Although it is too early assess the sustainability of this scheme, the initial results are encouraging. The SIP reports that rural communities as well as small and mid-level NGOs are responsive to the scheme. The pilots have been successful at attracting private investment to the provision of piped water. However, limited access to financing is still a major constraint; most of the six sponsors have found it difficult to implement the construction phase because of inadequate funding. The government currently is replicating this model in 300 villages through another IDA-funded project, the Bangladesh Water Supply Program Project.

Sources: World Bank 2004; Social Investment Program; and Global Partnership on Output-Based Aid.

Despite the involvement of SPSPs in government programs, the knowledge about existing Bangladeshi SPSPs is anecdotal (Bridges 2007). No studies have yet analyzed SPSP characteristics and operations and determined their importance in service provision. This lack of knowledge hinders the government's ability to assess their impact and integrate them into national strategies.

A Survey of SPSPs in Bangladesh

To contribute to a better understanding of SPSPs and their operations, the World Bank organizations mentioned earlier funded a survey that was carried out by Economist Associati (2007) in late 2006, focusing on the predominant types of SPSPs identified in Bangladesh:

- Water kiosks are very simple operations consisting of a pipe connecting the water source with the distribution point (a standpipe), where water is distributed to consumers who refill their own containers. Water is sourced from public utilities.
- The distinctive trait of treated water mobile distributors that distribute purified water in containers is the use of fairly sophisticated water treatment systems, which allow these operators to sell purified water to commercial clients and middle-class households at prices that are a multiple of those charged by other water SPSPs and utilities.
- Handcart vendors are mobile operators distributing water from barrels placed on handcarts or rickshaws.
- Market electricity providers are mini-grid operators distributing electricity from their own generators and through their own wired networks.

- BCSs are very simple point source operations that charge automotive batteries used for lighting and power purposes by people not connected to the grid. They rely on electricity from public utilities.

The survey did not include some types of SPSPs for a variety of reasons. Kiosks run by "slum lords" were excluded because they include the cost of water in the monthly fee that they charged to slum dwellers, for their all "services." Piped water providers were excluded because they are reported to be uncommon in the country. However, evidence suggests that some have emerged in the last few years (box IIA.2). In addition, community water points and other community-based organizations were not included in the survey as a result of limited information about them. Experience of those providers has been analyzed in Chowdury et al. (2004) and Snell (1998). SHSs turned out to be a product rather than a service. Private providers with concessions under the RAPSS were not operational at the time of the survey.

Box IIA.2

A Piped Water Operator in Dhaka

Since 2000, a small operator has provided piped water through standpipes and household connections to 9,100 households (50,000 persons) in a low-income settlement in Gulshan, a high-income area in Dhaka. The operation, the motivation for which was the chance to make a profit, was a response to the inability of the water utility to serve those low-income residents. The operator himself designed the system consisting of a 1.3-kilometer distribution pipeline from the source (an illegal connection to the utility network) to the settlement, 15 standpipes, and 100 household connections. Because of the flat terrain, pumping is required to deliver about 300 cubic meters (m^3) of water per day to a reservoir built in the settlement. The initial cost of the installation of the system was about $862, which came from the owner's funds. The owner also covers maintenance costs, and employs five people, all living in the service area.

While the water utility charges about $200 for a new connection, this SPSP charges an installation fee of $17. The tariff, however, is $0.86/$m^3$, while the utility charges only $0.12/$m^3$. Bills are paid monthly. Those with individual connections pay $1.17 per month. There are no metered connections. The average water consumption per household is about one m^3 per month, and most people obtain water from the standpipes. Water is available four hours per day, usually two hours in the morning and two hours in the evening.

Source: McIntosh 2003.

The survey used the SPSP definition proposed by Kariuki and Schwartz (2005), that is, an entity established as a private initiative, either for profit or not for profit, that has at least 25 percent of its capital financing provided by or borrowed by a private entity, operates on a commercial basis (without recurrent subsidy), and serves fewer than 5,000 customers.

A review of country sources suggests that the surveyed types of SPSPs serve a small share of the population. In electricity, they serve no more than 2 percent of the population in urban and rural areas, primarily through battery charging stations (table IIA.2).[26] In electrified areas, battery charging stations are primarily backup suppliers during power outages resulting from load shedding or system failures. In water, surveyed SPSPs are mainly an urban phenomenon; only kiosks have a sizable household clientele, representing 10–30 percent of the slum population. These finding are consistent with those of Conan and Paniagua (2003), who report that SPSPs in water serve just 10 percent of Dhaka's population. The high level of government subsidy to customers of public water utilities and policy of providing "free" water to the poor, combined with good access to groundwater, seem to have limited the niche market for SPSPs in water, despite the low service provision levels of the utilities (McIntosh 2003).

26. Individual businesses that use their own portable generators to provide electricity for self-consumption during power outages are not included among SPSPs.

Table IIA.2 Prevalence of Water and Electricity SPSPs

Sector	SPSP type	Estimated number of SPSPs	Estimated number of people served	Estimated percentage of population served		Comment
				Among relevant population with access to improved water supply or electricity source	Among entire population	
Water	Handcart vendors	Unknown	0	0	0	Only commercial clients
	Treated water sellers	250–300	7,000– 10,000	n.a.	< 1	Mainly commercial and well-off clients
	Kiosks	> 200	Large but unknown	Large but unknown	Large but unknown	Active in slums, serving 10–30% of population
Electricity	Battery charging stations	12,200	360,000	2	1	In electrified areas, service available during load-shedding periods
	Market electricity providers	2,000–3,000	30,000	< 1	< 1	Focus on commercial clients during load shedding

Source: Economist Associati 2007.

Note: n.a. = Not applicable.

The survey was exploratory, providing qualitative rather than statistically significant results. The survey did not gather information on SPSPs' customers, so the results reflect just the operators' perspectives. The sample included 10 kiosks, 20 treated water sellers, 10 handcart water vendors, 20 market electricity providers, and 20 battery charging stations. The survey consisted of face-to-face interviews with SPSP managers and owners using typology-specific, closed questionnaires covering a variety of structural, operational, and financial issues. No formal sampling strategy was developed, but the sample included representatives of a variety of operating conditions. Interviewed operators were randomly selected in the type of areas in which they were more prominent. Interviewed treated water sellers were located in affluent urban areas of Dhaka and Chittagong, and included registered and unregistered operators. Water kiosks were located in the slums of Dhaka. Handcart vendors were from both affluent and poor areas of Dhaka and Chittagong. Market electricity providers were located in 10 Thanas Upalizas (districts) in Dhaka, Chittagong, and Comilla. BCSs were from five Thanas Upalizas in Dhaka and Comilla.

Main Survey Findings

The survey found that most SPSPs are one-person businesses serving on average fewer than 120 clients. Except for market electricity providers and half of treated water sellers, SPSPs are dependent on public utilities for the water and electricity that they sell. Technical operations are in most cases simple, with investments of US$3,500 at most. SPSPs indicate that their clients rarely complain about services, except clients of water kiosks. SPSPs show an ability to tailor their services to the demands of the poor, usually providing flexible arrangements. However, prices are many times higher than those charged by public utilities and, in some cases, are higher than what poor consumers can afford. Returns on investment are very attractive in percentage terms, but low in absolute terms. Self-financing is the dominant source of funding. Finally, most SPSPs operate without any formal license or recognition from public entities. This illegal status has affected many kiosk operators, making them subject to abuse from corrupt officials.

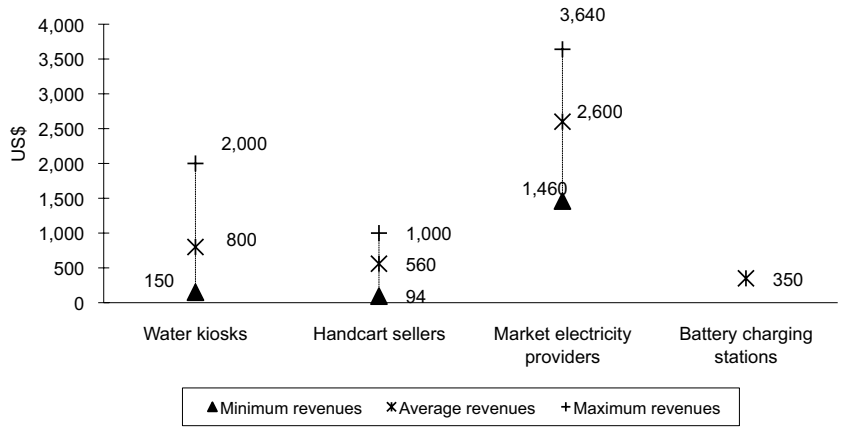
Treated water sellers are the only exception to the above portrait. They are rapidly growing, formal businesses whose core activity is water purification. The poor quality of potable water distributed by public utilities has made this a booming business. Sales of and investments in this type of SPSP are at least 10 times higher than those of the other SPSPs. Their clientele consists of commercial and well-off household clients. Competition in this market is vibrant and growing. Returns on investment, although higher than those of other SPSPs, are still modest in absolute terms. Even though they obtain some funding from commercial banks, their primary source is self-financing.

The following sections describe the characteristics of SPSPs in more detail, including size of operations, customers, technical operations, pricing, investment, financial performance, funding, and licensing and regulation.

Size of operations

SPSPs are very small operators with annual revenues ranging from US$100 to almost US$4,000 (figure IIA.1). Treated water sellers are the only exception, with annual sales ranging from US$17,000 to US$32,000. Average annual water sales are below 1,000 m^3 per year for all types of water SPSPs (figure IIA.2). Battery charging stations serve between 360 and 960 batteries per year and market electricity providers sell between 20 and 120 kWh per day. Treated water sellers are able to generate revenues that are many times those of any other SPSP because of their prices (see Pricing section below) rather than higher sales volume.

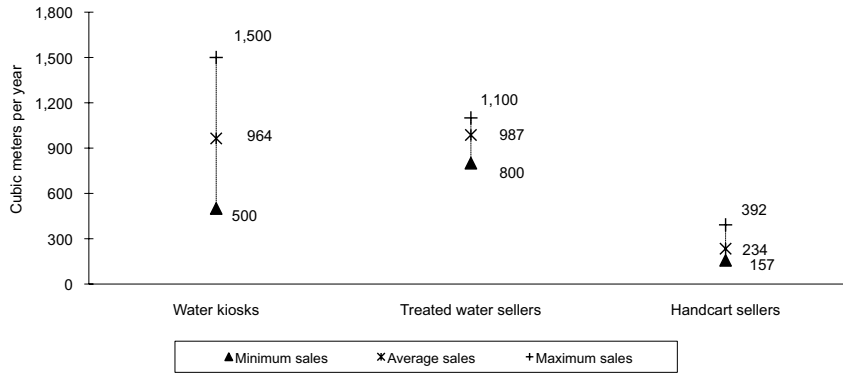
Figure IIA.1 Range of Annual Revenues by Type of SPSP



Source: SPSP survey in Bangladesh 2006.

The small scale of SPSPs' operations explains the simplicity of their organizations. Except for treated water sellers, SPSPs are individually owned businesses, run directly by the owner (often part time), with limited, if any, assistance. Again, treated water sellers are the exception, employing on average nine full-time, skilled workers. Most SPSPs have been in business for some time. BCSs have operated on average for 10 years; the other types of SPSPs have been in business for four to six years.

Figure IIA.2 Range of Annual Water Sales by Type of SPSP

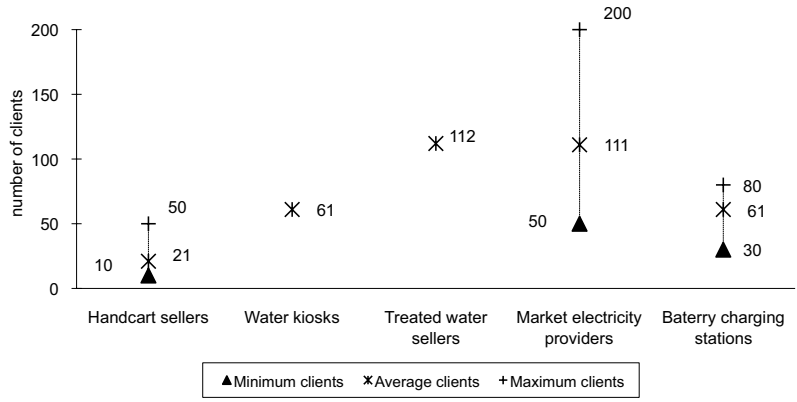


Source: SPSP survey in Bangladesh 2006.

Customers

The customer base ranges from 10 clients for handcart vendors to 200 clients for market electricity providers (figure IIA.3). Sales per customer are also small. Kiosks sell on average 43 liters/day per client (household), while treated water sellers vend about 24 liters/day per client (household) through home delivery in 20-liter jars. Battery recharging stations serve on average just four batteries per day.

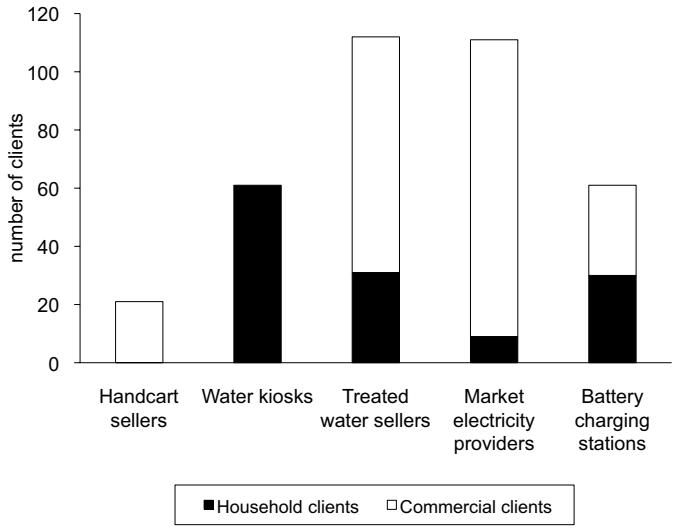
Figure IIA.3 Range in Number of Clients by Type of SPSP



Source: SPSP survey in Bangladesh 2006.

With regard to types of clients, only water kiosks serve exclusively households (figure IIA.4) which all of them are located in poor areas. The remaining SPSPs serve primarily businesses in commercial areas (for example, shops, restaurants, and hotels). All SPSPs serve their clients throughout the year with limited seasonal fluctuations, and only treated water sellers take a weekly rest. Water kiosks operate between 8 and 14 hours every day. Handcart sellers make two to four trips a day. Market electricity providers function three to six hours a day, averaging 3.8 hours, between 5 pm and 9 pm.

Figure IIA.4 Average Numbers of Clients by Type of SPSP



Source: SPSP survey in Bangladesh 2006.

The survey did not explore service quality except to ask SPSPs about consumer complaints. SPSPs reported that their customers rarely complained, except for those of kiosks. Common complaints among kiosk customers were insufficient volumes of water for the flat monthly fees the kiosks charge, and the need to lengthen operating hours and shorten refilling times (2.5 minutes per jerrican). The poor quality and quantity water supply to kiosks by utilities (low pressured, intermittent and often contaminated water supply) is also a source of customer dissatisfaction.

Billing methods differ between types of SPSPs depending upon mode of service provision. Handcart vendors, treated water distributers, and BCSs charge clients based on consumption, that is, per barrel or jerrican or by battery size, whereas kiosks and market electricity providers rely on monthly fees with little relation to actual consumption.

Technical operations

SPSPs can be grouped into two categories based on technical features. The first group, made up of kiosks, handcart vendors, and BCSs, conducts simple operations and depends on public utilities for their water and electricity. The second group, formed by treated water sellers and market electricity providers, consists mainly of independent operators, generating their own water or electricity supply.

The technical complexity of water kiosks varies from water spills from gravity pipes connected to the utility network to operations with underground storage tanks and electric or manual pumps. One-third of surveyed operators reported weekly technical faults that led to service interruptions. The cost structure varies depending on pump type. The water bill from the utility represents three-quarters of the operational costs in kiosks with hand pumps, and half in kiosks with electric pumps.

Handcart vendors get their water from public pump stations or private standpoints and transport it with handcarts or rickshaws equipped with 0.20–0.25 m^3 barrels. Water purchases represent 90 percent of their operational costs.

Battery charging stations' operations consist of an inverter used to transform grid-supplied alternating current to direct current. Only a few of BCSs use charge controllers, so battery size usually determines charging time. Most battery charging stations are dissatisfied with electricity provided by electric utilities, which is prone to recurrent load shedding and low voltage.

Treated water sellers operate modern and well-conceived plants, and their water purification processes vary from the simple (sand filtering and chlorination) to more advanced techniques (reverse osmosis and ultraviolet disinfection). Just half of them depend on water supplied by utilities, but several of those are planning to drill their own wells. Labor is the main operational cost, followed by energy for both "dependent" and "independent" operators.

Market electricity providers have rudimentary operations; owners themselves install networks despite limited technical knowledge. All produce their own electricity using one or (rarely) two fossil fuel (diesel) generators whose capacity varies from 10 kW to 30 kW, with an average capacity of 20 kW. Estimated generated power ranges from 20 kWh to 120 kWh per day. Network length ranges from 250 meters to 2 kilometers with an average of 700 meters. No surveyed network used transformers or meters. One-third reported technical problems causing weekly interruptions. Fuel and labor were the main operational costs.

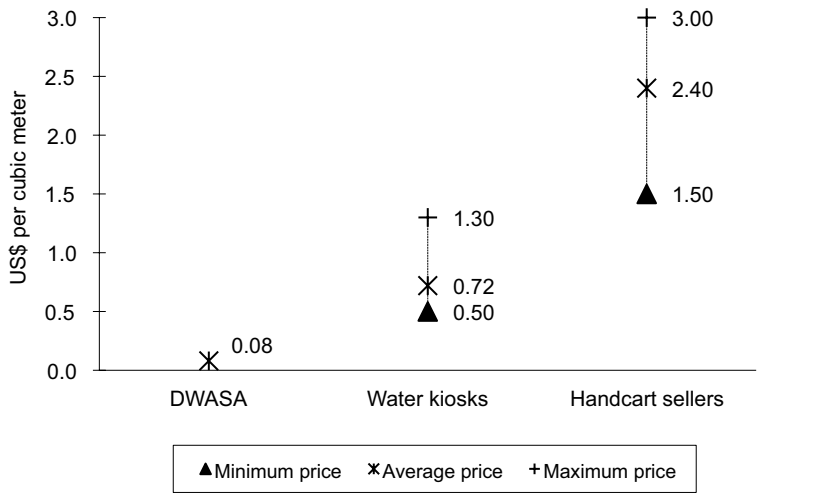
Pricing

Prices vary greatly, reflecting technologies employed and market conditions, but all SPSPs charge prices many times higher than those of public utilities. Treated water sellers are by far the most expensive water supplier, reflecting

the "consumer good" nature of purified water and home delivery service. Kiosks are the least expensive suppliers, followed by handcart vendors (figure IIA.5). Nevertheless, prices charged by kiosks range from US$0.50 to US$1.3 per cubic meter and are on average US$0.72, which is 9 times the tariff charged by public utilities.

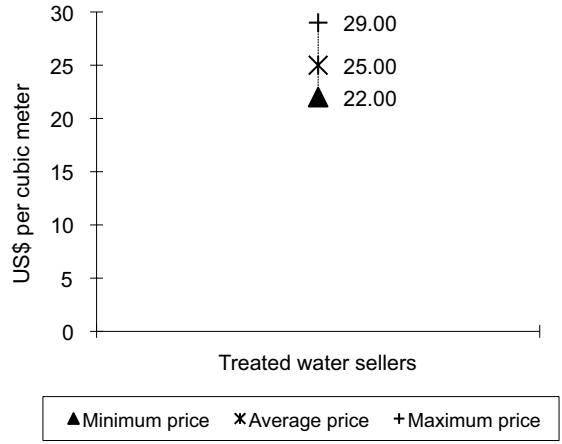
Although it is not surprising that the price of water at kiosks is higher than the highly subsidized rates charged by utilities, kiosk prices also seem much higher than slum customers would be able to afford. At the average kiosk price, a customer would have to spend, on an annual basis, the equivalent of 7.8 percent of Bangladesh's GDP per capita (US$450) to acquire the average consumption per capita in Asia (134 liters per day). This amount is significantly higher than the 3–5 percent considered to be the affordability ceiling for the poor. Not surprisingly, kiosk customers purchase low levels of water. The average kiosk customer buys about 43 liters per day, which, at the average kiosk price, yields an annual water consumption cost of about 3 percent of the country's GDP per capita.

Figure IIA.5a Water Price Range by Type of SPSP



Source: SPSP survey in Bangladesh 2006.
Note: DWSA= Dhaka Water Supply and Sewerage Authority

Figure IIA.5b Water Price Range of Treated water sellers



Source: SPSP survey in Bangladesh 2006.

The market electricity providers charge a monthly flat fee or flat rates based on the number and type of electric appliances in a household. Average monthly fees are about 125 Bangladeshi taka (TK) (US$1.7) for households and Tk 150 (US$2.2) for business clients; rural operators are about 15–20 percent more expensive than urban ones. The flat fees translate into 0.09 US$/kWh, which exceeds by 13 percent the highest residential tariff and by 137 percent the lowest residential tariff of the Bangladesh Power Development Board.[27] This difference is not surprising given that small diesel generators used by SPSPs have higher unit costs than do public utilities' larger generators, and that the tariffs of public utilities are significantly subsidized. Other factors contributing to the higher operating costs of market electricity providers are that many of them operate second-hand diesel generators with low technical efficiency, and fuel leaks are common. BCSs are more expensive, charging about US$0.60 for recharging the most common types of batteries.

Although high compared with those of utilities, prices charged by most SPSPs do not necessarily reflect abuse of their monopolistic positions. Many SPSPs operate in competitive niche markets in which the number of operators is growing. The number of treated water sellers has increased dramatically in the last few years, and competition is expected to increase as

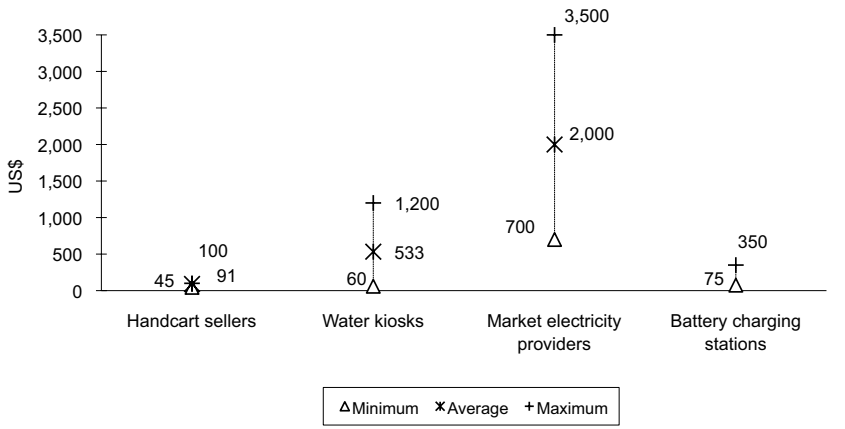
27. This calculation assumes an average generation capacity of 0.17 kW per customer and a load factor of 0.15.

new operators enter into this profitable market. Similarly, the number of market electricity providers is growing rapidly, particularly in urban areas, which has intensified competition. About 80 percent of operators in the survey sample began business in the 2000s, when electricity shortages in the country became acute. Successful handcart vendors have been able to successfully manage competitive pressures by developing small pools of loyal customers. Competitive pressure for water kiosks seems to be lower. Although they report some competition from other kiosks, public utilities, and mobile vendors, a number of them enjoy de facto local monopolies, in some cases reinforced by close relations with "slum lords."

Investment

Except for treated water sellers, investments by SPSPs are small, ranging from US$45 by the simplest water handcart seller to US$3,500 by the most sophisticated market electricity provider (figure IIA.6). For treated water sellers, investments range from US$10,000 to US$50,000, with an average of US$29,000. For these operators, distribution vehicles and water treatment systems compose at least 50 percent of their investments, while water sources represent just 11 percent of investment.

Figure IIA.6 Range of Investment among Types of SPSPs



Source: SPSP survey in Bangladesh 2006.

For water kiosks, the upper end of the investment range corresponds to operators equipped with storage tanks, electric pumps, and long supply pipes, while the lower end encompasses basic schemes that operate just hand pumps and a few meters of pipe. When present, storage tanks account for 50–70 percent of investment.

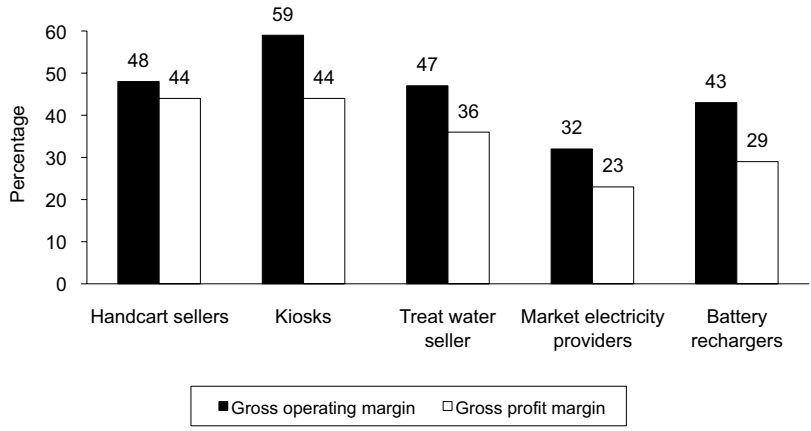
Power generators account for 60 percent of market electricy providers' investment, followed by the wired network at 25 percent. The average capital intensity is about Tk 1,400 (US$20) per client, a much lower investment rate than that of more sophisticated networks, such as those run by Cambodia's Rural Electricity Enterprises (about US$100 per client).

Financial performance and funding

All SPSPs in Bangladesh operate profitably with impressive gross profit indicators (figure IIA.7). The high gross profit margins may, in part, reflect pent-up demand for water and electricity services in the context of poorly performing public utilities. However, absolute profits are small as a result of the scale of the operations (figure IIA.8). Even treated water sellers, the largest operators, have average annual gross profits of just US$9,000.

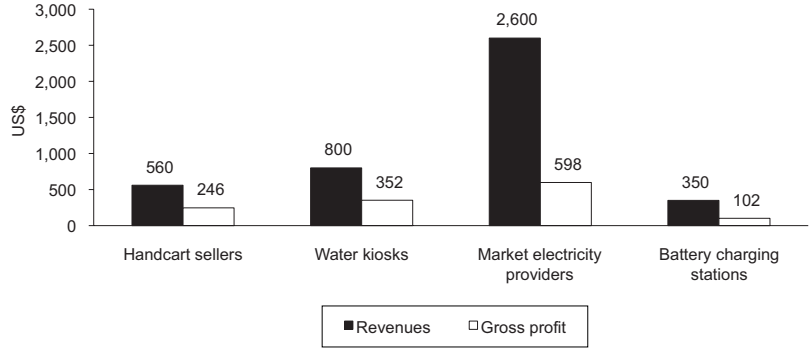
Most operators are satisfied with current business conditions and plan to expand their operations. The majority of surveyed kiosk operators planned to renovate pumps and pipes or drill wells to reduce their dependency on water utilities. Similarly, most treated water sellers planned to expand or improve treatment systems, drill their own wells, and expand their vehicle fleets. Finally, most market electricity providers (73.7 percent) planned to invest in fixed assets to expand operations or improve service quality.

Figure IIA.7 Average Financial Indicators by Type of SPSP



Source: SPSP survey in Bangladesh 2006

Figure IIA.8 Average Annual Revenues and Gross Profits by Type of SPSP



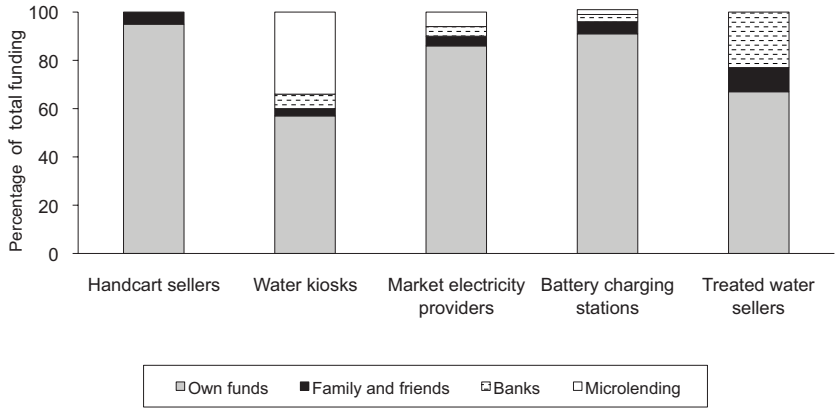
Source: SPSP survey in Bangladesh 2006

Note:

a. Revenue minus cost of goods sold

SPSPs rely mainly on self-financing. Own funds account for about 90 percent of total investment by market electricity providers, battery charging stations, and handcart vendors, and for about 60 percent by treated water sellers and water kiosks (figure IIA.9). Although most types of operators have some access to bank financing, only treated water sellers have bank financing as a key source of financing. The share of bank financing for the other type of operators is rather marginal (at most 6 percent of investments). Micro lending is important for water kiosks, reflecting the fact that NGOs established many kiosks.

Figure IIA.9 Average Funding Sources by Type of SPSP



Source: SPSP survey in Bangladesh 2006

Licensing and regulation

SPSPs operate either informally or with just a general trade license. Treated water sellers are the exception, with nearly all registered as formal companies and three-quarters licensed by the Bangladesh Standard and Testing Institution (BSTI), the national entity enforcing quality standards. In some cases, treated water sellers also have licenses from water utilities or local authorities.

Public officials often inspect treated water sellers, primarily because of public concerns about high prices for poor quality water. Half of treated water sellers had at least one technical and safety inspection for water quality in the 12 months preceding the survey. No fines or closures resulted from these inspections, but operators considered them difficult, in part, because of their unclear process. However, serious concerns surround the effectiveness of BSTI inspections of treated water sellers, and consequently, of the quality of the water (Khandaker 2005).

The cost of informality is high for water kiosks. However, to operate formally, most of them would need an agreement with the utility company for connecting to the mains and paying bulk-connection fees. Getting an agreement is not easy, and several kiosks have required the intervention of an NGO to obtain one. In some cases, payments for obtaining the connection were required, but it is unclear whether those payments went through the appropriate channels at the utility or were kickbacks to utility officials. In addition, most kiosks relying on utilities for water supply report paying for their supplies, but again it is unclear whether the payments are part of

the utility's revenue collections or unofficial payments. Finally, some kiosk operators received fines for "charging excessively high prices," but the procedures and bases for those fines were unclear.

Poor consumers usually end up paying the cost of informality. McIntosh (2003) reports the differences between tariffs charged by SPSPs and those charged by public utilities in Asian cities where SPSPs operate illegally, as in Dhaka. Price differentials are significantly higher than in cities where SPSPs have received official authorization.

Informality does not seem to be a problem for the remaining types of SPSPs. For example, market electricity providers did not reveal any inspection or supervision from authorities. However, anecdotal information suggests that market electricity providers located near utilities sometimes are asked for bribes by utility officials.

Conclusions and Recommendations

Water and electricity SPSPs serve clients that public utilities are not able or willing to serve. Given the current conditions of service provision by public utilities in Bangladesh, it is unlikely that public utilities will be able to serve such clients in the near future. If anything, Bangladesh's rapid urbanization is putting further pressure on already overwhelmed public utilities. The large deficit in electricity and safe water supplies provides a strong argument for searching for and promoting different modes of service provision. With the proper environment, SPSPs, particularly kiosks and market electricity providers, can play a key role in improving and expanding service.

The survey found that SPSPs provide valuable services, although in some cases prices seem to be higher than what consumers are able to pay, and service quality is lower than that expected by consumers. These problems are particularly acute for clients of water kiosks, mainly poor households in slums. The informal status of water kiosks makes it difficult for the government to oversee prices and water quality. The informality of kiosks also adversely affects kiosks themselves and water utilities. Their informal status makes operators of water kiosks subject to abuse by corrupt officials (and, in some cases, by local musclemen) and possible expropriation. The high incidence of technical faults reported by kiosks may reflect, in part, their reluctance or inability to invest in upgrades because of their illegal status. Public water utilities also lose because, in many cases, water distributed through kiosks represents unaccounted for water regardless of whether the kiosk operator pays for that water.

In this context, recognizing water kiosks as formal water providers, particularly in arrangements with public utilities, can improve the kiosks' ability to provide services and can improve utility finances. Formal recognition

will make kiosks less prone to abuse and encourage them to invest once they are assured their investments will not be expropriated. Kiosks are profitable businesses and operators are eager to expand and improve their operations. Public utilities could improve their finances by obtaining revenues for the water supplied to kiosks. Consumers could benefit from better service and government oversight of water quality and prices.

Other SPSPs in Bangladesh are also profitable and eager to expand and improve operations. However, they are constrained by their current size and by limited access to sources of finance, such as microlending. Public agencies may not need to regulate their prices because competition seems to be working, and regulation may drive many of them out of business. Nevertheless, some water quality regulation may be necessary for treated water sellers and safety supervision for market electricity providers.

In conclusion, this survey is the first attempt to provide an overview of SPSPs and their operations in Bangladesh. The survey findings, which are similar to those of other SPSP studies in the region, should help to set the framework for in-country discussions about the role of SPSPs in the provision of water and electricity services. The topic merits further discussion by practitioners and policy makers to identify the most appropriate solutions for Bangladesh. In addition, further research on SPSPs may be required to deepen the knowledge. Possible areas of study might include the types of SPSPs not included in this survey (for example, piped networks) or a large-scale survey covering water kiosks in the slums of Dhaka and Chittagong to gain a better understanding of their financial viability and to assess the feasibility of their formalization. Another topic for further research is the perception that other stakeholders, such as customers, local governments, utilities, NGOs, and financiers, have of SPSPs. Similarly, a deeper analysis of the regulatory process, enforcement, and the business environment for SPSPs could shed light on the changes required to improve their operations. Finally, the limited access to sources of finance is another possible area for further research.

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IIB
A Survey of Small-Scale Private Service Providers of Water and Electricity in Cambodia[28]

Cambodia has significantly improved access to safe water and electricity since its pacification in the mid-1990s. Nevertheless, access to those services remains far from universal and is concentrated in urban areas. The provision of electricity and water is very limited in rural areas, and is primarily provided by small scale private operators that emerged as a result of pent-up demand and the unmet needs of rural populations. The government of Cambodia has acknowledged the importance of these small operators and has designed programs to support their further development as part of its strategy to expand the provision of electricity and safe water in rural areas.

Despite this progress, very little systematic information is available on who these small scale private operators are and how they operate. Taking this into account, the World Bank's Energy Sector Management Assistance Program, Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a survey of small scale private service providers (SPSPs) in Cambodia to better understand them and assess their ability to further contribute to the provision of potable water and electricity. The survey consisted of face-to-face interviews with 186 SPSPs comprising network providers (piped water operators and rural electricity enterprises), point source providers (battery charging stations [BCSs]), and mobile distributors (handcart water vendors). The survey sample was designed to be statistically significant for network providers, while it had an exploratory nature (providing qualitative rather than statistically significant results) for the remaining types of SPSPs. The survey was part of a larger study that included surveys in three other countries (Bangladesh, Kenya, and the Philippines).

The purpose of this appendix is to summarize the main findings of the survey, point out some policy issues it raises, and recommend future work. In short, the survey found that SPSPs are self-sufficient private businesses serving small numbers of clients in rural and peri-urban areas. They self-finance their operations and report positive investment returns although those returns are small. SPSPs provide valuable services to households for which these are the only available service providers. However, their prices are much higher than those charged by public utilities and seem higher than

28. This report was prepared by Ada Karina Izaguirre (Finance, Economics, and Urban [FEU] Department of the World Bank). Iwona Reichardt (consultant) provided background material and assistance with the literature review. Comments on an earlier draft were provided by Jan Willem Rosenboom (Water and Sanitation Program), Marlon Lezama (Energy Sector Management Assistance Program), and Maria Paniagua (consultant). The work was funded by ESMAP, PPIAF, WSP, and Finance, Economics, and Urban Department of the World Bank.

those considered affordable by the poor, while service quality, particularly water treatment, is below standard.

The high prices charged by network providers, particularly in electricity, seem to reflect, at least in part, high operating costs and the small scale of their operations. In these circumstances, government programs that promote expansion of network providers could also help them to improve their performance and viability. In addition, financial and technical assistance programs could assist SPSPs in improving technical operations and service quality.

The remaining sections of this appendix further elaborate on these characteristics and issues and are organized as follows: The first section summarizes the current provision of water and electricity services. The second section presents the predominant types of SPSPs in the country and summarizes the survey methodology. It also reports the main survey findings on size of SPSPs, customers, technical operations, prices, investment, financial performance, and funding sources. Finally, the third section discusses recommendations and possible future work.

Country Context

With the peace and stability achieved in the mid-1990s after decades of internal conflict, Cambodia has focused on restoring its destroyed infrastructure, and has made significant progress. However, coverage of water supply and electricity services is still low and primarily concentrated in urban areas. The share of total population with improved access to water rose from 29 percent in 1995 (World Bank 2008) to 55.6 percent during the dry season and to 74.8 percent during the rainy season in 2005 (table IIB.1).[29] The difference in access ratios between seasons is explained primarily by the importance of rainwater during the rainy season, when it becomes the main improved source of drinking water in rural areas and the second main source in urban areas.[30] Excluding rainwater, piped water is the main improved source of water in urban areas, covering 40.5 percent of urban

29. The improved water access data reported here are the latest available and most reliable for the country. There have been significant discrepancies in water access data in the country (Levisay and Sameth 2006), but current improvements in survey instruments for the national census and socioeconomic surveys are expected to make future data sets more comparable (Rosenboom, Ockelford, and Robinson 2007).

30. All rainwater in Cambodia is considered improved access because survey data do not distinguish between types of rainwater storage (and methods of drawing water from the tank), which are crucial to determining if the rainwater can be classified as an "improved" source (Rosenboom, Ockelford, and Robinson 2007). For instance, a closed container with first flush systems and taps provided by many nongovernmental organizations and other agencies, should be considered improved sources because they provide clean and safe water. However, cement open storage, which is ubiquitous in the country, is very likely to provide microbiologically unsafe water as demonstrated by quality water testing.

households (dry season,) while tube wells and boreholes serve 32 percent of households in rural areas. A gradual normalization of the electricity network started in 1995, and by 2005 about 20.5 percent of households had access to electricity (2005 Demographic and Health Survey). The disparity between rural and urban areas for access to electricity is higher than that of water supply. While about 66.8 percent of urban households have access to electricity, only 12.6 percent of rural households do.

Cambodia faces formidable challenges to reaching universal coverage in water supply and electricity services because of the country's socioeconomic conditions and the current situation of the water supply and electricity sectors. Cambodia is a predominantly rural and poor country. Of its 14 million inhabitants, about 80 percent live in rural areas. The GNI per capita was US$570 in 2007, and about 30 percent of the population lived below the poverty line. At a more disaggregated level, access rates to modern water and electricity services are very limited and highly concentrated in urban areas and among the rich. Only 9.7 percent of the population has residential piped water services, and this population is primarily located in urban areas where 38.8 percent have access to piped water (table IIB.2). The gap in access rates between rich and poor is also substantial, particularly in piped water and electricity. At the national level, the access gap (percentage point difference in access) between the richest and the poorest strata is 45.7 percent in piped water and 85.4 percent in electricity. Those access gaps are even larger in urban areas, as well as in the richest and poorest regions (table IIB.2).

Table IIB.1 Household Sources of Drinking Water in Cambodia by Source, 2005 (percentage of total households)

Source of drinking water	Dry season			Rainy season		
	Total	Urban	Rural	Total	Urban	Rural
Improved source	**55.6**	**67.3**	**53.7**	**74.8**	**82.1**	**73.5**
Piped water into dwelling, yard, or plot	10.3	40.5	5.2	9.2	37	4.4
Public tap or standpipe	0.2	0.3	0.2	0.1	0.1	0.1
Tube well or borehole	29.8	17.4	31.9	22.8	14.3	24.3
Protected dug well	13.1	6.9	14.1	9.8	4.2	10.8
Protected spring	0.2	0.2	0.2	0.1	0.2	0.1
Rainwater	2.1	1.9	2.1	32.8	26.2	33.9
Nonimproved source	**42.5**	**25.0**	**45.5**	**23.7**	**11.5**	**25.8**
Untapped dug well	13.2	5.4	14.4	11.3	3.6	12.6
Tanker truck or cart with small tank	5.1	6.9	5.0	1.4	2.5	1.2
Surface water including unprotected spring	25	12.8	25.9	11.0	5.4	11.9
Bottled water	**1.6**	**7.0**	**0.7**	**1.3**	**6.1**	**0.5**
Improved source for cooking and washing	1.1	5.9	0.4	1.0	5.5	0.3
Unimproved source for cooking	0.5	1.1	0.3	2.0	0.6	0.2
Other sources	**0.2**	**0.7**	**0.2**	**0.2**	**0.4**	**0.2**

Source: 2005 Cambodia Demographic and Health Survey (Cambodia National Institute of Public Health, National Institute of Statistics, and ORC Macro 2006).

Note: Figures may not add to totals due to rounding.

In urban areas, state-owned utilities are the primary providers of water supply services, but only the utility serving Phnom Penh operates efficiently.[31] In Phnom Penh, the municipal government serves the city through its Water Supply Authority (PPWSA), which is the only large system in the country, serving 750,000 inhabitants. In the last decade, PPWSA has transformed itself into a well-run utility, increasing its number of connections from 10,700 in 1997 to 105,700 in 2004, and improving its operational and financial performance substantially (World Bank 2003). PPWSA provides 24-hour water supply to its clients and its ratio of unaccounted for water declined from 65 percent in 1997 to 8 percent in 2006. It provided piped water to 68 percent of the population in its concession area. Outside of Phnom Penh, the Ministry of Industry, Mines, and Energy (MIME) is responsible for water provision in the 23 provincial capitals.[32] MIME operates the water system in 19 of the 23 provincial towns. The other four provincial towns are served by private operators which operate under licenses granted by MIME. Officially, each of the 23 provincial towns is served by a water utility but, in practice, many do not have functioning networks, and those with working systems do not serve more than 15 percent of the population.

In rural areas, access rates to safe water are very low, with the majority of households relying on self-provision (table IIB.1) and small scale private operators. Rural markets are primarily served by a growing private sector made up of thousands of micro and small enterprises, ranging from individual, door-to-door water sellers to small, family-run piped schemes, to larger experimental piped schemes supplying an entire village (Salter 2003). This market is currently unregulated and largely informal. Waterborne and water-related diseases continue to be a serious public health problem because of poor consumer habits and little public awareness of the health hazards of using unsafe water (Salter 2003; WSP 2004). The Ministry of Rural Development, which is responsible for overseeing rural water supply, is working on improving access to safe water by promoting the development of communal water systems.

31. None of these utilities provide sewerage services.
32. Cambodia is divided into 23 provinces and the capital (Phnom Penh).

Table IIB.2 Weighted Distribution of Access (Percentage of Population) and Access Gap (Percentage Points) between the Richest and the Poorest in Cambodia[a]

Area	Service		
	Improved water access	Piped water access	Electricity
National			
Access	65.2	9.7	20.5
Access gap	28.3	45.7	85.4
Rural			
Access	63.6	4.8	12.6
Access gap	24.8	32.7	76.5
Urban			
Access	74.7	38.8	66.9
Access gap	30.9	60.1	95.2
Poorest Region[b]			
Access	72.2	10.0	12.6
Access gap	44.2	52.2	75.9
Richest Region[b]			
Access	79.2	68.1	90.9
Access gap	84.3	78.3	98.0

Source: Ruiz, Christiaensen, and Kulkarni 2008.

Notes :

a. Access-income-gap is the percentage point difference in access between the richest and the poorest strata of the population.

b. The poorest region is that with the highest percentage of households in the poorest strata (Kampong Cham), while the richest region is that with the highest percentage of households in the richest strata (Phnom Penh).

The electricity sector is small and highly fragmented with 24 isolated systems covering various provincial cities and Phnom Penh (ADB 2006). The estimated installed capacity in the country was less than 170 MW in 2006. Electricity consumption per capita was estimated at 45 kWh per year, one of the lowest in Asia, while electricity costs and tariffs are among the highest in the world. There is no integrated high-voltage transmission system or interconnection with neighboring countries, and most generators are fueled by costly imported diesel. The state-owned Electricité du Cambodge (EDC) serves Phnom Penh and five other provincial or district towns, and plans to expand its operations into seven other towns. EDC also manages a number of areas supplied by medium-voltage transmission lines from Vietnam.

The rest of the country is served by independent power producers in larger towns and rural electricity enterprises in small village and communes. In the early 2000s, it was estimated that between 600 and 1,000 small private power systems operated in Cambodia, providing access to about half the population (Kariuki and Schwartz 2005). Most of these entrepreneurs set up their businesses before the formation of the interim government in the mid-1990s and continue to provide service to communities that otherwise would have no network connections whatsoever.

Small-Scale Private Service Providers (SPSPs) and Their Role in Service Provision

SPSPs play a key role in the provision of electricity and water supply services in rural areas of Cambodia. The government of Cambodia has acknowledged their contribution and has made them part of its strategy to expand service coverage, particularly in rural areas. The 2001 Electricity Law established a licensing system that recognizes SPSPs as formal providers in small towns and rural areas. By 2005, the Electricity Authority of Cambodia, the sector regulatory agency created by the same law, registered 85 SPSP licensees in small towns and rural areas serving about 150,000 customers (World Bank 2006). In addition, the government established the Rural Electrification and Renewable Fund, which supports small scale private sector provision in rural electrification and renewable energy development (box IIB.1).

Box IIB.1

Expanding Electrification through Small Private Providers

The government of Cambodia has set ambitious electrification goals for the country. It aims at having some form of electricity provision in all villages by 2020 and a national electrification rate of at least 70 percent by 2030. As part of the strategy to accomplish those goals, the government has established the Rural Electrification Fund (REF) to support small private entrepreneurs in establishing or expanding electricity provision in rural areas. Currently, the REF has a program to provide grant assistance to

1. Rural Electricity Enterprises for installing up to 50,000 new connections;
2. Solar panel firms for supplying up to 12,000 solar home systems with a minimum capacity of 40 Watts peak (Wp); and
3. Companies interested in developing micro-hydropower plants (average 50 kW), mini hydro plants (average 0.75 to 5 MW) and other forms of renewable energy plants up to a total capacity of 6.85 MW.

The REF finances 25 percent of the investment cost of selected projects. For 2008, REF support was set at US$45 per new connection, US$100 per solar home system, US$400 per kW in new micro- and mini-hydropower plants; and US$300 per kW of other renewable technology power plants.

Source: Cambodia Renewable Energy and Rural Electrification (http://www.recambodia.org/reap.htm).

Although the government of Cambodia also encourages private participation in water supply, sector laws to govern such participation have not yet been enacted. In the absence of a general legal framework, MIME and provincial governments have promoted the formalization of SPSPs by issuing licenses. However, most licenses require further specifications because they poorly define license conditions such as rights and duties of licensee and licensor, duration, and cost, among others. MIME has also promoted private sector schemes to provide piped water at the rural village level by awarding contracts to local operators (box IIB.2).

Box IIB.2

Engaging the Local Private Sector in Water Supply in Small Towns

With the support of the World Bank, MIME has developed guidelines and procedures to contract with private firms to improve water supply and sanitation services at the local level. Depending on the specific socioeconomic circumstances of the local area, MIME has used one of two kinds of contracts to recruit local private operators: a design-build-operate contract (DBO) or a design-build-lease (DBL) contract. In both contract types, the private operator prepares the final design of the water system, builds the system, and is obliged to operate the system for 15 years. The difference between the types of contracts is the source of funding. In a DBO contract, a grant from IDA subsidizes between 50 and 60 percent of the investment (up to US$500 per connection) while the local private operator provides the remainder. Customers are expected to pay a uniform tariff (US$0.50 per cubic meter) designed to cover operation and maintenance costs, taxes, and a return for the private operator. In a DBL contract, a credit from IDA finances 90 percent of construction of the water system while the local private operator finances the remainder. Customers will pay a uniform full cost recovery tariff including a lease fee (to reimburse the IDA credit), taxes, and a return for the private operator. By 2007, six DBO contracts involving over 13,000 connections had been awarded and were being implemented. All benefited towns were located in Kampong Cham province (the province with the highest proportion of households in the poorest strata). In addition, 12 DBL contracts were awarded covering more than 13,000 connections.

Sources: Triche, Requena, and Kariuki 2006; Navarro and Tavares 2008.

A Survey of SPSPs in Cambodia

Even though the important role SPSPs play in the provision of electricity and water supply services in Cambodia is recognized, little systemic information covers who they are, their characteristics, and operations. Except for a 2001 survey of rural energy enterprises carried out by Enterprise Development Cambodia, no studies analyze SPSPs' characteristics and operations, and determine their importance in service provision. This lack of knowledge hinders the government's ability to effectively integrate them into national strategies. The survey of SPSPs funded by a group of World Bank departments was undertaken to contribute to a better understanding of SPSPs and their operations.

The survey was carried out by Economisti Associati (2007) in late 2006, and focused on the predominant types of SPSPs in Cambodia:

- Piped network operators (PNOs) supply water through fixed connections, using piped systems of variable length and complexity. Water is sourced primarily from wells, springs, and rivers.
- Rural electricity enterprises (REEs) are mini-grid operators distributing electricity produced by their own generators and through their own wired networks.
- Battery charging stations (BCSs) are stationary operators who rely on their own diesel generators to charge automotive batteries used for lighting and power purposes.
- Handcart water vendors (HCRs) are mobile sellers who deliver small volumes of water using drums placed on a trailer.

The survey used the SPSP definition proposed by Kariuki and Schwartz (2005), that is, an entity established as a private initiative, either for profit or not for profit, that has at least 25 percent of capital financing provided by or borrowed by a private entity, operates on a commercial basis (without recurrent subsidy), and serves fewer than 5,000 customers.

Based on the survey results and a review of country reports and statistics, the study found that the selected types of SPSPs serve an important share of the population, primarily with electricity services in rural areas (table IIB.3). The survey estimates that of all the rural population that has access to electricity, 42 percent of them get it from REEs while BCSs are the main source of electricity for 15 percent of the total national population. Compared with the results of the 2001 survey on rural electricity enterprises, this survey estimates that the number of REEs is lower (300 versus a range of 600 to 1,000), and the proportion of the population REEs serve is lower (22 percent versus 50 percent of total population with electricity access). The lower estimate of providers is partially explained by the consolidation of the SPSP business. The survey fieldwork suggests that many REEs went out of business in the last few years.

In the water supply sector, the survey estimated that PNOs serve about 6 percent of the population that has improved access to water, which represents 2.5 percent of the total population. The survey could not estimate the number of handcart water vendors and the population they serve, but it is thought to be small.

Table IIB.3 Prevalence of Water and Electricity SPSPs in Cambodia

SPSP types in each sector	Estimated number of operators	Estimated number of households served	Estimated percentage of population served	
			Among relevant population with access to improved water supply or electricity source	Among entire population
Water				
Piped network operators (PNO)	280	70,000	6	2.5
Handcart water vendors (HCR)	—	—	—	—
Electricity				
Rural electricity enterprises (REE)	300	100,000	22	4
Battery charging station (BCS)	8,000	> 400,000	> 20	15

Source: Economisti Associati 2007.

Note: — = Not available.

The survey consisted of face-to-face interviews with 186 SPSP managers or owners and used typology-specific, closed questionnaires covering a variety of structural, operational, and financial topics. The survey results reflect just the operators' perspectives given that it did not gather information from SPSP customers. The survey used two types of sample sizes. For network providers, large sample sizes were used to make the results statistically significant at a 95 percent degree of confidence with a margin of error of 10 percent. The interviewed SPSPs (81 REEs and 75 PNOs) were selected based on a stratified sampling according to their licensing status, which was used as a proxy for their development and sophistication. Three strata were used for REEs: operators licensed by the Electricity Authority of Cambodia (24 interviews), those holding a permit from MIME (32 interviews), and those with no license (24 interviews). Three strata were also used for PNOs: providers licensed by MIME (9 interviews), those licensed by the provincial department of MIME (17 interviews), and those unlicensed or licensed by other authorities (49 interviews). Within each stratum, interviewed operators were randomly selected in 21 of Cambodia's 24 provinces. Phnom Penh, where SPSPs are scarce, and two distant provinces were excluded from the survey.

For the other two types of SPSPs, small sample sizes were used (20 BCSs and 10 HCRs); consequently, the survey results provide only a qualitative analysis. In the case of BCS, one operator was randomly selected in each of the 20 provinces while the 10 HCR were randomly selected in 5 provinces.

Main Survey Findings

The survey found that SPSPs in Cambodia are individually owned, private businesses, run on a commercial basis by their owners. Most of them operate in rural and peri-urban areas, serving 370 or fewer customers, half of which are poor households. Network providers, except for the smallest ones, have growing customer bases, a trend they expect to continue given the large number of unserved households in their operating areas. Most SPSPs charge clients based on actual consumption (with network providers using meters to measure consumption) and provide service seven days a week, but their daily operating hours are limited. The survey did not explore service quality, except for asking SPSPs about consumer complaints. Their responses suggest that consumers would like better service (longer hours of operation, less voltage fluctuation, or higher water pressure) at lower prices. SPSPs' prices are several times higher than those charged by the main public utilities and also seem higher than those considered affordable by the poor. Although most network providers enjoy de facto local monopolies, their prices seem to reflect high operating costs rather than monopolistic pricing. Indeed, network providers report gross profit margins between 3 percent and 5 percent.

SPSPs are independent operators, producing their own electricity or water supply, building their networks without any external assistance, and relying on self-financing. Network providers have simple business organizations, employing two or three full-time people and using some basic reporting. Half of them do some form of financial reporting, a quarter file tax returns, and very few use the formal financial system. In most cases, technical operations need to be improved to reduce system losses, or equipment needs to be acquired to control or improve the quality of water or electricity. However, only 40 percent of PNOs and half of REEs planned to invest in capacity expansion or improvement of existing operations. Most network providers are subject to some government oversight of technical and safety issues. Business associations are still nascent. HCRs and BCSs are more basic enterprises, run directly by the owner with limited, if any, support; operators do not expect to expand their businesses.

The following sections describe the characteristics of SPSPs in more detail, including location, size of operations, customers, technical operations, pricing, investment, financial performance, funding, and licensing and regulation.

Location

SPSPs are a rural and peri-urban phenomenon in Cambodia; all four surveyed types are located mainly in villages or district towns with fewer than 20,000 inhabitants. However, preferred locations differ by type of SPSP. PNOs are located primarily in densely populated areas (more than 500 people per square kilometer) near rivers with relatively poor populations (55 percent are located in districts that fall in the two poorest quintiles of income distribution). REEs are more common in relatively rich areas (60 percent are in areas where inhabitants are in the second and third richest quintiles) with population density between 100 and 250 per square kilometer.

Organization

SPSPs are fully private, family-owned businesses run directly by the owner. Network providers (PNOs and REEs) are relatively sophisticated businesses. On average, they have 2.5 to 3 full-time-equivalent employees, while the largest ones can reach up to 10 full-time-equivalent staff. About half keep financial reports, but in a rudimentary manner, and a quarter file tax returns. Most of these operators run their businesses from home and do not use the formal financial system. Fewer than 10 percent have bank accounts. However, they have been in business for some time (PNOs for 8 years on average, and REEs for 8.5 years), and their network enterprises represent the main source of income for 80 percent of the owners. The level of education of PNO and REE owners is relatively high, with more than half having completed secondary school and more than 10 percent having a university degree. Business associations of network providers are still in the formative stages. Only 14 percent of REEs and 7 percent of PNOs are members of sector associations, which are mainly discussion forums.

HCRs and BCSs are more basic enterprises, operated directly by the owner with limited, if any, help. BCSs usually are the main income source for owners, but only half of HCRs can rely on water sales as the main source of income. The remaining HCRs supplement their income with farming and other commercial activities.

Customers

Most SPSPs serve a small number of residential clients (table IIB.4); poor households constitute a significant share of the customer base.[33] Water SPSPs report that poor households account for more than 40 percent of their customers; REEs indicate the poor represent half their clients; and

33. Only a few REEs and BCSs serve any commercial clients.

BCSs more than 60 percent.[34] In addition, customer bases vary significantly across network providers. Small PNOs serve fewer than 150 clients while those of medium size serve between 200 and 450, and large ones more than 1,000. Similarly, the small REEs serve fewer than 200 clients, medium between 200 and 450 clients, and large more than 700 clients.

Table IIB.4 Average Number of Clients by Type of SPSP

Type of SPSP	Number of clients
Piped network operators	250
Handcart water vendors	27
Rural electricity enterprises	370
Battery charging stations	55

Source: Economisti Associati 2007.

SPSPs provide service to their clients seven days a week throughout the year, but limited hours per day. PNOs provide service on average 14 hours and REEs 11 hours per day. Only the largest SPSPs—a third of PNOs and a sixth of REEs—provide 24-hour service. BCSs operate like retail shops, typically open six to eight hours a day. HCRs are the only SPSPs in the country that experience seasonal demand due to changing weather conditions, with peak periods ranging from two to three months during the driest months.

The survey did not explore service quality except to ask SPSPs about consumer complaints. The responses suggest that service quality is lower than that expected by consumers. A quarter of REEs acknowledge receiving frequent complaints while a third report sporadic complaints. Most complaints are about high prices, voltage fluctuations, meters running too fast, and short hours of operation. Only 7 percent of PNOs report receiving complaints, mainly concerning low water pressure, smell of chlorine, and high prices. However, PNOs acknowledge that there is room for improvement. About 40 percent of PNOs indicate that clients would appreciate higher water pressure, better water quality, and larger volumes.

Technical operations

SPSPs are self-sufficient operators, generating their own water or electricity supply and setting up their systems without any external assistance. Most operations have limited technical complexity (the shares of treated water and medium voltage electricity are modest) and report high system losses.

34. These data are based on SPSPs' perceptions about their customers' income levels and were obtained by asking SPSPs about the percentage of their clients that they regard as poor or very poor.

Most PNOs do not treat the water they supply, but do have significant system losses. The average PNO consists of motorized pumps to obtain raw water, storage tanks with a capacity of 65 cubic meters, and 5,000 meters of piped network (or 20 meters per connection). Electricity is by far the main operational cost, followed by labor and treatment costs for medium and large PNOs, or maintenance costs for small PNOs. Although more than 70 percent of PNOs obtain raw water from open sources (rivers and lakes), only a third treat the water and half of these follow the recommended sequence (aeration-coagulation-flocculation-sedimentation-sand filtration-chlorination).[35] Furthermore, only 20 percent of PNOs perform internal water quality tests. Water losses are significant, reaching an average level of 24 percent, primarily resulting from leaking pipes and inaccurate meters. However, this figure probably underestimates actual losses; some small and medium operators reported water losses of 0 to 5 percent, more than likely an understatement.

Most REEs are also basic operations that do not make use of transformers, and have significant system losses. REEs produce electricity using one or two diesel generators (two-thirds of REEs) or three to five generators (one-third of REEs), and have an average installed capacity of 146 kW. Only 14 percent use transformers and about half of the connections are equipped with meters. Distribution network length is 4,200 meters on average, but the range is wide, from a minimum of 150 meters to a maximum of 45 km. Fuel costs are by far the largest operating cost. Electricity losses reach an average of 33 percent, mainly as a result of small conductors (48 percent), meter inaccuracy and tampering (29 percent), and excessive line length (10 percent). In addition, 12 percent of REEs report daily or weekly service interruptions, but about 70 percent have less than one interruption per month. The main causes of service interruptions are generator malfunctions (over 50 percent) and wire breaks (37 percent). Operational performance of REEs, however, seems to have improved since 2000 when almost 40 percent of surveyed REEs reported weekly service interruption caused by system failures (Economisti Associati 2007).

BCSs are relatively sophisticated operations; almost all produce electricity with their own generators, which have an installed capacity ranging from 3 kW to 25 kW. Charge controllers are uncommon—batteries are disconnected when "they are hot" or after a fixed time. Fuel accounts for 90 percent of operating costs. The main technical problem is engine breakdown, but most operators are able to fix problems by themselves. Another issue is

35. The remaining PNOs extract their water supply from wells or boreholes.

the disposal of used batteries. Although BCSs report storing them in a safe place or discharging them through specialized collectors, most BCSs do not seem to follow proper used battery discharge.

HCRs are the simplest SPSPs in the country, with handcarts as their only asset. Just a few operators have integrated systems including a well, a pump, and a storage tank. Fuel represents over 80 percent of the operational expenditures for integrated operators, while the main cost for the remaining HCRs is for purchasing water from either a public utility or a private supplier.

Pricing

Prices charged by SPSPs are higher than those charged by public utilities and higher even than what would be considered affordable, particularly for the poor. PNOs charge an average of US$0.45 per cubic meter while HCRs charge US$1.2 (table IIB.5), two and eight times, respectively, the rate charged by PPWSA. Those prices imply expenditures on water consumption higher than the threshold of 3 percent of purchaser's income, which is considered the affordability ceiling for the poor. A PNO customer would have to spend, on an annual basis, the equivalent of 4.5 percent of Cambodia's GDP per capita (US$490) to acquire the average daily consumption of 134 liters per capita. More disaggregated data indicate that a large share of the population spends substantially more than that threshold for water purchases. Rosenboom, Ockelford, and Robinson (2007) estimate that 11 percent of all households and 47 percent of those with piped water spend more than 3 percent of their income for water (table IIB.6). Piped water is equally expensive for the poor and non-poor. Although households in the poorest quintile are the most affected, with 62 percent of those with piped water spending more than 3 percent of their income on water, the richest quintile is also severely affected, with the 43 percent of those with piped water spending more than 3 percent of their income on water.

Table IIB.5 Range of Prices Charged by Type of SPSP, 2006

	Piped network operator	Handcart vendor	Rural electricity enterprise	Battery charging station
Size	US$ per cubic meter		US$ per kWh	
Minimum	—	0.55	0.48	—
Average	0.45	1.20	0.71	0.52
Maximum	—	1.92	0.85	—

Source: Economisti Associati 2007.

Note: — = Not available.

Prices across PNOs do not vary much, suggesting that they charge a reference price. Unfortunately, there is no information on costs of production so cost and tariffs cannot be compared. Another interesting fact is that the average price charged by PNOs is lower than the tariff of US$0.50 per cubic meter set for operators of design-build-operate (DBO) contracts awarded by the government in 2003–04. The government deemed that rate affordable for both non-poor and poor clients (Navarro and Tavares 2008).

Table IIB.6 Proportion of Income Spent on Water in Dry Season by Consumption Quintile (percentage of income)

	All water sources			Piped water into the home		
Total expenses on water consumption	Poorest quintile	Richest quintile	Total	Poorest quintile	Richest quintile	Total population
No expenditure on water	93.1	49.0	78.9	5.6	0.8	1.9
< 3% of income	2.5	27.6	9.8	32.7	56.6	51.0
3–10% of income	2.5	16.8	7.3	42.4	31.9	33.6
> 10% of income	1.9	6.4	4.0	19.4	10.7	13.4

Source: Rosenboom, Ockelford, and Robinson 2007.

Prices charged by REEs are also high, with the average price about four times as much as the maximum residential tariff charged by EDC in Phnom Penh. Prices have increased 29 percent compared with the prices reported in the 2001 REE survey, driven mainly by fuel costs. Electricity prices have probably increased further since the 2006 survey, to keep up with higher fuel costs in 2007–08. Those high prices severely constrain access by rural consumers, particularly the poor. However, setting affordable prices is challenging, given the high cost structure of small scale operators, particularly those using diesel generators. Private REEs must set tariffs at cost-recovery levels. Nevertheless, anecdotal evidence indicates that there is some room to reduce prices. Hotels and large companies in Phnom Penh generate their own electricity because it is cheaper than buying from EDC. Unfortunately, the lack of data on operating costs makes it harder to estimate possible price reductions.

SPSPs charge mainly on the basis of monthly consumption which could be actual or imputed (in the case of network customers without meters); flat monthly fees are rarely used and connection fees are uncommon. Although about 40 percent of network providers charge entry fees, they rarely are true

connection fees because customers are often responsible for financing their water and electricity connections (pipes and plumbing work, meters, and outside wiring). About 70 percent of network providers collect payments monthly while the remainder collect in shorter periods (every two weeks, weekly, and even daily). Network providers have high collection rates and rarely resort to disconnection. Just 4 percent of PNOs and even fewer REEs report serious problems with collecting payments. Disconnection rates are about 2 percent of PNO clients and 1 percent of REE clients.

Investments and funding sources

SPSPs are as diverse in their investments as they are in their technical operations (table IIB.7). Network providers show wide variations depending on the scale of their operations and technical features. For PNOs, technical features that affect cost are the usage (or not) of wells and the presence (or not) of treatment processes. However, for all PNOs, distribution networks account for the largest share of investment, followed by wells and water treatment systems when present. PNOs invest on average US$120 per client. For REEs, network size accounts for the bulk of investment (over 50 percent) followed by generating capacity (38 percent). As expected, the share of power generators in total investment declines with REE size. The average capital intensity is US$100 per client although there are some variations among smaller and larger REEs.

Table IIB.7 Range of Investments by Type of SPSP and Size in US$

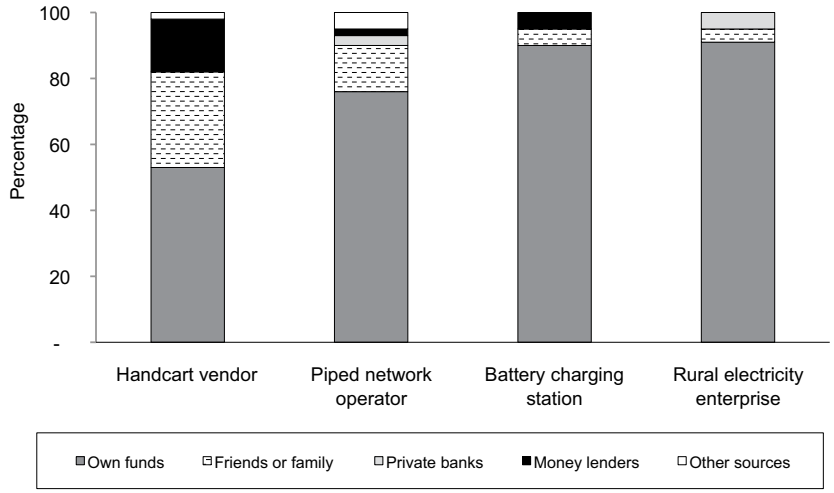
Operator size	Piped network operator	Rural electricity enterprise	Handcart vendor	Battery charging station
Small	8,500	5,500	n.a.	n.a.
Medium	49,500	24,600	n.a.	n.a.
Large	499,000	169,700	n.a.	n.a.
Average	49,400	53,300	870	1,150

Source: Economisti Associati 2007.

Note: n.a. = Not applicable.

The other two types of SPSPs are much simpler operations with lower investment requirements. For BCSs, electricity generators account for 70 percent of total investment. The rest of investment is spent on AC/DC converters, battery chargers, and on rare occasion on charge controllers. For most HCRs, the handcart is the only asset, and is usually bought second hand for US$50 to US$100. For integrated HCRs, the well is the main asset, accounting for half of total investment, followed by storage tanks (15 percent).

Figure IIB.1 Funding Sources by Type of Provider



Source: SPSP survey in Cambodia 2006.

Most SPSPs finance investments with their own or family and friends' funds (figure IIB.1). Only the largest SPSPs are able to obtain loans from microfinance institutions or banks. The smaller entrepreneurs found those sources either unavailable or unaffordable. Most banks require 150–300 percent collateral for loans, which is hard for such small operations to meet (ECA and Mercados de Energia S.A. 2002). In addition, limited business management skills and lack of good recordkeeping prevent many SPSPs from being eligible for formal credit (ECA and Mercados de Energia S.A. 2002). Funding from donors or nongovernmental organizations has so far been limited to a few SPSPs, mainly through the MIREP project for PNOs financed by the French government.[36]

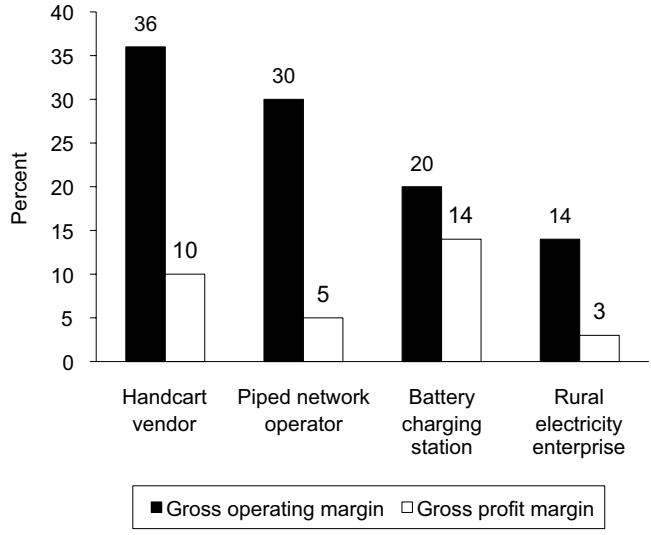
Financial performance and funding

REEs are the largest operations by annual revenue, followed by PNOs (figure IIB.2). All SPSPs operate profitably, recovering operating costs and making respectable gross operating margins. However, when depreciation costs

36. The Mini Reseaux d'Eau Potable (MIREP), a pilot program of the Ministry of Rural Development financed by Syndicat des Eaux d'Ile de France (SEDIF) and the French Ministry of Foreign Affairs focused on providing capacity building to small scale water suppliers. With six projects piloting village-level water supply systems financed and operated by local private sector enterprises, the program has aimed to ensure access to water for all households in targeted villages (Salter 2003).

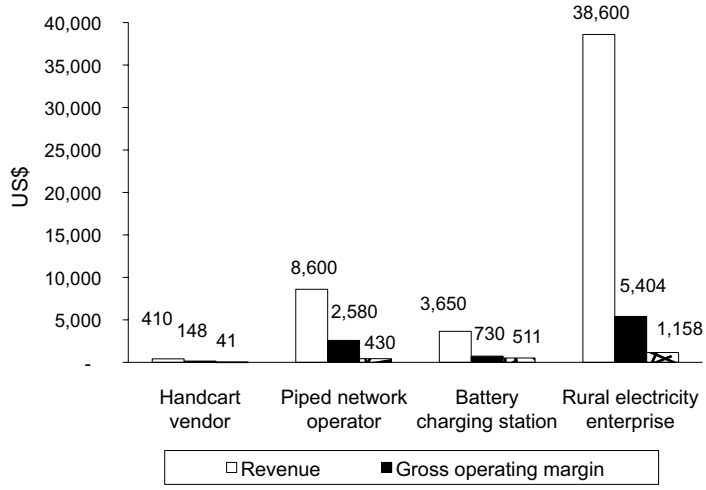
are taken into account, profits became low in both percentage and absolute terms. REEs, the operators with the largest profits, report on average just over US$1,000 of annual gross profits. Annual profits of BCSs are slightly higher than those of PNOs while those of HCRs are quite modest. It should be noted that revenue and profitability data are rough estimates because of the reluctance of SPSPs to provide such information and their poor record-keeping practices.

Figure IIB2.a Percentage financial indicators



Source: SPSP survey in Cambodia 2006.

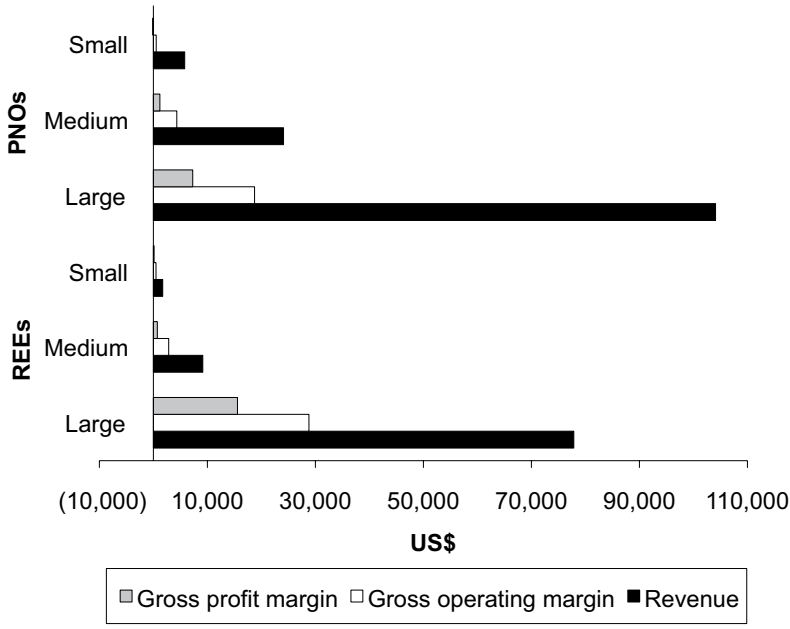
Figure IIB2.b Absolute financial indicators



Source: SPSP survey in Cambodia 2006.

There are, however, significant differences in financial performance across network providers (figure IIB.3). Large PNOs reported gross profit margins of 20 percent, medium ones 8 percent, and small ones 2 percent. There was less variation among REEs, with the largest ones reporting gross profit margins of 7 percent and the small ones of minus 2 percent.

Figure IIB.3 Average Annual Revenues and Margins of Network Providers



Source: SPSP survey in Cambodia 2006.

Business perspectives

Most network providers operate with virtually no competition. Almost all PNOs and 75 percent of REEs indicated they faced no competitive pressure from public utilities. Competition mainly comes from other SPSPs but is not regarded as strong. Only the smallest REEs operating in highly populated areas face competition from larger REEs or public utilities.

In their markets, SPSPs perceive opportunities to expand their businesses. More than half of PNOs and 60 percent of REEs reported increasing their number of clients during the year previous to the survey. In addition, almost all REEs and two-thirds of PNOs thought most unconnected households in their operating areas were potentially attractive clients. Not surprisingly, over half of the network providers, mainly medium and large ones, expected their businesses to improve in the future, and about 40 percent of PNOs and half of REEs planned to invest in capacity expansion or improvement of existing operations.

Conversely, BCSs and HCRs operate in highly competitive markets because of the low entry barriers, and do not see expansion opportunities. Most BCSs planned to maintain their current level of operations, with only 10 percent having plans to invest in fixed assets. HCRs serve a niche market, supplying

the poorest households with water during periods of scarcity. As soon as the water scarcity wanes, their businesses decline. HCRs are not competitive providers compared with other SPSPs. Their services are less efficient than those of PNOs but they charge higher prices. Consequently, it is not surprising that HRCs' market shares decline rapidly in areas where PNOs expand their services; half of HCR operators expected business to decline in the future.

Licensing

The survey was designed to capture SPSPs with different levels of licensing, and the results reflect the sample selection. The survey reveals a few interesting findings in this regard. First, there is some government oversight for most network providers regardless of their license status. Half of PNOs and 70 percent of REEs received at least one inspection focusing on technical and safety issues, and for REEs, on prices, too. Second, most inspections did not result in fines or temporary closures, but a small portion of operators reported they received requests for unofficial payments. Third, limited progress has been made on incorporating REEs into the national license system created by the 2001 Electricity Law and managed by the Electricity Authority of Cambodia (EAC). Only 43 percent of surveyed REEs had an EAC license; 38 percent of REEs were still operating on the basis of earlier permits issued by either MIME/DIME (Department of Industry, Mines and Energy) or local authorities. The slow adoption of EAC licenses could be driven, in part, by its cost (between US$250 and US$750), which is high compared with the cost of DIME permits (between US$50 and US$150). Finally, although BCSs are not regarded as electricity suppliers and thus do not require a license under the Electricity Law, about half of those surveyed hold a license or permit issued by the provincial DIME or local authorities.

Conclusions and Recommendations

As in other conflict and postconflict countries, electricity and water SPSPs emerged in Cambodia as a result of pent-up demand and unmet needs, particularly of poor and rural populations. While electricity providers have consolidated somewhat, with the number of suppliers declining, SPSPs continue to be the main service providers in rural areas and will remain so in the near future, primarily because of the lack of alternatives.

The survey found that SPSPs provide valuable services, although prices seems to be higher than what is considered to be affordable, and service quality is lower than that expected by consumers. The high prices are at least partially driven by the small scale of operations and high operating costs. Indeed, larger SPSPs report on average lower system losses, better service (longer hours and better water or electricity quality), and higher profits. Therefore, government or donor programs that aim to support net-

work expansion of SPSPs should also help them to benefit from economies of scale. However, those programs do not deal with the main operating cost of those providers, which is their heavy reliance on small diesel generators. To address this problem, a technical and financial assistance program could help network providers to lower energy costs by improving operations, finding alternative generator technologies, reducing system losses, and improving their recordkeeping.

The main policy issue with regard to service quality is the lack of water treatment by most piped water providers, which poses significant public health risks. Indeed, most consumers do not buy water from small scale piped networks because it is treated but because it is cheaper than other providers and more convenient (Salter 2003). Such consumer behavior reflects little public awareness of the health hazards of using unsafe water and is worrisome in Cambodia, where waterborne and water-related diseases continue to be a serious public health problem. To improve public health, the government should implement a surveillance program to monitor compliance with the national water quality standards so that water reaching consumers does not carry waterborne diseases. Improving water quality, however, would also require providing the financial support, because SPSPs' low profit margins are not adequate to generate enough resources to self-finance water treatment systems. Technical assistance would also be needed to ensure that water treatment is done properly. Equally important, awareness-raising campaigns on the benefits of treated water would be required because consumers dislike (and distrust) the taste of chlorine, which discourages operators from implementing or using existing infrastructure to treat and disinfect water.

In sum, the findings of this survey should provide the basis for in-country discussions about strategies to promote service expansion of network providers in particular, as well as better supervision and regulation of all SPSPs. The topic merits further discussion by practitioners and policy makers to identify the most appropriate solutions for Cambodia. In addition, further research on SPSPs may be required to deepen the knowledge, such as which rural electricity enterprises could migrate from diesel generators to more cost-effective generators, such as those that use biomass, and what minimum water quality standards would ensure public health but also be attainable by small operators and affordable for their clients. Reaching an appropriate balance between water quality and affordability is critical in Cambodia, given its high rates of waterborne and water-related diseases in rural areas. Another topic for further research is the perception that other stakeholders—customers, local governments, utilities, and financiers—have of SPSPs. Similarly, a deeper analysis of the limited access SPSPs have to sources of finance could provide some light on the changes required to improve it.

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IIC
A Survey of Small Scale Private Service Providers of Water and Electricity in Kenya[37]

Kenya faces major challenges to providing adequate water and electricity services to its population as a result of the current limited coverage of those services, the poor performance of public utilities, and the country's disadvantageous socioeconomic conditions. The pent-up demand for water and electricity has created a growing market for small scale private service providers (SPSPs), which have established a strong position, particularly in rural areas.

Considering their significance, the World Bank's Energy Sector Management Assistance Program, Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a survey of SPSPs in Kenya to understand their role in both sectors and to assess their potential for helping Kenya meet its development objectives, including the Millennium Development Goals. The survey was part of a larger study that included surveys in three other countries (Bangladesh, Cambodia, and the Philippines). The survey was carried out by Economisti Associati in late 2006 and consisted of face-to-face interviews with SPSP managers and owners to obtain their perspectives on a variety of structural, operational, and financial topics.

The purpose of this appendix is to summarize the main findings of the survey, point out policy issues it raises, and recommend future work.

Two groups of SPSPs emerged from the survey: (i) network providers and (ii) point source and mobile distributors.

Network providers in Kenya are community-based organizations that operate independently. They are able to generate financial resources to build the initial infrastructure for the business, although many of them received financial support from the government, nongovernmental organizations (NGOs), or donors. Most network operators have basic operations that take advantage of natural resources. They primarily serve households and charge tariffs that are comparable to those charged by public utilities. Although operating costs are recouped, the tariffs collected by many network providers are unable to cover maintenance and rehabilitation costs or network expansion.

Point source and mobile distributors are privately owned, one-person businesses that obtain water and electricity supply from public utilities or private sources. Each of them engages in very basic operations to serve a

37. This report was prepared by *Ada Karina Izaguirre, (Finance, Economics, and Urban [FEU] Department of the World Bank) and Iwona Reichardt (consultant). Kameel Virjee (Water and Sanitation Program) provided comments. The work was funded by ESMAP, PPIAF, WSP and Finance, Economics, and Urban Department of the World Bank.*

small number of households. Among these operators, water kiosks and battery charging stations (BCSs) have the largest impact on the poor. However, the prices that kiosks charge are very high when compared with those charged by public utility providers and also seem excessively burdensome for the poor, who, in turn, compensate for high prices with low water consumption levels. The prices charged by water kiosk operators provide significant profits relative to investment, but the absolute value of those profits is small.

This appendix is organized as follows: The first section summarizes the current provision of water and electricity services. The second section presents the predominant types of SPSPs in the country, summarizes the survey methodology, then reports the main survey findings with regard to SPSP's size and organization, customers, technical operations, prices, investment, financial performance, funding sources, licensing, and regulation. The third section discusses recommendations and possible future work.

Country Context

This section discusses the evolution of water and electricity access rates nationwide as well as across urban and rural areas. It also present status of service provision for those connected to public water and electricity utilities.

Low Access Rates and Limited Improvements Predominantly Affect the Poor

Access rates to water and electricity services in Kenya are low, reflecting the limited improvement in coverage over the last decades. The share of households with access to improved water supplies grew from 41 percent in 1990 to 57 percent in 2006 (World Bank 2008b), while the electrification rate increased from 14.5 percent in 1998 to 16 percent in 2003.[38] At those rates, about 18.6 million people did not have access to improved water in 2006, and 30.7 million lacked electricity access. Access rates are significantly higher in urban than in rural areas, but coverage improvements vary across services and geographic areas. In urban areas, the electrification rate grew from 47.5 percent in 1998 to 50.2 percent in 2003, but the share of population with improved access to water fell from 90 percent in 1990 to 85 percent in 2006. A rapidly growing urban population (3.8 percent annually between 1990 and 2007) and the limited ability of public utilities to expand access explain the declining coverage in water and the limited increase in electricity. In rural areas, improved access to water grew from 30 percent

38. Access rate data come from World Bank (2008b). Although different in absolute values, the trends reported by household survey data are consistent with those of utility-reported data. For instance, according to Africa Infrastructure Country Diagnostic (AICD), the share of households with access to electricity provided by the Kenya Power and Lighting Company (KPLC) increased from 8.7 percent in 2000 to 11.4 percent in 2005.

in 1990 to 49 percent in 2006, while the electrification rate rose from 3.8 percent in 1998 to 4.6 percent in 2003. Additionally, about 3 percent of rural households had electricity service through photovoltaic solar home systems as of 2006.[39]

The limited progress in service coverage is reflected in low consumption levels. Kenya's average electricity consumption per capita was 138 kWh in 2005, which ranked among the lowest in the world and was even low by African standards.[40] Gulyani, Talukdar, and Kariuki (2005) estimate the average water consumption in the three main urban areas in Kenya to be about 40 liters per capita per day (lcd)—low even by developing-country standards. The study reported higher water consumption for urban areas in Tanzania (70 lcd) and Uganda (47 lcd) as well as in nine Asian capital cities (ranging from 91 lcd in Kathmandu to 200 lcd in Delhi). The low levels of water consumption in Kenya have a major impact on public health. It is estimated that waterborne or sanitation-related diseases make up the majority of Kenya's morbidity rate and are responsible for over 60 percent of premature deaths (UNESCO 2006).

Limited service coverage in urban areas primarily affects the poor. In the slums of Nairobi, high economic poverty (73 percent of slum dwellers fall below the poverty line) is accompanied by precarious living conditions (World Bank 2006). For instance, only 22 percent of slum households have an electricity connection and barely 19 percent have access to a supply of piped water through either an in-house water connection or a yard tap. Such low connection rates stand in sharp contrast with the relatively good coverage data reported for Nairobi as a whole. World Bank (2006) city-level data suggest that 71–72 percent of Nairobi's households have piped water (in-house connections or yard taps) and that 52 percent have electricity connections. Another study found similar results in Nairobi as well as in other cities. Surveying households in Nairobi, Mombasa, and Kakamega, Gulyani, Talukdar, and Kariuki (2005, 27) found that "although about half of the sampled households had access to private piped water connections, only 5% of those connected are poor. The poor households are thus overwhelmingly dependent on alternative water sources."

Expanding water and electricity access to reach most of the population poses major challenges because of the country's socioeconomic conditions, which limit its ability to modernize and expand its infrastructure. The GNI per capita was just US$680 in 2007, and about one-third of the population

39. These data are based on Jacobson (2007) and PVMTI (2006). There are no national data on off-grid photovoltaic systems in Kenya and available estimates vary significantly.
40. Kenya ranked in the lower half of the 26 Sub-Saharan African countries for which data were reported by the International Energy Agency (IEA 2006).

live below the poverty line. Although rapidly urbanizing, Kenya is still a predominantly rural country with about 79 percent of the population living in rural areas. Kenya not only ranks 148th out of 177 countries in the 2007/2008 United Nations' Human Development Index (HDI), but also showed a declining HDI over the last 15 years (UNDP 2007).

Service Provision for Those Connected is Precarious, but Improving

In the early 2000s, water supply in the main urban centers (Nairobi, Mombasa, Kakamega) was dismal (Gulyani, Talukdar, and Kariuki 2005). Utilities in those cities were caught in a cycle of declining investment, quality of service, and financial returns, and were characterized by (i) low coverage and unreliable service, (ii) high levels of unaccounted for water and unpaid bills, (iii) poor financial management, (iv) revenues insufficient to cover operations and maintenance costs, and (v) inadequate commercial management. This situation translated into inadequate service to the population. Gulyani, Talukdar, and Kariuki (2005) conducted a household survey in three urban areas and found "36 percent of the households with private connections, 36 percent of those relying on kiosks, and 47 percent of those with yard taps report that water was available for less than 8 hours per day. Only about one-third of households that had private connections usually get water for more than 16 hours a day" (Gulyani, Talukdar, and Kariuki 2005, 19). Half of the surveyed households were dissatisfied with their water supply services, and the majority rated improving those services as their top development priority. Poor water supply is also reported by more recent studies, such as World Bank (2008a), which indicates that firms, on average, experience 85 days a year of failures in water supply, and WSP (2007b), which points out that half of urban consumers are dissatisfied with their interactions with water companies.

To improve the water sector's performance, the government of Kenya began a comprehensive reform by enacting and implementing the 2002 Water Act. The act mandated a new institutional setup for the water sector to harmonize and streamline the management of water resources and water supply and sewerage services. A central tenet of the new service delivery framework was the dispersion of functions to different entities. Thus, the reform reorganized the Ministry of Water and Irrigation (MWI) into a policy entity; established new sector oversight institutions (the Water Services Regulatory Board, a Water Services Trust Fund to assist in financing the provision of water services to areas without adequate service, and a Water Appeal Board); and created seven Water Services Boards, which are responsible for appointing and contracting with Water Services Providers (WSPs) to be responsible for service delivery. A local government cannot directly assume the role of WSP but could form a legally separate WSP company.

The reform has experienced the setbacks and delays inherent to any major reform effort (World Bank 2007d).

Before 2003, the delivery of water and sanitation services was fragmented into various regimes and under the responsibilities of different agencies and organizations (the MWI, the National Water Conservation and Pipeline Corporation [NWCPC], and local authorities). MWI operated about 73 piped urban water systems serving 52,000 connections and 1.4 million people, and about 555 rural water systems serving about 230,000 connections and 4.7 million people (World Bank 2007d). NWCPC, created in 1988 to take over commercially viable operations from MWI, operated piped systems in 221 urban centers totaling 93,000 connections and serving about 2.2 million people. MWI and NWCPC did not operate wastewater systems, leaving them (where they existed) to local authorities. Ten local authorities (including in Nairobi) operated their own water systems as well as sewerage systems. Additionally, self-help groups operated about 355 piped water supply schemes serving about 2.3 million people, and about 10,000 stand-alone water points serving about 2.6 million people.

As part of the water sector reform and with the World Bank's support, the Athi Water Services Board (AWSB) contracted with the municipality-owned Nairobi City Water and Sewerage Company (NWSC) to operate water services in Nairobi. AWSB defines NWSC's responsibilities through a Service Provision Agreement that is subject to regulatory oversight as well as technical and financial audit. Since the reform, NWSC has set up a modern and comprehensive billing, collection, and customer management system and has reorganized itself into five business centers to be closer to customers and enhance service delivery standards. Each business center has transitional performance contracts with corporate headquarters. Revenue collections increased by 60 percent between 2004 and 2006 leading to full recovery of operating and maintenance costs. NWSC is working with Transparency International Kenya to reduce corruption in company operations.

In the electricity sector, the government of Kenya embarked on a major reform beginning in the late 1990s to overcome the corporate governance crisis in which the sector was submerged. The state-owned enterprise and the sector were unbundled into generation and distribution in 1997, an electricity regulator was created in 1998, and the Rural Electrification Authority was established in 2007. In addition, a new Energy Policy was enacted in 2004 and a corresponding Energy Law in 2006, which expanded the reforms and opened up the sector to private capital and operation. In 2006, the government divested 30 percent of KenGen, the state-owned generating company, to the public and granted a two-year management contract to Kenya Power and Lighting Company (KPLC), the distribution and transmission company.

In addition, four independent power producers supplied about 12 percent of electricity demand by 2007. The government has given high priority to rural electrification, setting a goal of increasing rural electrification from the current 8 percent to 20 percent by 2012 and 40 percent by 2020.

Electricity services have expanded in the last few years, but still need further improvement. In 2006–08, KPLC's operational and financial performance improved markedly: connections increased from 30,000 annually to more than 150,000; losses were reduced from 19 percent to 17 percent; revenue collection came close to 100 percent. Enterprise surveys reflect those service improvements, but also indicate that unreliable electricity continues to be costly. The World Bank's 2007 enterprise survey reported electricity as the fourth top constraint for Kenyan companies, with 27 percent considering it a major business constraint (World Bank 2007c). That is an improvement compared with the results of the 2004 survey, when 37 percent of Kenyan manufacturing firms rated electricity services as "poor," "very poor," or "not available" and the electricity sector was performing more poorly than in the neighboring countries of Uganda, Tanzania, and Zambia (Rped 2004). The average lost production in manufacturing firms resulting from power outages or surges declined from 9 percent of annual sales in the 2004 survey to 6.35 percent in the 2007 survey. However, they remain a significant burden to Kenyan firms. To cope with frequent outages, 66 percent of firms owned or shared generators in 2007, from which they produced 15 percent of their electricity requirements.

Small Scale Private Service Providers (SPSPs) and Their Role in Service Provision

SPSPs have partially filled the demand for water and electricity services unmet by the limited coverage of public utilities. Indeed, Kenyan SPSPs are well-established entities whose contribution to service provision is significant in water supply and expanding in electricity. The government of Kenya acknowledges their role and supports their development in the 2002 Water Act as well as in the 2004 Energy Policy and 2006 Energy Law. Government policies have recognized independent community-based operators as viable service providers and promoted their development through different schemes, including establishing operating standards and the provision of financial support. There has been a gradual recognition of the role privately owned SPSPs located in urban areas can play in service provision, particularly in water supply. Since the passage of the 2002 Water Act, water kiosks have been registered as formal providers and in many cases are charged discount bulk tariffs to reduce their water cost.

A review of existing literature suggests that water SPSPs are a key source of supply for rural and urban households in Kenya. In contrast, the importance of electricity SPSPs has not been very well documented and only anecdotal information of their presence exists. To assess their potential in water supply and better understand their role in electricity, the World Banks' Energy Sector Management Assistance Program and Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a comprehensive survey of SPSPs.

A Survey of SPSPs in Kenya

The survey was carried out by Economisti Associati (2007) in late 2006 and focused on six predominant types of SPSPs in Kenya:

- Water kiosks (KIOs) are point source resellers of water from utilities through supply pipe connected to a distribution point, where it is purchased by customers.
- Piped network operators (PNOs) obtain water from open sources or their own wells and distribute it to consumers via piped networks.
- Water truckers (TRKs) are mobile operators distributing water with trucks equipped with water tanks.
- Handcart vendors (HCRs) are mobile operators distributing water using 20-liter jerricans placed on handcarts or trailers.
- Micro-hydropower schemes (MHPs) are mini-grid operators distributing electricity from their own generators and through their own wired networks.
- Battery charging stations (BCSs) are stationary operators providing battery-charging services to clients using electricity from public utilities or their own generators.

The survey used the SPSP definition proposed by Kariuki and Schwartz (2005), that is, an entity established as a private initiative, either for profit or not for profit, that has at least 25 percent of capital financing provided by or borrowed by a private entity, operates on a commercial basis (without recurrent subsidy), and serves fewer than 5,000 customers.

Country sources indicate that SPSPs play an important role in water supply, serving about 6 percent of Kenya's total population. Community-based PNOs in rural areas serve about 11 percent of the rural population with improved access to water, while water kiosks reach about 8 percent of the urban population with improved access to water. The share of the population reached by mobile vendors (handcarts and water truckers) is unknown but presumably small. These estimates vary widely from those of earlier studies. For example, the 2007a WSP study estimated about 3,000 com-

munity-based water supply schemes served about 30 percent of the rural population, while a 2001 World Bank study pointed that the records of the Ministry of Environment and Natural Resources indicated that there were only 355 piped systems operated by self-help groups, serving 2.3 million people. A 2004 WSP study estimated the number of water kiosks at 2,085, less than half the current survey's estimate, while another study (Gulyani, Talukdar, and Kariuki 2005) concluded that water kiosks served at least 19 percent of urban households in main urban areas.

In electricity, the survey estimates that overall SPSPs play a relatively small role, with MHP schemes totaling 35 to 40 operations and BCSs serving fewer than 50,000 people. SPSPs are estimated to serve less than 2 percent of the total Kenyan population. The survey did not include solar home systems (SHS) because providers of those systems were considered product retailers rather than service providers.

Table IIC.1 Prevalence of Water and Electricity SPSPs in Kenya

Sector	Type of SPSP	Number of operators	Households served	Population served (%)	
				With access	Total
Water	Piped network operators	520	215,000	5	3
	Water kiosks	4,600	205,000	5	3
	Mobile water vendors	< 50	Unknown but presumably small	—	—
Electricity	Micro-hydropower schemes	35–40	2,500–3,000	< 1 (20–25% in the areas where MHP are present)	< 1
	Battery charging stations	> 1,000	> 50,000	n.a.	< 1

Source: Economisti Associati 2007.

Note: n.a. = Not applicable; — = Not available.

The survey consisted of face-to-face interviews with SPSP managers and owners using typology-specific, closed questionnaires covering a variety of structural, operational, and financial topics. Survey results reflect operators' perspectives and do not include information from customers. The survey used three types of sample sizes. For PNOs and KIOs large sample sizes

were used to make the results statistically significant at a 95 percent degree of confidence with a margin of error of 10 percent. Interviewed managers (95 KIOs and 85 PNOs) were selected through a two-stage stratified sampling based on the area of operation (informal settlements and small towns for KIOs) or hydro-geological considerations (PNOs).

Medium sample sizes (20 interviews) were used for BCSs and TRKs, while small sample sizes (10) were used for HCRs and MHPs. Although no formal sampling strategy was developed for these groups, efforts were made to ensure broad geographical coverage. Because of the small sample size, results of these surveys provide only qualitative insights. The survey field work was carried out in 11 districts and 5 urban areas (Nairobi, Mombasa, Kisumu, Nakuru, and Thika).

Main Survey Findings

The survey identifies two clearly distinguishable groups of SPSPs in Kenya: network providers (PNOs and MHPs) and point source or mobile operators (KIOs, HCRs, TRKs, and BCSs). Network providers are primarily community-based organizations capable of producing their own water and electricity, and able to generate the resources required for building infrastructure. However, government and donor funding played an important role at some point in their development. These operators are located in rural areas where they take advantage of natural resources and provide relatively continuous service to households. Their operations are basic: none of the piped water providers had water treatment facilities and only one electricity operator used transformers.

Tariff policies of network operators aim at providing affordable services to their customers, rather than ensuring the long-term financial viability of the operations. Tariffs usually cover operational costs but not maintenance, replacement of existing assets, or expansion, given that most network operators report negative gross profit margins. Nevertheless, operators feel satisfied with current business results and planned to invest in service expansion and improvement. The discordance between negative financial results and satisfaction with current business and investment plans reflects the social nature of these operations, the limited financial expertise of operators, and their expectation of relying on government or donor support to carry out investment plans.

Point source and mobile distributors are simpler, privately owned operations that rely on public utilities or other private sources for water and electricity. Many of these providers emerged in the last six years in response to the growing demand for services. Water providers are concentrated in urban and peri-urban areas while electricity providers are in rural areas.

They serve small numbers of households, ranging from 10 to 50 clients, and their physical operations are made of basic distribution assets that vary according to the nature of the operation.

Point source and mobile operators charge prices much higher than those charged by network providers. These prices seem to be an excessive burden on poor households, who, in turn, tend to compensate for high prices with very low consumption. KIOs and BCSs have the largest impact on the poor. Kiosk prices provide operators with very attractive profit margins, but are also reflective of the country's acute water scarcity and the way in which water is managed. The complex relationships between water utilities and water kiosks are, in many cases, shaped by personal connections with utility staff rather than by an established utility policy toward SPSPs. Prices of BCSs do not seem to be a major concern for policy makers and customers.

Location

SPSPs operate across the country but certain types of SPSPs concentrate in specific geographic areas. Electricity SPSPs are primarily located in rural areas, while water SPSPs are in both urban and rural areas, with different types predominating in each area. KIOs and mobile providers (TRKs and HCRs) are urban phenomena, mostly operating in informal settlements around Nairobi and Mombasa, and to a lesser extent, in mid-sized cities such as Kisumu and Nakuru, among others. PNOs are located in rural areas, concentrating in a dozen districts in the central highlands. MHPs are mostly concentrated in the areas around Mount Kenya (Kirinyaga, Muranga, and Meru South districts), while BCSs are primarily present in rural areas and small towns.

Most network operations take advantage of available natural resources. PNOs rely on surface water and prefer mountainous locations with deep aquifers. PNOs also tend to locate in areas with relatively high population densities (over 150 inhabitants per square kilometer), favorable hydro-geological structures (for example, not where shallow aquifers facilitate private tube wells), and comparatively better-off populations. The majority of the MHPs were found around Mount Kenya and used run-of-river schemes.

Ownership and organization

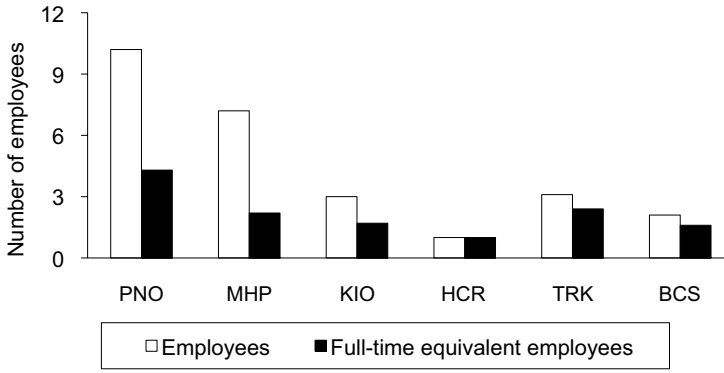
Kenyan SPSPs include both community-based organizations and fully private, commercially oriented operators. All network operators (PNOs and MHPs) and some KIOs are community-based organizations whereas the other SPSPs (most KIOs, HCRs, TRKs, and BCSs) are primarily privately owned businesses. Individual or family ownership predominates among the latter group; the most basic being the BCSs, which operate primarily as side businesses of retail shops. Community-based schemes are governed by committees elected

by members. Operational responsibilities are entrusted to a professional manager or a member of the committee working on a part-time basis. PNOs and MHPs are usually registered as self-help groups under the Societies Act.[41]

Network operators are the most structured SPSPs; almost all of them operate from dedicated premises, keeping written records of costs and revenues, having a bank account, and 70 percent of them filing tax returns. Other SPSPs are less structured. Half of surveyed TRKs operate from dedicated premises, and three-fourths of respondents have a checking or savings account with a financial institution. Most KIOs (73 percent) operate from dedicated premises, but are poorly equipped. Only one surveyed kiosk (a community-managed kiosk supported by a donor-funded grant) had a fully equipped office; the sole item of office equipment for half the respondents was a mobile phone. BCSs operated in facilities shared with other activities, and lacked office equipment.

PNOs are the largest employers (figure IIC.1), employing an average of 10 people primarily on a part-time basis, yielding the equivalent of 4.3 full-time staff. Most PNOs (64 percent) generally rely on hired labor while the remaining surveyed schemes relied exclusively or predominantly on the work of members of the community organization (29 percent) or have balanced composition between hired labor and member work (7 percent). Among the other SPSPs, only TRKs rely mostly on hired labor while KIOs, BCSs, and HCRs are run by the owner as "one person shops" with some assistance from family members.

Figure IIC.1 Average Number of Employees by Type of SPSP



Source: SPSP survey in Kenya 2006.

41. In addition, a fifth of the surveyed PNOs (typically the oldest) are also registered with the Registrar of Companies.

PNOs are, by far, the longest-established organizations, having been operational for an average of 18 years. Some of these schemes were formed at the initiative of villagers, sometimes with support from local NGOs or religious organizations. Others were established within the framework of donor-financed programs or by the MWI and subsequently handed over to local communities. Other SPSPs were established more recently. KIOs and TRKs have been in operation for an average of eight and six years, respectively, with most starting operations in the early 2000s when the country was hit by a severe drought. Electricity SPSPs are also a newer phenomenon, with the vast majority of MHPs and BCSs having been established in the 2000s. The establishment of MHPs followed the success of a couple of pilot projects in late 1990s. Three-fourths of surveyed BCSs were established in the 2000s, and one-fourth were established in 2005 and 2006, suggesting a substantial business creation rate.

PNO managers are the most senior and experienced. They are often prominent community members in their forties and fifties or older. Education levels for these managers are mixed: about half have completed general secondary schooling, 23 percent have completed technical schooling, and the remainder have only completed primary schooling. Most managers have experience in the sector, either through previous employment in public utilities or ministries or through long tenure at the PNO. However, only 12 percent of interviewees derived the bulk of their income from the PNO business. The rest provided their services to the community on unpaid volunteer and part-time basis. All MHPs are run by committees whose members are involved on volunteer and part-time basis.

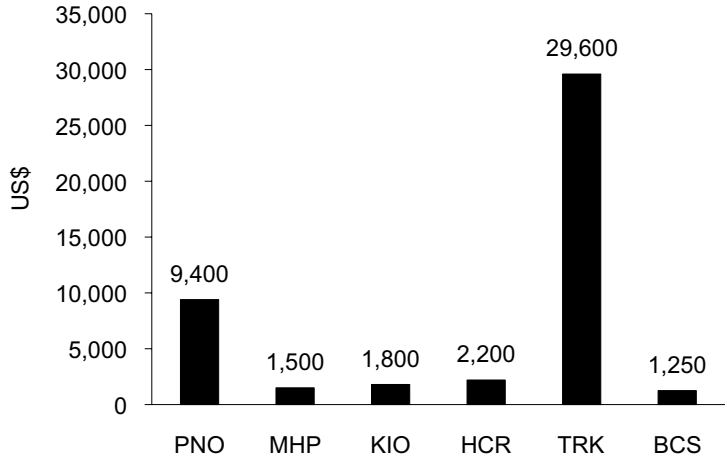
Managers of other SPSPs are a more diverse group. Kiosk operators or managers are mainly males in their thirties and forties with a mixed level of education: 50 percent completed secondary schooling and 42 percent completed primary schooling. The KIO business is the main source of income for the majority of KIO managers (65 percent). HCR owners are generally males in their thirties with relatively low education levels (just 30 percent completed secondary schooling) and the water business is their main income source. BCS owners are males in their twenties and thirties who completed secondary schooling and had no previous experience in the sector (three-quarters of them). The majority of BCS owners are primarily involved in other income-generating activities (such as retailing and farming).

Size of operations

Kenyan SPSPs fall into two groups by level of revenues. The first group includes most SPSPs, which have average annual revenues ranging from about US$1,250 (BCSs) to US$9,400 (PNOs). The other group consists solely of TRKs, whose annual revenues are in the range of US$29,600

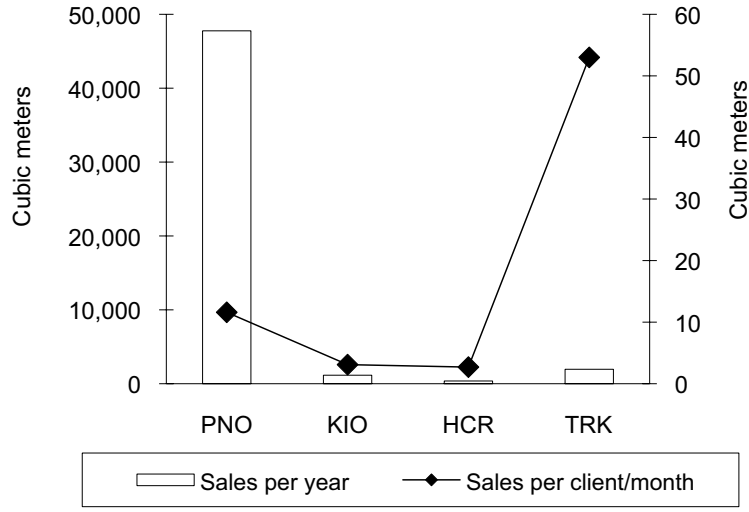
(figure IIC.2). PNOs are the largest SPSPs as measured by physical sales, distributing an average 47,700 cubic meter/year (figure IIC.3). TRKs are able to generate revenues many times those of any other SPSPs because of their high prices (see Tariffs section below) rather than high total sales volume. In addition, volume sales per client among TRKs is by far the highest among SPSPs, indicating that they focus on better-off clients (see Clients section). BCSs are the smallest providers of electricity services, serving between 100 and 200 batteries per month.

Figure IIC.2 Average Annual Revenues by SPSP Type



Source: SPSP survey in Kenya 2006.

Figure IIC.3 Average Annual Physical Sales of Water by SPSP Type



Source: SPSP survey in Kenya 2006.

Average annual revenues and sales, however, mask the large dispersion of values observed within types of water SPSPs. KIOs have annual revenues ranging from less than US$600 to more than US$10,000 and physical sales vary from 300 liters up to 20 m^3 per day. TRKs' annual sales range from US$2,000 (occasional operators) to US$70,000 (large operators), with one making US$480,000 per year. HCRs' annual revenues run from less than US$550 to more than US$5,500. In general, KIOs and HCRs in Nairobi report lower revenues than those in Mombasa.

Clients

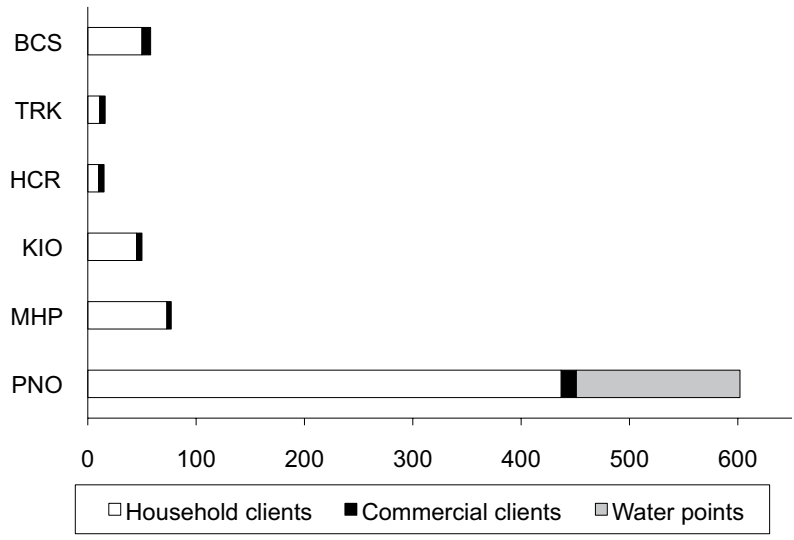
The average SPSP customer base is small. PNOs have the largest average base at 600 clients. Of those PNO clients, an average 150 are served through water points and the rest are served via household connections. Water points are used by 25 percent of surveyed PNOs and are basically standpipes where the villagers who are not connected to the network can fill their jerricans and jars. The other SPSPs serve clients numbering on average 77 (MHPs), 58 (BCSs), 50 (KIOs), 16 (TRKs), and 15 (HCRs). Most Kenyan SPSP clients are households. Commercial clients are important customers only for HCRs and TRKs (figure IIC.4).

Network providers and BCSs report serving mostly poor households (figure IIC.5). Among the remaining SPSPs—water providers operating in urban areas—KIOs and HCRs have the largest share of poor households,

which constitute about 40 percent of their clientele. TRKs serve a more affluent clientele, frequently residents of the newly urbanized areas. The high proportion of non-poor households among the SPSP clients in urban areas reflects the limited ability of public utilities to serve those clients. PPIAF (2002) estimated that in Nairobi, 40 percent of those served by the utility do not receive a 24-hour supply, some 30 percent receive water once in two days, while 10 percent receive water only once a week.

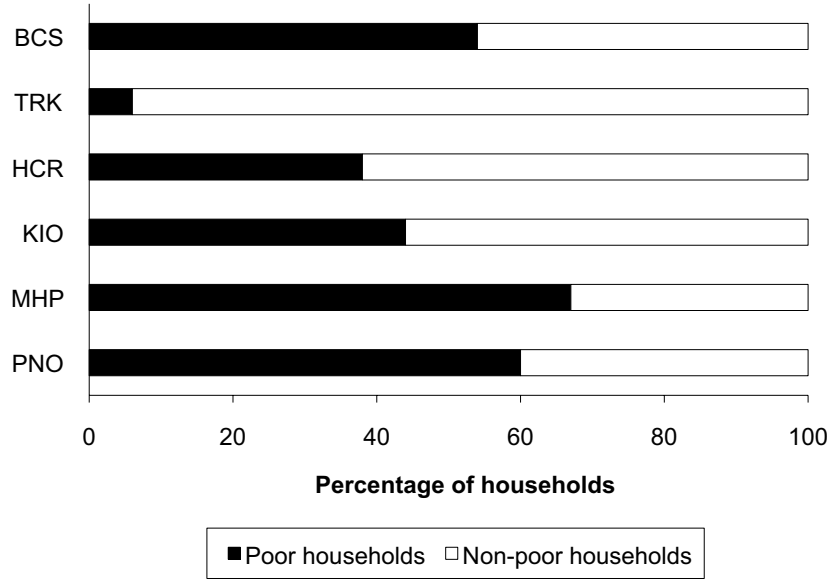
Most SPSPs provide service seven days a week throughout the year; seasonality has a limited impact. About 10 percent of PNOs and half of TRKs stop operations during the low seasons (rainy periods), which lasts three months or less. Most network operators provide service around the clock (nearly all MHPs and two-thirds of PNOs) or 12–18 hours a day (one-quarter of PNOs). Most KIOs (75 percent) provide service for 12–15 hours while BCSs tend to work the 11–12 hours that the retail shops to which they are attached operate. For TRKs, the number of delivery trips varies significantly, depending upon the season and the distance traveled.

Figure IIC.4 Average Number of Clients by Client Type



Source: SPSP survey in Kenya 2006.

Figure IIC.5 Share of Poor Customers by Type of SPSP



Source: SPSP survey in Kenya 2006.

The survey did not explore service quality, except to ask SPSPs about consumer complaints. About 20 percent of network providers admitted receiving frequent complaints and the majority (over 50 percent) indicated that customers would appreciate service improvements (higher water volume and pressure as well as better water quality, and higher electricity voltage). The other SPSPs report even lower complaint rates. Only 5 percent of the KIOs and no TRKs reported receiving frequent complaints. However, over 20 percent admitted that clients would appreciate increases in water supply.

Billing methods differed depending upon modality of service provision. Network providers bill and collect on a monthly basis although a few PNOs collect annually. The other SPSPs charge clients based on consumption, that is, per barrel or jerrican or by battery size.

Payment collection appears smooth except for PNOs and KIOs. Late payments were a serious problem (more than 75 percent of payments were late) for about 20 percent of PNOs and an additional 19 percent of PNOs faced some problems. In the year before the survey, PNOs disconnected about 3,200 clients (6.3 percent) because of unpaid bills, but two-thirds of them were later reconnected upon settlement of outstanding bills. Reconnection fees varied between 200 and 500 Kenyan shillings (KSh; US$3–US$7). About 17 percent of KIOs, primarily those located in Mombasa, reported

serious problems with late payments. Those KIOs have a generally permissive attitude toward late payments and rarely deny water sales on this basis. Conversely, over 25 percent of KIOs, primarily those located in the informal areas of Nairobi, such as Kibera and Mukuru, tend to immediately interrupt water sales to "bad clients."

Technical operations

SPSPs can be grouped into two categories based on technical features. Network providers (PNOs and MHPs) are independent operators, producing their own water or electricity. KIOs, TRKs, HCRs, and BCSs generally depend on public utilities or private suppliers for their water and electricity.

PNOs are simple operations. Most PNOs (77 percent) obtain their raw water from surface sources such as rivers and streams and use gravity schemes for distribution; the remaining 23 percent extract water from their own wells or boreholes using motorized pumps powered by electricity from the public utility. Most PNOs have one or more concrete storage tanks; the average network length is 11,800 meters. Pipes are usually made of PVC and laid at a depth of 0.9 meters. Only 20 percent of PNOs install systematic metering. Wells, where present, have an average depth of 150 meters, yield 16 m^3 per hour, and are operated using one or two motorized pumps. The initial network design and construction was supported financially and technically by government entities and donors. Expansions and renovations have been carried out by PNOs without external assistance but with public sector authorization and supervision. The main cost item for PNOs using gravity schemes is labor (50 percent of costs) followed by maintenance (30 percent). The main cost for those using electric pumps is electricity (40 percent) followed by labor (30 percent).

PNOs generally supply untreated water although a handful of PNOs treat water with chlorine. PNOs experience certain technical difficulties. About a quarter of PNOs report facing technical problems leading to service interruption at least once a week and an additional 47 percent report such interruptions at least once a month. Leaks and burst pipes are the main technical problems and operators are able to fix them without external assistance. PNOs report an average unaccounted for water ratio of 17 percent, but the ratio varies widely across providers: 44 percent of PNOs reported losses of 10 percent or less and 14 percent of PNOs experienced losses of over 30 percent.[42] Pipe leakage is the main cause of water losses.

MHPs are very simple operations, using run-of-the-river schemes. Only one respondent used a reservoir. MHPs' installed capacity is less than 5 kW; they distribute single-phased electricity. About 75 percent of MHPs oper-

42. About 22 percent of surveyed PNOs were not able to quantify their system losses.

ate "medium head" schemes, (water intake positioned between 20 and 120 meters vertically above the power house) and the remaining use "low head" schemes (below 20 meters). Over half of surveyed MHPs used load controllers but only one used transformers. Most networks are powered with medium voltage electricity and range in length from 500 to 6,000 meters. None of the MHPs used meters to measure usage. Average system losses were reported to be 15 percent, with only one respondent indicating a higher value (50 percent). However, without proper metering it is difficult to assess the accuracy of these system losses. Technical problems leading to service interruption occur rarely (fewer than once a month) and networks are closely monitored by daily or weekly inspections. When technical problems occur, staff are able to fix them without external support. However, spare parts are hard to find. The main cost item for MHPs is labor, followed by maintenance.

Most KIOs depend on public utilities. About 90 percent of KIOs obtain water from public utilities; the remaining 10 percent use their own wells. KIOs consist mainly of pipes connecting to either the main water network or a borehole. Pipe length varies from 10 to 500 meters and despite government standards requiring that pipes be made of steel, PVC pipes are fairly common because of their lower cost and higher flexibility. KIOs install their systems without any external assistance. Storage tanks are the second most common item of equipment: 41 percent of surveyed KIOs have one tank and 15 percent two or more. Tanks are fairly small (10 m^3 or smaller) and are made of PVC or galvanized iron sheets. Only 16 percent of KIOs use motorized pumps to abstract water from the well or borehole or to fill the storage tank. The capacity of the pumps ranges between one and eight m^3 per hour and the pumps operate about six hours a day. KIOs do not own water treatment equipment nor do they perform any kind of purification. When present, wells have an average depth of 83 meters and yield of 2.5–8 m^3 per hour. Only 22 percent of KIOs use electricity (to operate electric pumps), which they obtain from the public utility. KIOs report water losses of 8 percent on average, with fewer than 15 percent of operators reporting losses higher than 10 percent. These data reflect rough calculations done on the spot by the operators. Only 14 percent of KIOs reported equipment problems once a month on average leading to service interruption (leaking equipment, blocked water meters, blown pump fuses, and problems with tanks); 7 percent of KIOs report experiencing monthly problems with pipes (leaks at the join with the main network or bursting caused by excessive water pressure). KIOs use external assistance to fix these problems.

Costs varied significantly between dependent and independent KIOs and across dependent KIOs. Annual operating costs ranged from less than US$100 up to US$ 3,000, with an average value of US$800 for dependent

providers and more than US$2,000 for independent operations. The main cost item for dependent KIOs is water purchases. Energy to power pumps, followed by labor, are the main cost items for independent KIOs. The cost variation among dependent KIOs is driven by volume of water sales and by their different underlying costs for water purchases. About half of KIOs purchasing water from municipality-owned utility companies are charged a bulk tariff, about 25 percent of KIOs pay commercial or industrial tariffs, and the remaining 25 percent pay standard household rates. Some KIOs also benefit from significant "rebates" off official tariffs, resulting from privileged relations with and/or kickbacks paid to utility inspectors. Not surprisingly, relationships between KIOs and public utilities at times have been confrontational with widespread allegations of illegal connections and bribery of public utility officials.

TRKs are also dependent operations purchasing water from private suppliers and delivering it directly to clients' using old trucks. Most providers operate second-hand Japanese trucks equipped with storage tanks, with a capacity on average, of 10 m^3. Only about one-fourth of surveyed TRKs extracted water from their own wells or boreholes. The depth of these wells and boreholes ranged from 20 to 150 meters; they yielded 15–44 m^3 per hour. Those operators have at least one motorized pump and one metal or concrete storage tank with a capacity varying from less than 50 m^3 up to 400 m^3. These TRKs procure electricity from KPLC, the public utility company. Just one-third of TRKs indicated that the water they sell is treated or chlorinated by either the water supplier or by the TRK itself. Only the largest TRK owns any laboratory equipment for testing.

HCRs and BCSs are the simplest of all SPSPs. HCRs obtain water from public utilities and, to a lesser extent, from private suppliers. Water purchases constitute 90 percent of HCRs' operating costs. This cost varies depending on the source of the water and the geographic location. Public utility companies charge HCRs on average US$1.73 (KSh 125) per m^3 while private suppliers charge US$2.63 (KSh 190) per m^3. HCRs in Nairobi pay on average US$2.22 (KSh 160) per m^3 while those in Mombasa pay only US$0.97 (KSh 70). An HCR's equipment is limited to a handcart and between 10 and 20 jerricans. BCSs rely primarily on electricity provided by KPLC, with just a few operators producing electricity themselves using different types of generators (windmill, photovoltaic, and fossil-fuel based systems). Only one-fourth use charge controllers and measuring devices; most operators set recharging times that are not strictly related to the size or capacity of a battery. About a third of BCSs lament inadequate electricity supply (frequent power cuts and unstable voltage). KPLC usually charges BCSs commercial tariffs.

Tariffs

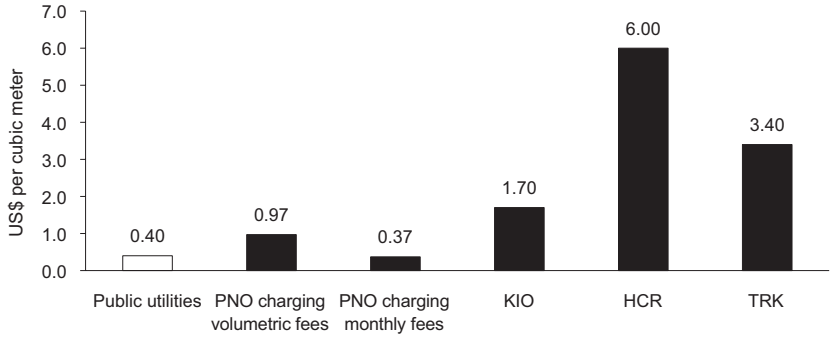
Tariff policies of SPSPs vary depending on the nature of the business. In line with their community-based goals, network operators set tariffs aimed at providing affordable services to their members and customers, similar to those charged by public utilities. The remaining, privately owned SPSPs charge prices that are on average many times higher than those charged by PNOs (figure IIC.6).

Network operators usually charge both monthly fees and one-time connection fees.[43] MHPs charge, on average, a monthly fee of US$2.00 (KSh 150) and a connection fee that ranges from US$41 (KSh 3,000) to US$550 (KSh 40,000). Connection fees, which are paid in installments over a two-year period, cover the cost of the wiring up to a client's house and, in about half of the cases, the in-house wiring, too. Most PNOs (67 percent) charge flat monthly fees (on average US$1.22 or KSh 88); the remainder charge by consumption (12 percent), use a mixed pricing model (8 percent), or rely on membership dues to cover incurred costs (13 percent). PNOs charge connection fees of, on average, US$174 (KSh 12,500), ranging from US$69 (KSh 5,000) to more than US$275 (KSh 20,000).[44] Converting flat fees into unit prices based on consumption levels, PNOs charge an equivalent average price of US$0.37 (KSh 27) per m^3, which is comparable to water tariffs charged by the public utilities in Nairobi (US$0.21) and Mombasa (US$0.30). However, nonmember clients filling up jerricans at water points pay higher prices, on average US$1.42 (KSh103) per m^3. This price difference is partly justified by the need to recoup network investment costs, but it may also suggest some degree of cross-subsidization from standpipe consumers to residential and member connections.

43. The low level of metering of PNO clients reduces the scope for tariffs based on actual consumption.

44. PNO connection fees, which are paid in monthly installments throughout a year, can be seen as membership fees because a number of other costs are charged to the new client. Indeed, meters (when they are used) are invariably paid for separately as are pipes in 62 percent of cases.

Figure IIC.6 Average Water Price per Cubic Meter by Type of SPSP



Source: SPSP survey in Kenya 2006.

Among the other water SPSPs, KIOs are the least expensive (charging on average US$1.70 [KSh 124] per m^3 with seasonal price variations) followed by TRKs (US$3.1 [KSh 225]) and HCRs (US$6.1 [KSh 444]). These SPSPs have different tariff-setting principles. About 40 percent of KIOs, mainly located in Nairobi, report agreeing on selling prices with fellow KIOs; about 35 percent of KIOs claim to consider clients' affordability as the main criteria in determining price levels; and the remaining 25 percent of KIOs, concentrated in Mombasa, set prices on a "cost plus" basis. TRKs set prices using three criteria: the period of the year (with higher prices in the peak season); distance traveled; and type of clients (with business clients charged a higher price). HCRs use two criteria to set prices: seasonality and location. Prices charged in the peak season could be four times higher than those in the off-peak season and HCRs operating in urban slums charge 50 percent more than those operating in urban formal settlements. BCSs charge a fixed fee per charge depending on the battery size, with an average price equivalent to US$1.4 per kWh.

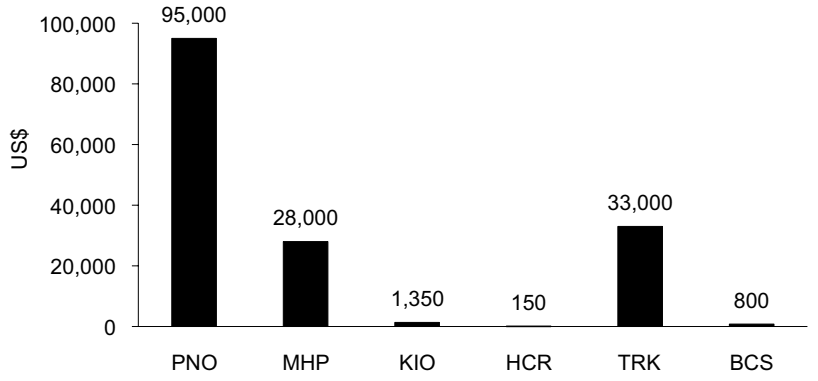
The survey estimated KIO and HCR prices to be significantly lower than those estimated by Gulyani, Talukdar, and Kariuki (2005), which used a household survey carried out in 2000. Gulyani et al. (2005) found that prices charged by KIOs were on the order of US$2.7 or KSh 205/$m^3$ (KSh 4.1 per jerrican) while mobile vendors were charging up to US$8.40 or KSh 630/$m^3$. The discrepancy is at least partially explained by the household survey data being collected at a time when Kenya was affected by a severe drought, which inevitably affected price levels. If prices are adjusted by the "drought inflation" factor of 25 percent calculated by Gulyani et al. (2005), results from the two surveys become broadly comparable for KIO prices.

Prices charged by KIOs are the most socially sensitive, given that KIOs provide service to households, generally poor, in informal settlements. At the average KIO price, acquiring the average daily consumption which ranges from 40 to 45 liters per capita in Kenyan urban households (Gulyani, Talukdar, and Kariuki 2005), a customer would annually spend between US$24.8 and US$27.9, an equivalent of 3.6 to 4.1 percent of Kenya's annual GDP per capita (US$680). Given that incomes in informal settlements are lower than the national average, this level of water consumption requires a higher share of poor household income than 3.6 to 4.1 percent and therefore is substantially higher than the maximum 3 percent of personal income considered affordable for the poor to spend on water. In addition, those KIO tariffs corroborate findings from previous studies suggesting that poor households do not benefit from the "social" tariff that utilities charge for bulk supply to KIOs serving informal settlements (Gulyani, Talukdar, and Kariuki 2005; WSP 2005).

Investments and funding

SPSPs are as diverse in their investment as they are in their technical operations. Investment amounts reflect operation size and technical features. PNOs report the largest investment (US$95,000 on average), followed by TRKs and MHPs (figure IIC.7). The remaining SPSPs have invested US$1,350 or less.

Figure IIC.7 Range of Investments by Type of SPSP



Source: SPSP survey in Kenya 2006.

Among PNOs, investments range from as little as US$5,500 to almost US$500,000, with a median value of US$55,000 and average capital expenditure of about US$220 per client. Total investment is positively correlated with the number of network clients but shows wide variation: the most sophisticated PNOs invested over US$700 per client while the simplest ones invested less than US$30 per client. The composition of investment reflects the different structures of PNOs. The main investment for most PNOs, predominantly gravity systems with or without storage tanks, was the network, accounting for over 60 percent of total investment. For PNOs with pumps, network and pumps together accounted for more than 70 percent of total investment. For PNOs with wells and pumps, wells and networks represented about 60 percent of total investment.

MHPs also showed diversity, with investment ranging from US$15,000 to over US$55,000 and average capital intensity of about US$400 per client. Wired network was the main investment item, accounting for 50 percent of the total. Construction works (power house and reservoir) accounted for 25 percent and the generator and other equipment (for example, transformers and load controllers) for another 15 percent.

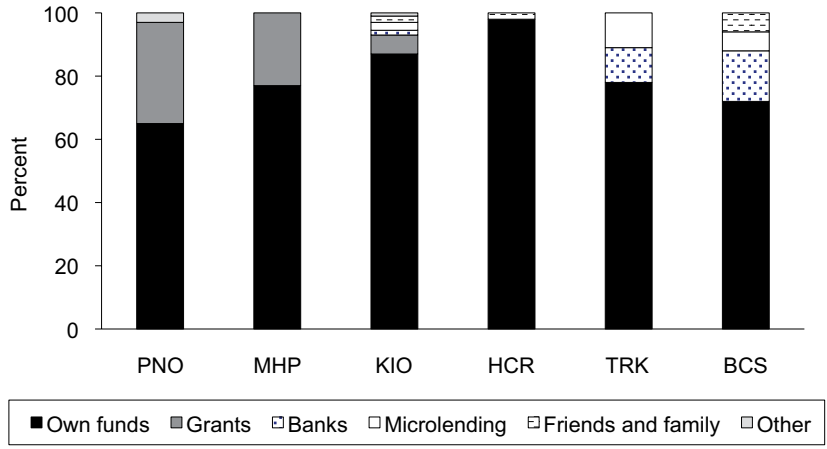
Most TRKs invested below the average, between US$10,000 and US$20,000. For TRKs operating their own wells or having more than one truck, investment rose to US$70,000. Only a few TRKs had investments of more than US$140,000. Vehicles were the main asset for all TRKs, representing over 70 percent of total investment. When present, wells and storage tanks accounted for 25–40 percent of total investment.

Investment levels in KIOs varied across organizational types. Fully private kiosks (88 percent of the survey sample) invested on average US$1,000 while self-help or community groups (the remaining 12 percent of surveyed KIOs) invested, on average, over US$4,000. The lower investment of fully private KIOs is explained by their simpler operations. The main investment items for these KIOs were pipes (over 30 percent), connection fees to the water utility (over 20 percent), and storage tanks (20 percent). None of them had their own wells, boreholes, or pumps. Community-based KIOs put more than 70 percent of total investment in wells and pumps, when present. In the community-based KIOs without wells, pipes and storage accounted for over half of the investment.

HCRs and BCSs are simple operations with low investment requirements. HCRs, whose capital expenditures varied between US$80 and US$280, invest primarily in handcarts and jerricans (45 percent) and working capital (55 percent). BCSs, whose investments varied between US$700 and US$1,400, allocated most of the capital expenditure to charging equipment (about 55 percent) or to generators, when used.

Own resources are the main source of funding for all SPSPs in Kenya. Access to other sources of funding was limited (figure IIC.8). Network providers were among the few that benefited from external funding comprising grants from the government, NGOs, and donors, and accounting for 20–30 percent of total investment. The share of self-financing and grants varied considerably across network operators. More than half of PNOs relied on internally generated resources as the predominant funding source (over 70 percent of funding) while a fifth relied roughly equally on self-financing and public funds. The remaining quarter of PNOs depended heavily on public funding. Internally generated resources consisted of operating revenue, member contributions, private donations, and money collected through fund-raising events. Generally, the share of self-financing in funding grows over time (that is, the older schemes display a more genuine self-help nature) and is inversely correlated with size regardless of how it is measured (number of clients, length of networks, revenue, and so forth). About half of MHPs were entirely financed with resources from community members while the other half benefited from government, NGO, or donor grants. In the latter case, community members participated with small contributions and voluntary work. BCSs and TRKs were also able to benefit from external funding sources, thanks to the involvement of owners in other business activities, which enabled them to develop familiarity with financial institutions.

Figure IIC.8 Average Funding Sources by Type of SPSP

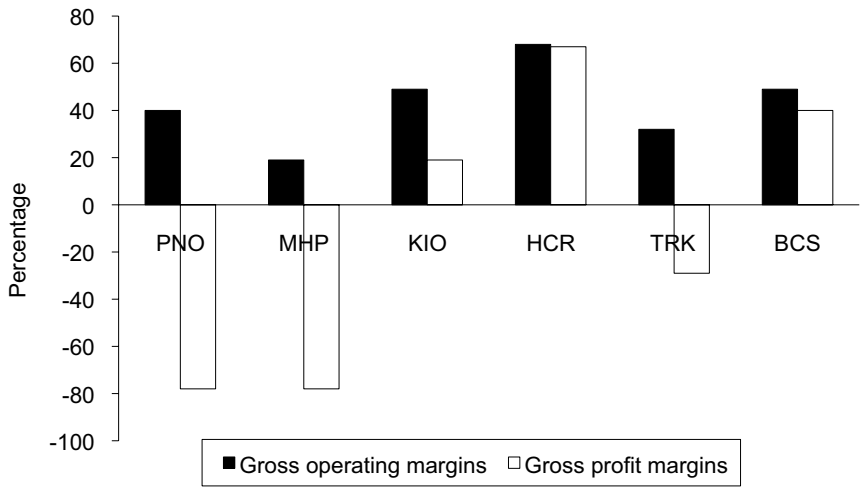


Source: SPSP survey in Kenya 2006.

Financial performance

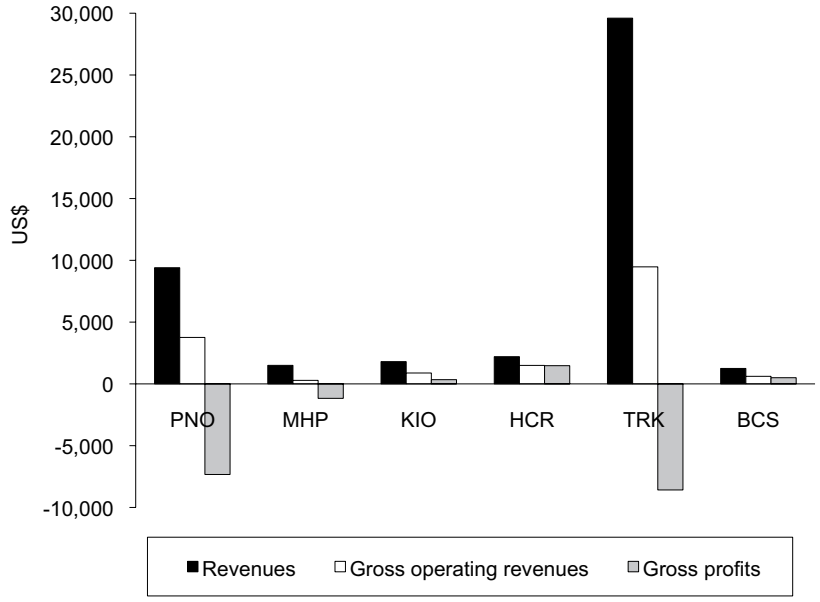
All SPSPs reported attractive operating margins, ranging from 19 percent for MHPs to 68 percent for HCRs (figure IIC.9). However, once depreciation charges are taken into account, profit figures change substantially for network providers and TRKs, which, on average, reported substantial losses. Thus, although these SPSPs cover, on average, all operational costs, they are not able to finance maintenance, replacement of existing assets, or expansion with internal resources. In addition, the attractive profit margins of the other SPSPs result from rather small average profits in absolute terms (less than US$1,500 for HCRs, US$500 for BCSs, and US$340 for KIOs) because of the small scale of their operations (figure IIC.10).

Figure IIC.9 Average Financial Indicators by Type of SPSP



Source: SPSP survey in Kenya 2006.

Figure IIC.10 Average Annual Revenues and Gross Profits by Type of SPSP



Source: SPSP survey in Kenya 2006.

A closer look at PNOs indicates that while only a minority of schemes (7 percent) post operating losses (negative operating margins), 74 percent of PNOs post negative profit margins when depreciation is taken into account. Operating margins are positively correlated with direct involvement of members in operations and negatively correlated with network and sales sizes. These financial results are not surprising because pricing policies are based on rudimentary notions of cost recovery (some PNOs do not even charge a proper tariff, but hold fund-raising events to collect whatever is needed to keep the system running) and investments were at least partly financed through grants. Indeed, this poor financial performance did not translate into a negative assessment of current conditions by surveyed PNOs. Instead, 83 percent of PNOs reported being very satisfied or satisfied with current business conditions. MHPs have similar views—the majority of operators declared themselves fairly satisfied about current business conditions despite their reports of large negative gross profit margins.

While all KIOs cover operating and maintenance costs, gross profit margins varied significantly, from 10 percent among small KIOs (sales of 42 jerricans per day), to 26 percent among medium size KIOs (96 jerricans per day), to 42 percent among large KIOs (342 jerricans per day). In addition

to scale of operations, profitability is determined by the unit cost of the water input. In particular, small kiosks that displayed better profitability rates seemed to benefit from some form of preferential agreement with utility officials. The KIOs' gross profit margins reported in the survey are significantly lower than those reported in previous studies. Two studies from the late 1990s (Collignon and Vézina 2000 and WSP 1998) estimated gross profit margins of kiosks in Nairobi to be about 80–90 percent. It is unclear what factors account for the difference in reported profit margins between the late 1990s and 2006. Underreporting of profits by KIOs in the SPSP survey could explain part of the difference but a portion can also be attributed to improvements in water service provision, particularly in Nairobi, and a more receptive attitude toward kiosks (as discussed in the Regulation and institutional aspects section below). The studies ascribe, at least partially, the high profit margins to the difficult environment in which water kiosks operated in Kenya. Gulyani, Talukdar, and Kariuki (2005, 26) concluded that "the apparently high margins reflect the hidden costs of connecting to distant water trunk lines or making unofficial payments to gatekeepers in informal settlements." In other words, "the high cost of risks associated with developing and running a kiosk service has essentially overridden the subsidy provided by the utility." However, it points out "the extent to which the kiosk system does or does not result in extraordinary net profits (that is, monopoly rents) and who benefits require further research."

The financial performance of TRKs partially depends on the urban area in which they operate. Most TRKs in Nairobi reported gross operating margins half the size of those reported by TRKs operating in other areas. Once depreciation charges are included, most TRKs in Nairobi post negative profit margins. Not surprisingly, they also had the most pessimistic assessment of current business conditions.

HRCs have very high operating margins as a result of their low operating costs and substantial mark-ups. HCRs in Mombasa have higher margins (mainly because of much lower water purchase prices and larger sales) than those in Nairobi. These differences translate into average gross operating profits of more than US$3,000 in Mombasa and US$760 in Nairobi.

Although all BCSs have high operating margins (50 percent), their operating profits are modest in absolute terms, typically ranging between US$140 and US$1,400 per year. Given the limited funds typically invested, the inclusion of depreciation charges does not significantly alter profit margins. There is a positive correlation between profitability and number of batteries recharged per year but no correlation with prices. The majority of BCS operators declared themselves to be fairly or very satisfied about their current business conditions.

Business perspectives

The prospects of SPSPs vary by the degree of competition faced by each type, by size, and by location. Network providers operate with virtually no competition and in largely untapped markets, offering them opportunity for expansion. Only 25 percent of PNOs and a minority of MHPs indicated they were currently facing competitive pressures or expected them in the future. About 75 percent of PNOs and 50 percent of MHPs reported growing customer bases and most of them perceived unconnected households in their operating areas as potential clients. The potential threat posed by public utilities appeared to be distant—over 80 percent of PNOs and all MHPs regarded the possibility that public operators would start serving their areas as "unlikely" or "extremely unlikely." Most network providers also expected to remain in business over the ensuing two years and about 90 percent of PNOs and almost all MHPs planned to invest in expanding and improving existing infrastructure. However, most of them expected to finance these investments primarily with grants from the government or NGOs and donors. Such reliance on grants is not surprising given the poor financial performance of most network providers.

The other SPSPs operate in competitive markets and their business prospects vary by size or location. Most KIOs (88 percent) reported experiencing competition from peers as well as from mobile water distributors and municipal utilities. The large and medium KIOs were able to increase customer bases in the 12 months previous to the survey while the small ones saw their number of clients decline. About 90 percent of KIOs expected competition to increase, primarily from peers. In their outlook for the future, KIOs were divided, with about 40 percent, primarily the larger ones, expecting business to improve and planning to invest, mainly in storage tanks, while about 30 percent, mainly the smaller ones, expected business to deteriorate in the coming years.

TRKs already experience strong competition, which they expected to increase, particularly in Nairobi. In the 12 months previous to the survey, all TRKs in Nairobi faced competition from peers as well as from the public utility, and reported declining numbers of customers. In contrast, operators in Mombasa and Nakuru did not face competition from public utilities and were able to expand their customer bases. The latter group had a positive business outlook and expressed willingness to invest in their operations, while the first group expected their business to deteriorate and were not willing to make further investments. HCRs and BCSs reported being satisfied with current business; 50 percent of HCRs and 75 percent of BCSs plan to improve or expand operations.

Regulation and institutional aspects

SPSPs operate under various license and permit schemes based on their degree of formality and changes in the legal framework. The 2002 Water Act introduced a new licensing system that operators are still adopting. At the time of the survey (2006) only 12 percent of PNOs were registered with the recently formed Water Services Boards; 66 percent still operated on the basis of permits issued by the Ministry of Water and Irrigation (MWI), 14 percent were unlicensed, and the remaining 6 percent held licenses from local authorities. The license status of KIOs and TRKs varied across cities. KIOs in Nairobi and Thika were registered with local authorities, those in Nakuru still operated based on old permits issued by MWI, and those in Kisumu were unlicensed. Overall, two-thirds of KIOs were licensed, which reflects the efforts made by local authorities to regularize KIO connections following the 2002 water sector reforms. Most TRKs were licensed by different public authorities (MWI, Water Services Providers, WSBs, and local authorities), except for those operating in Nairobi, where relations with authorities were reportedly tense. In the electricity sector, BCSs operated either informally or based on trade licenses. All MHPs held some type of permit from the MWI, the Ministry of Energy, or local authorities.

KIOs were the most closely supervised and had the most difficult interactions with inspectors. Licensing authorities carried out at least one inspection for 86 percent of KIOs and four or more inspections for 44 percent of them in the 12 months previous to the survey. Inspections resulted in only 5 percent of KIOs receiving a written reprimand, two fines, and one temporary closure. However, about 20 percent of KIOs complained about receiving requests for unofficial payments. Other SPSPs have also been monitored by authorities, with 75 percent of MHPs, over 60 percent of PNOs, and half of BCSs and TRKs receiving at least one inspection in the last 12 months. Inspections focused on technical issues and, to a lesser degree, on safety and environmental matters. In general, inspections did not produce negative consequences and interactions with inspectors were considered amicable, except by TRKs.

Associations of SPSPs are uncommon and membership is considered of limited use. PNOs are among the most organized, with about 30 percent of PNOs belonging to sector associations. Although these water users associations (for example, the Ragati Water Users Association or the Tungu River Water Users Association) act at the regional or provincial level, the PNOs' opinion of these associations is not enthusiastic. Fewer than half of PNOs consider membership useful. Among KIOs, membership in water associations is just 6 percent while no TRK reported belonging to any association. In some cases in which KIOs created associations to interact with public

utilities, the results have been disappointing because of mutual distrust. In 2004, many KIOs in Kibera formed Maji Bora Kibera to establish a partnership with Nairobi Water Company, the public utility, to improve water supply in Kibera. However, the partnership, which was formed following a long period of acrimony stemming from illegal connections, failed to improve water supply as a result of the lack of mutual understanding, trust, and respect from both parties (Birongo and Le 2005).

Conclusions and Recommendations

Although electricity SPSPs are marginal in Kenya, water SPSPs play an important role in the provision of water. They serve a large number of clients that public utilities are not able or willing to serve. Given the current status of service provision and the socioeconomic conditions in the country, it is unlikely that public water utilities will be able to serve such clients in the near future. If anything, Kenya's rapid urbanization is putting further pressure on the already overwhelmed public utilities. The large deficit in safe water supply provides a strong argument to search for and promote different modes of service provision.

The survey found that SPSPs provide valuable services, but their impact on households and the policy issues they raised vary significantly across types of SPSP. Network providers, which are mainly community-based organizations operating in rural areas, provide basic services priced similarly to service provided by public utilities. However, those price levels only allow providers to recover operating costs, leaving little or no resources to cover maintenance or improve service. Providing donor or government funding for the expansion and improvement of current network providers and promoting the emergence of new providers could be a very costly approach, given the low coverage rates in rural areas of Kenya. Consequently, the main policy issues for network providers are how to expand their service coverage and improve service quality (for example, by introducing water treatment processes) to serve a larger portion of the rural population. Part of the government and donor support to network operators could include technical assistance on financial management and business planning. This proposal echoes a recommendation made by the Water and Sanitation Program on providing financial capacity support (routine bookkeeping and accountancy) to operators of rural water networks (WSP 2007a).

Among the point source and mobile water providers, water kiosks have the largest impact on the urban and peri-urban poor. However, water kiosks charge high prices that, in many cases, do not reflect the discount that water kiosks receive from public utilities, affecting poor consumers. The prices charged by water kiosks provide large profit margins, but also seem to

reflect the price of water scarcity and the way in which the limited available water is managed (complex relationships between water utilities and kiosk managers that, in many cases, are shaped by personal connections with utility staff rather than the utility's established policy toward the kiosks). As other studies have pointed out, further research is required to better understand these dynamics.

In conclusion, this survey is an attempt to provide an overview of SPSPs and their operations in Kenya. The survey findings, which are similar to those of other studies of SPSPs in the region, should help to set the framework for in-country discussions about the role of SPSPs in the provision of water and electricity services. The topic merits further discussion by practitioners and policy makers to identify the most appropriate solutions for Kenya. In addition, further research may be required to deepen the knowledge on SPSPs. Such studies might include a large-scale survey covering water kiosks to gain a better understanding of their financial viability and to assess the feasibility of promoting them as a solution to providing water services in peri-urban areas. Another topic for further research is the perception that other stakeholders, such as customers, local governments, utilities, NGOs, and financiers, have of SPSPs. Similarly, deeper analyses of the regulatory process and its enforcement, and of the business environment for SPSPs could shed light on the changes required to improve them. Finally, the limited access to sources of finance is another area for further research.

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IID
A Survey of Small Scale Private Service Providers of Water and Electricity in the Philippines[45]

Although the Philippines has been successful at expanding electricity access, it faces major challenges in expanding the provision of water services. About 13.7 million people (or 16 percent of the population) do not have improved access to water and just over a third of the population has access to residential piped water. The most affected groups are the growing populations in poor urban and peri-urban areas. Small scale private service providers (SPSPs) are important players in water supply although they have a marginal role in electricity services.

To better understand SPSPs and assess their ability to contribute to the provision of potable water and electricity, the World Bank's Energy Sector Management Assistance Program, Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a survey of SPSPs in the Philippines. The survey consisted of face-to-face interviews with 167 SPSPs, including network providers (piped water providers and micro-hydropower schemes), point source providers (tap and hose operators, water refilling stations, and battery charging stations [BCSs]), and mobile distributors (water trucks). The survey sample was designed to be statistically significant for piped water operators (85 interviews), while it had an exploratory nature (providing qualitative rather than statistically significant results) for the remaining types of SPSPs. The survey was part of a larger study that included surveys in three other countries (Bangladesh, Cambodia, and Kenya).

The purpose of this appendix is to summarize the main findings of the survey in the Philippines, point out policy issues it raises, and make recommendations for future work. In short, the survey found that water SPSPs are self-sufficient businesses, serving small numbers of clients in urban and peri-urban areas, with good prospects for expanding their services. They self-finance their operations and report positive investment returns, although revenues are small. SPSPs provide valuable services to households for which, in some cases, they are the only available service providers. Prices charged by network providers are similar to those charged by public utilities but other SPSPs charge prices that are much higher. Water treatment, at a basic level, is only performed by a minority of network providers.

45. This report was prepared by Ada Karina Izaguirre, (Finance, Economics, and Urban [FEU] Department at the World Bank) and Iwona Reichardt (consultant). R. Mukami Kariuki (East Asia Region at the World Bank), and Ella Lazarte (Water and Sanitation Program) and Jemima Sy (Water and Sanitation Program) provided comments. The work was funded by ESMAP, PPIAF, WSP and the Finance, Economics, and Urban (FEU) Department at the World Bank.

Electricity providers, in contrast, serve just a few clients each and are less viable businesses. Network providers report significant financial losses and declining customer bases. BCSs generate profits but have limited or no prospects for business expansion.

The remainder of this appendix is organized as follows: The first section describes the current provision of water and electricity services in the country. The second section presents the predominant types of SPSPs in the country, summarizes the survey methodology, and reports the main survey findings with regard to size, customers, technical operations, prices, investment, financial performance, funding sources, and business prospects. Finally, the third section presents recommendations and possible future work.

Country Context: High Access Rates Mask Poor Quality of Access in Water

The Philippines has relatively high access rates to both water and electricity, but a large number of people still do not have access to those services. The latest available data from Philippines Demographic and Health Surveys indicate that 84 percent of the population has improved access to drinking water while 77 percent has access to electricity (table IID.1). However, even at those access rates, about 13.7 million people do not have improved access to a water source while about 20 million lack an electricity connection. Growth in access rates has varied between these sectors. Access to electricity increased by 5 percentage points between 1998 and 2003, driven by rising access rates in rural areas and, to a lesser degree, in urban areas, which already have high access rates. In contrast, the rate of improved access to water dropped 2 percentage points, driven by declining access rates in urban areas. Other estimates of water access in the Philippines—although not fully consistent among themselves—confirm a downward trend in coverage in the last decade (World Bank 2005a).[46] The drop in water access in urban areas is partially driven by rapid urbanization. Since 1996, the urban population has grown 3 percent annually and 61 percent of the population in the Philippines lived in urban areas by 2003. However, recently published data suggest improvements in water access with 90 percent of population having improved access to drinking water in 2006 (National Statistics Office 2008). The increase was primarily driven the expansion in shared connections in urban and rural areas.

46. The government's annual poverty indicator survey reported a total access rate to water supply of 80 percent in 2002 while the Filipino Report Card on Pro-Poor Services survey published in 2001 reported that only 64 percent of the population had access to any formal level of service in 2000 with the rest relying on self-provision.

Table IID.1 Household Access to Electricity and Drinking Water in the Philippines, 1998 and 2003 (percentage of total households)

Source of electricity or water	1998			2003		
	Urban	Rural	Total	Urban	Rural	Total
Electricity	91.1	51.9	**71.3**	92.0	59.8	**76.6**
Improved drinking water sources	92.0	80.0	**85.9**	86.5	81.3	**84.0**
Piped water into dwelling	46.6	14.0	**30.2**	50.9	16.0	**34.3**
Piped water into yard or plot	7.8	5.4	**6.6**	4.8	5.9	**5.3**
Public tap or standpipe	11.4	11.7	**11.6**	11.1	15.2	**13.1**
Protected well	24.8	40.0	**32.5**	18.6	35.3	**26.6**
Rainwater				0.1	0.8	**0.4**
Open dug well (unprotected well)	1.9	11.2	**6.6**	0.7	8.7	**4.5**
Developed or undeveloped spring	1.9	15.0	**8.5**	-	-	**-**
Developed spring	n.a.	n.a.	n.a.	0.9	8.1	**4.3**
Undeveloped spring	n.a.	n.a.	n.a.	0.6	6.1	**3.2**
River, stream, pond, lake, dam	0.5	1.5	**1.1**	0.2	1.6	**0.9**
Tanker truck or cart with small tank	3.3	0.9	**2.1**	2.2	0.8	**1.5**
Bottled water or refilling station	1.6	0.0	**0.8**	9.8	1.3	**5.7**

Source: Measure DHS with 1998 and 2003 Philippines Demographic and Health Surveys.
Note: n.a. = not applicable

A closer look at the data reveals that the high total water access rates mask the underlying poor quality of that access. Just over one-third of the population has piped water service in the dwelling. An additional 18 percent has access to piped water in their yard or plot (5.3 percent) or through public taps and standpipes (13.1 percent). The rest rely on nonpiped water sources. In addition, piped water supply often does not comply with the continuity and bacteriological quality standards set by the government (World Bank 2005b). Thus, it is not a surprise that bottled water and refilling stations have become important sources of drinking water, as demonstrated by the increase in population served from 1.6 percent to 9.8 percent for urban areas between 1998 and 2003.

The improvement in rural electrification rates is explained by a successful government program involving various actors (Department of Energy 2009). The National Electrification Administration provides technical, financial, and institutional assistance to electric cooperatives to ensure the provision of reliable service and expand coverage. The National Power Company through its Small Power Utility Group is responsible to provide electricity to off-grid systems. The government also encourages independent power producers to participate in the rural electrification program in selected communities through the provision of financial assistance. The 2001 Electric Power Industry Reform Act opened opportunities for the private sector in the government's rural electrification activities. The government expects to reach 100 percent electrification at *barangay* level (the smallest administrative division in the country) by 2010 and 90 percent household electrification in 2017 (Department of Energy 2008).

The groups most affected by the lack of electricity and water supply are the poor and those living in rural areas. Urban areas are almost completely electrified while electricity reaches 60 percent of the population in rural areas. The electrification access gap between the richest and the poorest strata of the population is high not only at the national level (86 percent) but also in rural (88 percent) and urban areas (77 percent) (table IID.2). Of the urban population, 56 percent has access to piped water while 22 percent of the rural population does. The access gap for piped water is less pronounced than in electricity, but still high—more than 50 percentage points higher in urban and rural areas as well as in Metro Manila. The access gap for piped water is less pronounced in the poorest region but that is also the region with the lowest access. Improved water access rates are significantly higher than piped water access rates across the board, and the access gap between the rich and the poor is significantly lower.

Table IID.2 Weighted Distribution of Access (percentage of population) and Access Gap (percentage points) between the Richest and the Poorest in the Philippines, 2003

	Service		
Area	Improved water access	Piped water access	Electricity
National			
Access	84.0	39.6	76.7
Access gap	12.0	58.6	86.1
Rural			
Access	81.3	21.9	59.8
Access gap	22.9	51.1	87.9
Urban			
Access	86.5	55.8	92.1
Access gap	-7.3	54.4	77.1
Poorest Region[a]			
Access	58.4	11.7	42.4
Access gap	40.7	34.6	79.1
Richest Region[a]			
Access	83.1	63.6	98.9
Access gap	-19.2	57.2	33.9

Source: Ruiz, Christiaensen, and Kulkarni 2008.

Note: Access-income-gap is the percentage point difference in access between the richest and the poorest strata of the population.

a. The poorest region is that with the highest percentage of households in the poorest stratum (Armm). The richest region is that with the highest percentage of households in the richest stratum (the National Capital Region).

The limited progress on water supply is partially explained by the sector's highly fragmented structure. An estimated 5,000 providers consist of 3,100 barangay water service associations, up to 1,000 systems managed by local government units, about 580 water districts, 500 rural water supply associations, 200 cooperatives, and nine private firms (World Bank 2005a). In addition, a significant share of households with no or inadequate access to public services either revert to self-provision or rely on small scale independent providers. The vast majority of water providers, however, remain very small. Only about 80 water districts and five private providers outside Metro Manila serve more than 5,000 households. Regulatory functions in

the water sector are also fragmented, with most assigned to local government units and the National Water Resources Boards (World Bank 2005a).

The electricity sector, in contrast, is more integrated. Three large firms dominate the market: National Power Company (NPC) is the major generator and power purchaser; Transco is the transmission provider and system operator in the three high-voltage grids; and Manila Electric Company is the electricity distributor in Metro Manila. In addition, there are 17 investor-owned electricity distributors, 119 electric cooperatives, and two municipal distribution systems. NPC, through its Small Power Utility Group, supplies 41 electric cooperatives located in remote areas (World Bank 2005a).

Small Scale Private Service Providers (SPSPs) and Their Role in Service Provision

The Philippines has a long tradition of private sector–led growth, including in the water and electricity sectors. Since the early 1990s, the government has promoted the emergence of nonstate providers of water and electricity services. In addition, privatization schemes have incorporated SPSPs as viable providers (box IID.1). In this context, water SPSPs have surfaced as a diverse and dynamic group of operators, providing services in areas where public utilities are absent (remote locations and peri-urban areas) or service provision is deficient. Electricity SPSPs have also emerged but play a marginal role that is expected to decrease with the progress of the rural electrification program.

Box IID.1

Partnerships between Manila's Water Concessionaires and SPSPs

One feature of the two concession contracts in Metro Manila is that neither concessionaire was awarded an exclusive right to provide services. Instead, both were given incentives to cooperate with SPSPs because services provided by SPSPs were accounted for when assessing conformance with coverage targets as stipulated in the concession contracts. As a result, concessionaires and SPSPs have developed innovative approaches to increasing access for low-income and low-consumption households, without subsidies, by allowing customers to pay connection fees in installments or through a higher water tariff, by reducing connection costs through sharing meters, and by using low-cost approaches such as hoses for establishing individual connections in informal settlements.

Source: ADB, World Bank, and Japan Bank for International Reconstruction 2005.

Country sources suggest that SPSPs serve an important share of the population in water but not in electricity. Piped network operators serve about 3 percent of the population that has improved access, for about 2 percent of the total population. Tap and hose operators are primary providers in slum areas and number about 300. There are no estimates of the population served by water truckers but it is thought to be small. Water refilling stations are a booming business serving a growing affluent urban clientele. It is estimated that they serve over 1 million households, or about 7 percent of the total population. However, these providers are a supplementary rather than a primary water source. In electricity, about 60–65 micro-hydropower schemes serve an unknown—but likely small—population. BCSs serve no more than 1 percent (3,000 households) of the population located in remote locations, rural areas, and small towns.

Table IID.3 Prevalence of Water and Electricity SPSPs

Sector	SPSP type	Estimated number of SPSPs	Estimated number of people served	Estimated percent of population served		Comment
				Among relevant population with access to improved water supply or electricity	Among entire population	
Water	Piped network operators	515– 715	270,000–380,000	3	2	The number of housing estate providers is unclear
	Tap and hose operators	> 300	> 16,000	—	< 1	Data refer to Cebu City, where THO serve 10 percent of population
	Water refilling stations	12,000	1,080,000	n.a.	7	Service is supplementary rather than primary access
	Water truckers	Unknown	Unknown	—	—	Small client base
Electricity	Battery charging stations	Unknown	Unknown	n.a.	n.a.	Small client base
	Micro-hydropower schemes	60–65	2,000– 3,000	< 1	< 1	Only remote areas

Source: Economisti Associati 2007

Note: — = Not available; n.a. = Not applicable.

A Survey of SPSPs in the Philippines

To contribute to a better understanding of SPSPs and their operations, the World Bank's Energy Sector Management Assistance Program, Public-Private Infrastructure Advisory Facility, and Water and Sanitation Program funded a comprehensive survey. The survey was carried out by Economisti Associati (2007) in late 2006, and focused on those types of SPSPs identified as predominant:

- Piped network operators (PNOs) supply water through fixed connections, using piped systems of varying length and complexity. Water is sourced primarily from wells and boreholes. This category includes water cooperatives, community-based organizations (called Housing Estate Providers), and private providers (commonly real estate developers through their subdivisions).
- Tap and hose operators (THOs) distribute water from their own wells through a tap or standpipe. In certain cases, long hoses are used to deliver water directly to clients' houses.
- Water refilling stations (WRSs) distribute purified water in containers. Their distinctive trait is that they use fairly sophisticated water treatment systems, which allow these operators to sell purified water to commercial clients and middle-class households at prices much higher than those charged by other water SPSPs and utilities.
- Water truckers (TRKs) are mobile operators distributing water to clients, on demand, using trucks equipped with storage tanks.
- Mini-hydropower schemes (MHPs) are mini-grid operators distributing electricity from their hydropower plants and through their own wired networks.
- Battery charging stations (BCSs) are stationary operators who rely on electricity from public utilities to charge automotive batteries used for lighting and power purposes.

The survey used the definition of SPSPs proposed by Kariuki and Schwartz (2005), that is, an entity established as a private initiative, either for profit or not for profit, that has at least 25 percent of capital financing provided or borrowed by a private entity, operates on a commercial basis (without recurrent subsidy), and serves fewer than 5,000 customers.

The survey consisted of face-to-face interviews with 167 SPSP managers or owners using typology-specific, closed questionnaires covering a variety of structural, operational, and financial topics. Its results reflect only the operators' perspectives given that it did not gather information from SPSPs' customers. The survey used two sample sizes. For PNOs, a large sample

(85) was used so the results would be statistically significant at a 95 percent degree of confidence with a margin of error of 10 percent. The interviewed PNOs were selected based on a two-stage stratified sampling procedure. First, PNOs were grouped at the macro regional level (Luzon, Visayas, and Mindanao). Second, two provinces in each macro region were selected, producing a total of six strata. Within each stratum, the interviewed operators were randomly selected.

For the remaining SPSPs, small samples were used (22 BCSs, 20 TRKs, 20 WRSs, 10 MHPs, and 10 THOs); consequently, the survey provides a simple qualitative analysis. Field work was carried out in 12 provinces across the three island groups (Visayas, Luzon, and Mindanao). In addition, efforts were made to ensure appropriate geographic coverage. For instance, for MHPs, which are concentrated in remote areas, the survey focused on the provinces of Ifugao, Kalinga, and Antique. Interviewed operators of the other SPSP types were located in two or more provinces as a way to control for possible differences related to location.

Main Survey Findings

The survey found that SPSPs in the Philippines are a diverse group with firm structures ranging from one-person businesses, to community-based schemes, to primarily fully private, commercially oriented entities. They are geographically concentrated: water SPSPs are an urban and peri-urban phenomenon, electricity SPSPs are rural. PNOs and WRSs are the most sophisticated SPSPs, reporting the highest revenues, largest investments, and most complex operations. Nevertheless, all SPSPs are small businesses with average customer bases ranging from 450 clients for PNOs to 25 clients for BCSs and average annual sales ranging from US$24,000 for PNOs to US$190 for MHPs. PNOs reported the largest average investment, of less than US$71,000, followed by WRSs. The other SPSPs have investments of less than US$7,000. Network providers and THOs are independent, producing their own water or electricity; the remaining point source and mobile providers (WRSs, TRKs, and BCSs) depend on public utilities or private suppliers for their sources of water and electricity.

SPSPs have diverse client bases. Electricity SPSPs and two types of water SPSP (THOs and TRKs) serve mostly poor households. Despite the socioeconomic status of their clientele, THOs and TRKs charge tariffs three to five times those charged by public utilities. The other SPSPs serve primarily non-poor households, and charge water tariffs that tend to be comparable to those charged by main utilities, except for WRSs selling purified water. PNOs usually work around the clock, whereas MHPs work on average 13 hours a day. The other SPSPs follow a schedule typical of retail shops.

SPSPs, except for MHPs, are profitable businesses. Despite attractive profit margins, absolute profits are low because of the small scale of the operations. The future prospects of SPSPs vary according to the degree of competition each type faces and the demand for their services. PNOs and WRSs report a positive outlook for improving business, THOs and TRKs perceive business stability, and electricity SPSPs expect business to decline.

The degree of business formality varies across types of SPSP with network providers and WRSs being the most formalized. However, even they operate under different schemes (licenses, authorizations, and so forth). Supervision also varies significantly by type of SPSP. Nevertheless, most SPSPs agree that inspections are easily handled and have no negative consequences.

The following sections describe in more detail the characteristics of SPSPs, including size of operations, customers, technical operations, pricing, investment, financial performance, funding, and licensing and regulation.

Location

Water SPSPs are mostly located in urban and peri-urban areas, while electricity SPSPs are located in remote areas (MHPs) or in small towns and rural areas (BCSs). Specific factors influence location. PNOs are mainly located in areas with high population density (over 250 inhabitants per square kilometer) and with relatively high levels of income (that is, provinces in the richest quintile) while they are less common in regions with local and shallow aquifers. THOs are usually found in poor urban neighborhoods of large cities that have limited access to groundwater. TRKs serve clients in urban areas with hilly or mountainous topography. MHPs are generally located in isolated and scarcely populated areas (for example, Cordillera Autonomous Region and Antique) where the poverty incidence is higher than the country average. BCSs are found in both rural areas and small towns.

Organization and ownership

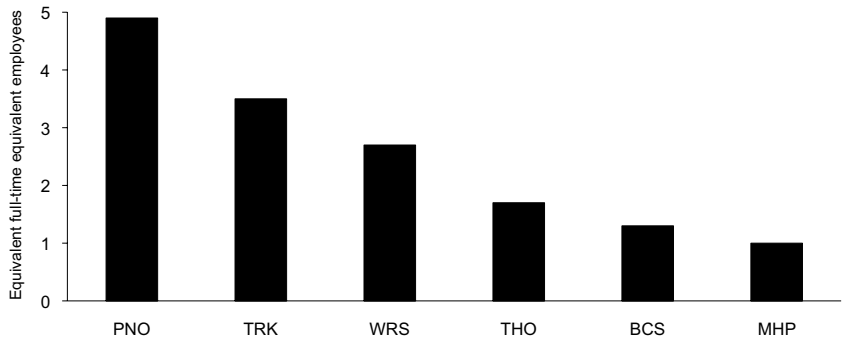
SPSPs can be grouped into two categories based on their business purposes. One group is formed by community-based schemes that aim at ensuring an adequate water or electricity supply for members. This group includes most PNOs (cooperatives and urban homeowners' associations) and MHPs. The second group is formed by nonnetwork SPSPs (WRSs, TRKs, BCSs, and THOs) and some PNOs (subdivision schemes)[47] that are primarily fully private, commercially oriented entities. WRSs and TRKs are generally sole proprietorships, with a few businesses structured as partnerships. THOs and BCSs are individually or family owned and run as a side business.

47. Subdivision schemes are businesses established by real estate developers with the purpose of supplying water to new urban zones not yet reached by the public utility.

PNOs are the most sophisticated SPSPs in the Philippines. More than half of PNOs are divisions of multipurpose cooperatives (that also provide retail, financial, and social services). PNOs are fairly well-structured organizations: more than 80 percent operate from dedicated premises, about two-thirds possess a computer and a fixed telephone line, and 95 percent maintain a bank account with a financial institution. WRSs are also sophisticated SPSPs, operating in well-equipped but small business sites, regularly performing bookkeeping activities; two-thirds claim to prepare annual financial statements for tax-related purposes. MHPs operate from dedicated premises that are owned by the association. The remaining SPSPs are simpler businesses run from the owner's domicile by a family member.

PNOs have had the longest presence in the Philippines, with an average of 10 years in operation, followed by BCSs (8 years), and THOs and TRKs (7 years). The newer SPSPs are MHPs (5 years) and WRSs (less than 3 years). PNOs maintain the largest workforce (five full-time-equivalent staff) followed by TRKs and WRSs (figure IID.1). The other SPSPs employ fewer than two full-time-equivalent employees. The majority of PNOs, TRKs, and WRSs use hired labor while the remaining SPSPs employ association or family members.

Figure IID.1 Average Full-Time-Equivalent Staff by Type of SPSP



PNO managers have substantial sector experience with nearly half (46 percent) having worked in the water business for more than 10 years and most of the remaining having 5 or more years of experience. Such lengths of tenure suggest a certain degree of stability. Managers and owners of others SPSPs have less sector experience, which, in some cases, is compensated for with training. Previous experience in the sector is largely uncommon among managers of WRSs and MHPs, but over one-third of WRS managers and half of MHP managers received dedicated training in the

12-month period preceding the survey. Managers of network SPSPs and WRSs have high levels of education. Over 75 percent of PNO managers hold a university degree and most of the rest have completed general or technical secondary studies. Similarly, more than three-quarters of WRS managers hold a university degree and all MHP managers hold either a university degree or secondary school diploma.

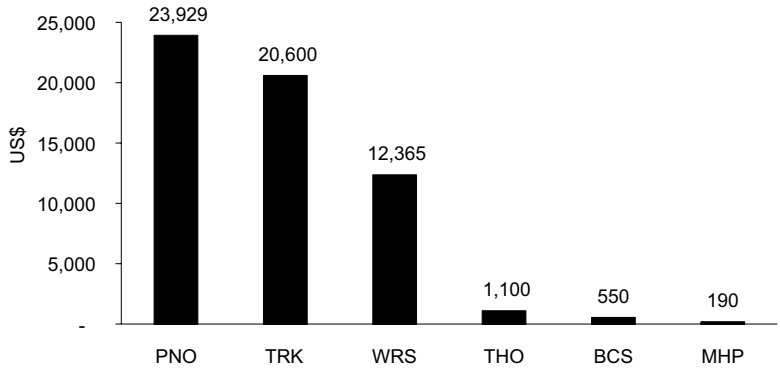
Almost half of PNO managers and the majority of WRS managers derive their main income from operating the SPSP; the remaining managers provide their managerial services on a part-time basis and are involved in a variety of other activities (farming, retail, civil service). Water delivery service is the main source of income for only a fourth of TRK owners or managers; most are involved in parallel business activities, especially in retail or wholesale commerce. For MHP managers and BCS owners, running the SPSP is just a complementary source of income to their main activities (farming or services).

Membership in water associations or water sector bodies is limited—only 15 percent of cooperative PNOs belong to such organizations. WRSs have established business associations, but membership is also limited. Some MHPs are also members of associations that deal with sustainable energy issues and are established at the provincial or barangay level. Membership is generally considered useful because it provides a forum to debate common problems and obtain training and other services.

Size of operations

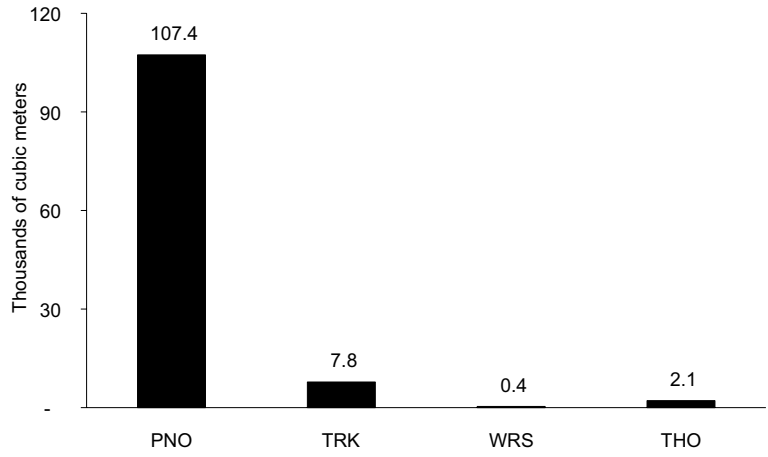
SPSPs fall into two groups by level of revenues. The first group includes most water SPSPs, which have average annual revenues of about US$13,700 (WRSs), US$20,600 (TRKs), and US$24,000 (PNOs). The other group (THOs and electricity SPSPs) is formed of micro SPSPs with average annual revenues ranging from US$190 to US$1,100 (figure IID.2), which reflect low physical sales. For instance, BCSs serve an average of four batteries per day and THOs have average monthly sales of 177 cubic meters of water. PNOs have the largest physical sales volume, more than 10 times higher than those reported by the other water SPSPs (figure IID.3). WRSs and TRKs are able to generate revenues close to those of PNOs because they charge high prices (see Pricing section below), not because they generate higher sales volumes.

Figure IID.2 Average Annual Revenues by Type of SPSP



Source: SPSP survey in Philippines 2006.

Figure IID.3 Average Annual Water Sales by Type of SPSP



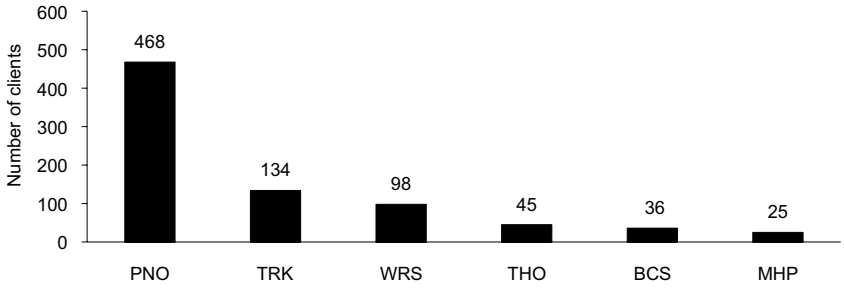
Source: SPSP survey in Philippines 2006.

Customers

SPSPs have small average customer bases. PNOs have the largest at 450 clients. Other SPSPs serve 130 (TRKs), 45 (THOs), and 25 (BCSs) clients on average. SPSP clients are all households, with the exception of some PNOs and WRSs that have a few commercial clients (figure IID.4). Customer base size varies significantly within each SPSP type. PNOs' customer bases range

from fewer than 100 customers to more than 1,000.[48] The number of customers for WRSs is as few as 50 and as many as 200. For THOs, the level of daily activity ranges from as few as 8 walk-in clients up to 135. The TRK customer base ranges from 20 to 500 with the quantity of water sold to each client varying inversely with the number of clients.

Figure IID.4 Average Number of Clients by Type of SPSP



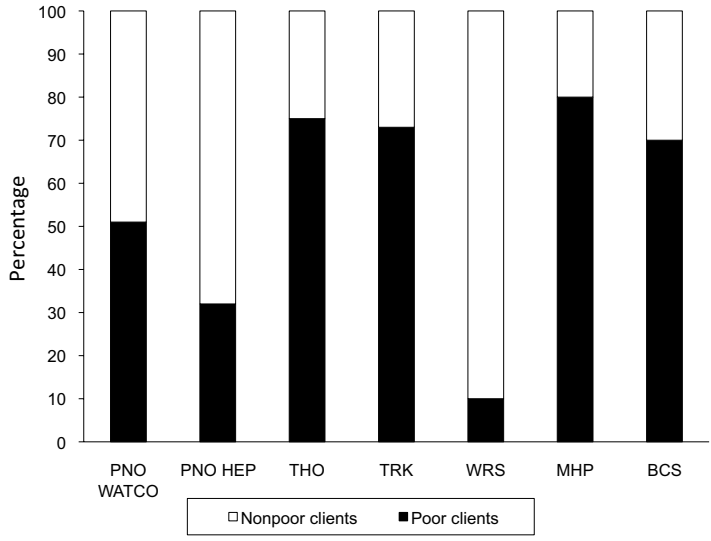
Source: SPSP survey in Philippines 2006.

Network providers typically provide service throughout the week. PNOs usually provide service around the clock, whereas MHPs operate for an average of 13 hours a day. Among point source operators, BCSs and THOs also work throughout the week, usually for 14–15 hours per day, whereas WRSs follow a typical retail shop schedule. The number of trips for TRKs ranges widely, depending upon the distance traveled, the number of trucks operated, and to a lesser extent, the capacity of the truck tank. Seasonality due to weather conditions also plays a role for TRKs—the average number of trips (200) during the peak season (the dry season) is double the corresponding value for the off-peak season (the rainy season).[49]

With regard to the socioeconomic status of the clientele, two types of water SPSPs (THOs and TRKs) and all electricity SPSPs serve mostly poor households. The remaining SPSPs serve primarily non-poor households (figure IID.5).[50] The structure of an SPSP's customer base determines, in part, the monthly water sales per client; SPSPs serving primarily poor households have lower per client sales (figure IID.6). Prices charged by SPSPs also influence water sales per customer, as discussed below.

48. A fifth of water cooperatives also operate standpipes at which nonmember clients can refill bottles and containers.
49. In the Philippines the dry season starts in December and runs through to June while the rainy (or wet) season goes from July through to November.
50. The number of poor household clients was reported by interviewed SPSPs and thus reflects operators' perceptions.

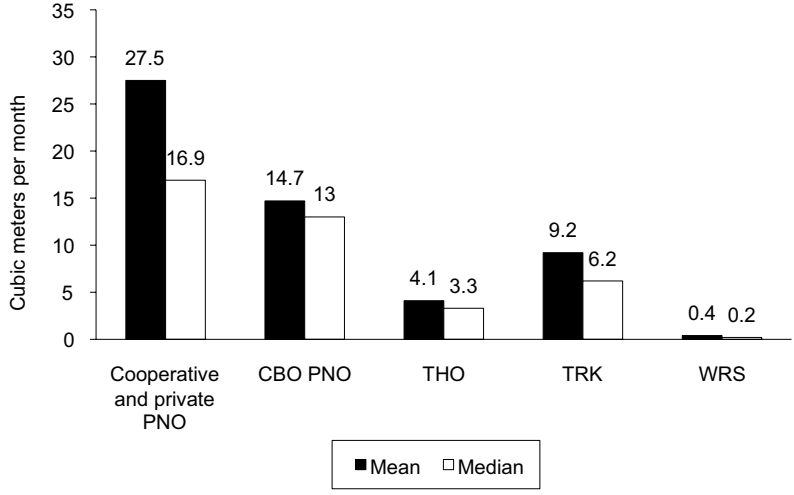
Figure IID.5 Share of Poor Customers by Type of SPSP



Source: SPSP survey in Philippines 2006.

Note: WATCO = Water cooperative; HEP = Housing estate provider

Figure IID.6 Monthly Sales per Customer by Water SPSPs in the Philippines



Source: Baker 2009.

Note: CBO = Community-based organization

Billing methods differ depending upon mode of service provision. Network providers bill and collect on a monthly basis with a few billing more frequently. WRSs, THOs, TRKs, and BCSs charge clients based on consumption, that is, per barrel or jerrican or by battery size. A very few community-based organizations charge monthly.

Payment collection appears to go smoothly for SPSPs except for MHPs and some community-based organizations. About 11 percent of cooperative PNOs have serious payment problems but rarely resort to disconnection. Nevertheless, disconnection policies are enforced, and 3.4 percent of clients were disconnected the year previous to the survey. Most disconnected clients were reconnected upon settlement of outstanding bills. Conversely, payment collection appears to be a difficult process for MHPs with two-thirds of respondents experiencing some problems and the remainder facing serious problems (defined as more than 75 percent of payments being delayed). A permissive attitude toward delinquent payers seems to be the basis of these difficulties. Respondents rely primarily on moral persuasion, and rarely resort to disconnection. The pending entrance of electric cooperatives in MHPs' operating areas seems to be further increasing the number of "bad clients."

The survey did not explore service quality except to ask SPSPs about consumer complaints. SPSPs report that clients are satisfied with their service. However, the picture is more nuanced—20 percent of SPSPs admit frequent complaints and 52 percent report "rare" or "very rare" complaints. Among PNOs, the main complaints are limited water supplied and low water pressure. MHPs are the most affected; 50 percent report frequent client complaints and acknowledge that clients would appreciate service improvements. The main complaints are insufficient power supply and short periods of service. Thus, it is not a surprise that customers opt to switch suppliers whenever there is an opportunity (for example, to electric cooperatives). Other negative factors (destruction of facilities by typhoons and families leaving the area as a result of insurgency) contribute to a declining customer base.

Technical operations

SPSPs can be grouped into two categories based on technical features. The first group (PNOs, THOs, and MHPs) comprises providers producing their own water or electricity. The second group (WRSs, TRKs, and BCSs) consists of operations dependent on public utilities or private suppliers for their water and electricity supply.

PNOs are primarily independent. Most PNOs (89 percent) rely on their own wells or boreholes (75 percent) or natural springs (14 percent); the remaining PNOs obtain water from public utilities or other private suppliers. PNOs have at least one concrete or metal storage tank, use one or two motorized pumps, and their wells or boreholes have an average depth

of 100 meters and a yield of 25 cubic meters per hour. About 90 percent of PNOs use motorized pumps, relying on electricity from public utilities. The remaining 10 percent use gravity schemes that do not require motorized pumps. Piped networks have an average length of 2,900 meters, are made of either steel or PVC, and are laid at a depth of 0.5 meters (but 31 percent of the PNOs had laid pipe on the ground). About 95 percent of PNOs completely or largely meter customer usage. The composition of operating costs depends on operating modes. Energy is the main cost for PNOs relying on their own wells. The main cost for PNOs relying on natural springs (gravity schemes) is labor. PNOs purchasing water from public utilities or private suppliers saw water purchases as the main cost.

Most PNOs distribute untreated water. Only 37 percent of the surveyed schemes perform any basic water treatment (usually chlorination, sometimes done manually). Availability of laboratory equipment is also limited; only 14 percent of the PNOs have chlorine testing tools and 6 percent have a pH meter. However, two-thirds of PNOs indicate that quality testing is performed by external laboratories on a monthly or quarterly basis.

More than half (54 percent) of PNOs have at least one interruption per month resulting from technical problems and an additional 11 percent have frequent interruptions (once a week). Technical problems are primarily located in the piped network (for example, leaks caused by poor junctions and burst pipes resulting from high water pressure). PNOs self-report average water losses of 11 percent, but anecdotal information indicates that this number seriously underestimates water losses. Some PNOs report more realistic water losses of 30 percent.

THOs are also simple, independent operations. The majority of THOs (80 percent) consist of a well 18–140 meters deep, electric pumps to abstract water, and storage tanks that range from 2 cubic meters made of galvanized iron, to 12–17 cubic meters made of concrete. Most THOs do not report water losses and the few that did provided seemingly underestimated figures (5–20 percent). THOs generally do not perform any water treatment. The only exceptions are a couple of operators who perform manual chlorination. Cost structures of THOs vary by the type of equipment and facilities used. THOs using electric pumps spend the most on energy. "Dependent" operators' main cost is water. In both cases, labor costs are usually nil. For those THOs that perform chlorination, chemicals make up 20–35 percent of total costs. In the majority of cases, annual operating costs are below US$500. However, these figures should be used cautiously, given that half of THOs keep no written records of expenses and revenues and those that do any accounting have difficulty separating their own domestic consumption from the water business in electric bills.

MHPs generate their own electricity, usually through store water in reservoirs; a few rely on run-of-the-river schemes. Generation capacity is extremely low, ranging from 0.5 to 4 kW. Network sizes range from 200 to 3,000 meters. Use of load controllers and transformers is rare and usage meters are uncommon. Maintenance costs, the main item in MHPs' cost structure, account for about 50 percent of annual expenditures, followed by labor in schemes relying on paid workers. Only a few respondents were able to estimate average system losses, setting their value in the 15–30 percent range. Service interruptions from technical problems are infrequent but usually caused by overheating or overloading of generators. MHPs reported difficulties in obtaining external assistance and spare parts to solve technical problems.

All WRSs surveyed are "dependent" operations, purchasing water and electricity from public utilities, and purifying water in fairly modern and well-conceived plants. WRSs operate one to four electric pumps to force water throughout the various treatment phases; two or three small stainless steel storage tanks (with a capacity of 0.4 to 1 cubic meter); and a water filtration and treatment system. Filtration systems and purification methods vary from simple processes (activated carbon filter and multimedia sedimentation processes) to more advanced techniques (reverse osmosis and ultraviolet disinfection). Laboratory equipment, such as pH meters and testers for residual chlorine and turbidity, were rarely used because external laboratories usually perform water quality tests. Technical problems leading to the interruption of service were rare among WRSs, mostly relating to the malfunctioning of pumps from sudden brownouts or to the need for frequent replacement of filters. Water losses were significant (up to 70 percent for some operators), occurring during treatment processes or as a result of refilling. Labor was the main operating cost, representing 30–65 percent of annual expenditure, followed by energy (20 percent), and the purchase of raw water (10 percent). Annual operating costs varied from US$2,000 to US$8,000, resulting in estimated unit production costs of between US$10 and US$24 per cubic meter.

TRKs are also dependent operations purchasing water from private suppliers and delivering it directly to clients' houses. Most providers operate second-hand Japanese trucks equipped with storage tanks of 3–5 cubic meters, and small gasoline pumps with a capacity of 2–3 cubic meters per hour up to 18 m^3. The main cost items for TRK operators are fuel and labor, followed by water purchase and truck maintenance. Problems with equipment malfunctioning are rare and most truckers use external assistance to fix them.

BCSs are simple operations; most obtain electricity from electric cooperatives and only a handful produce electricity "in house" using photovoltaic systems. The only equipment is an inverter used to transform the grid-sup-

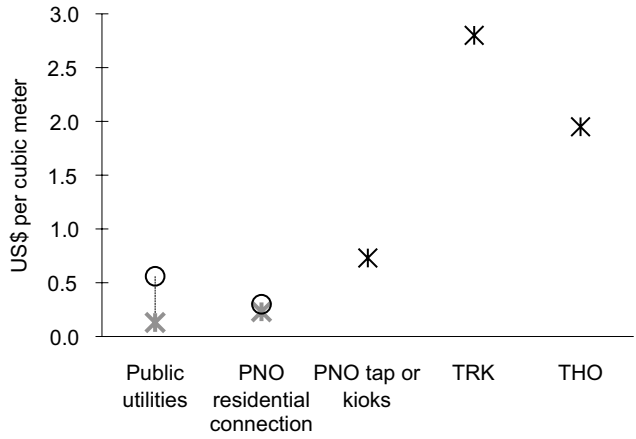
plied current into direct current. Most BCSs use predetermined charging times or just disconnect the batteries when they get hot. A few operators use charge controllers to avoid overcharging. Purchased electricity is the main cost item, accounting on average for almost 40 percent of annual expenditures.

Pricing

Most SPSPs use consumption-based tariffs. Network providers charge tariffs comparable to those charged by the main utilities, while point source and mobile operators charge significantly higher tariffs. Most SPSPs kept prices stable for the 12 months preceding the survey. Only a third of PNOs and BCSs, as well as half of TRKs, reported increasing prices because of higher energy and maintenance costs.

Cooperative PNOs charge an average price of US$0.27 per cubic meter to households and US$0.73 to standpipe customers (figure IID.7). This price difference suggests some degree of cross-subsidization from standpipe customers to customers with in-house connections. Other PNOs charge an average price of US$0.23 per cubic meter, but the range varies from a minimum tariff of US$0.12 (6 Philippine pesos [₱]) to a maximum of US$0.66 (₱33). Average prices charged by PNOs are only marginally higher than the rates charged by large private concessionaires in the Metro Manila area. Nearly all PNOs also charge connection fees, which range from ₱30–₱50 (less than US$1) up to ₱6,000 (US$120). Connection fees of ₱2,000 (US$40) or more include the costs of meters or pipes and plumbing works (or both). If the connection fee is lower, the cost of these items is borne by the client and rarely shared between the client and the PNO. Most PNOs charge by consumption; a small group (9 percent) use a mixed pricing system combining a monthly flat fee with a consumption fee, and a few use different pricing methods (flat fee, by container, and so forth).

Figure IID.7 Water Price Range by Type of SPSP



Source: SPSP survey in Philippines 2006.

THOs, which bill clients per refilling based on the size of container, charge an average of US$1.95 per cubic meter, which is three times the price charged by the most expensive public utility. TRKs are even more expensive suppliers, charging an average of US$2.8 per cubic meter, which is five times the price charged by the most expensive public utility. Distance traveled only marginally influences the price charged by TRKs. Finally, prices charged by WRSs are equivalent to US$29 per cubic meter, an order of magnitude higher than other SPSPs, reflecting the "consumer good" nature of purified water and home delivery service. WRSs sell water in a variety of container sizes to match prices with customers' ability to pay.

MHPs charge member clients per light or electrical appliance operated in the home; connection charges are uncommon. Prices vary from US$0.2 (₱10) per fluorescent bulb of 20 W to US$0.6 (₱30) per television. BCSs charge a flat rate depending on the battery's storage capacity, and the average price for the most common battery size, 50 12V AH, is US$0.72.

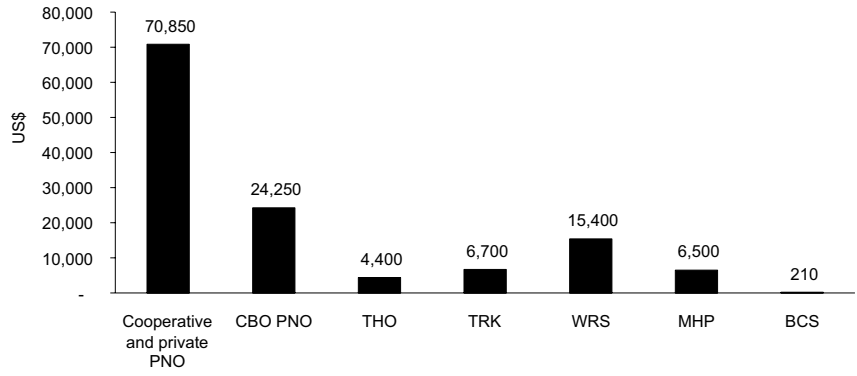
Investments

SPSPs are as diverse in their investment as they are in their technical operations. Investment size varied, reflecting operation size, technical features, and pricing policies. Water network providers report the largest investment followed by WRSs (figure IID.8). The other SPSPs have investments lower than US$7,000.

Within water network providers, there is significant variation by subtype. Cooperatives and private PNOs report an average investment of US$70,850 (a median of US$51,670), while community-based organizations have an

average (and median) investment of US$24,250. Those investments imply an average investment per household connection in cooperatives and private PNOs of US$150 and in community-based organizations of US$84. Source of water (public utilities) and pricing policy (low connection fees that do not include costs of meters and pipes) explain the lower investments by community-based PNOs.

Figure IID.8 Range of Investment by Type of SPSP



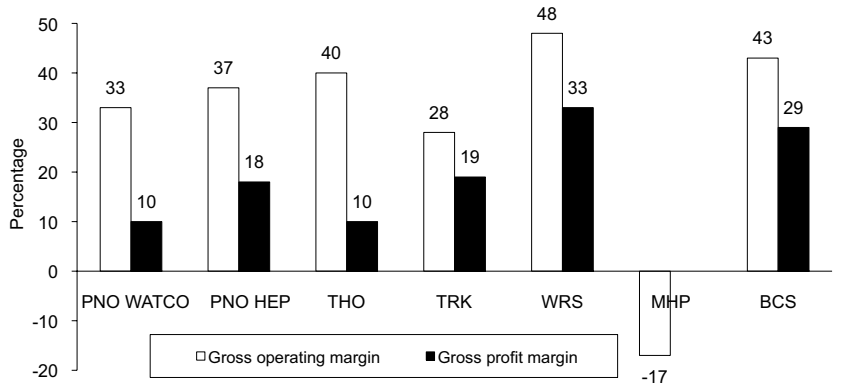
Source: SPSP survey in Philippines 2006.
Note: CBO = Community-based organization

The remaining SPSPs also showed significant variations in investments. WRSs, the second most capital intensive SPSP, have investments varying between US$10,000 and US$30,000. The water treatment system is the main investment item (40 percent of total investment) followed by storage tanks and pumps (25 percent), and office equipment and delivery vehicles (10 percent). Investment in THOs also varies across business models. Private operators have an investment range of US$700–US$2,700, whereas the range for community-managed operations is US$10,000–US$20,000. Wells, pumps, and storage tanks constituted between 60 percent and 100 percent of investment. TRKs had investments ranging from US$3,000 to US$11,000, with trucks accounting for the bulk of the investment (83 percent) and pumps on the trucks for most of the rest. Investments in MHPs ranged from US$3,600 to US$6,000; distribution networks and generator sets were the main assets (30 percent) followed by distribution equipment (for example, transformers and load controllers). BCSs had the smallest investment, ranging from US$60 to US$450; charging equipment was the main asset of BCSs.

Financial performance and funding

SPSPs—except for MHPs—are profitable businesses (figure IID.9). Commercially oriented SPSPs (such as WRSs, TRKs, and subdivision PNOs) report higher profits in both relative and absolute terms than do not-for-profit community-based SPSPs. Once depreciation is taken into account, gross profits decline substantially for PNOs, reflecting their relatively greater capital intensity. Given the small scale of operations of most SPSPs, the attractive profit margins are derived from relatively small absolute profits (figure IID.10). WRSs, the SPSPs with the highest absolute profits, report annual gross profits of US$4,500.[51]

Figure IID.9 Average Financial Indicators by Type of SPSP

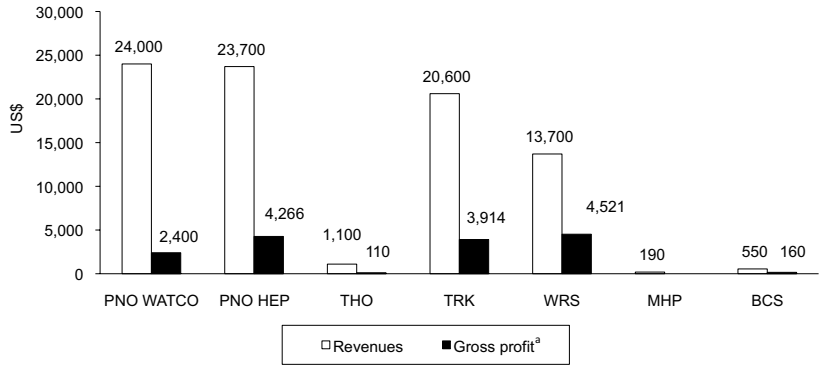


Source: SPSP survey in Philippines 2006.

Note: WATCO = Water cooperative.

51. Given self-reporting and limited bookkeeping, it is hard to determine the accuracy of SPSP-reported profits.

Figure IID.10 Average Annual Revenues and Gross Profits by Type of SPSP



Source: SPSP survey in Philippines 2006.

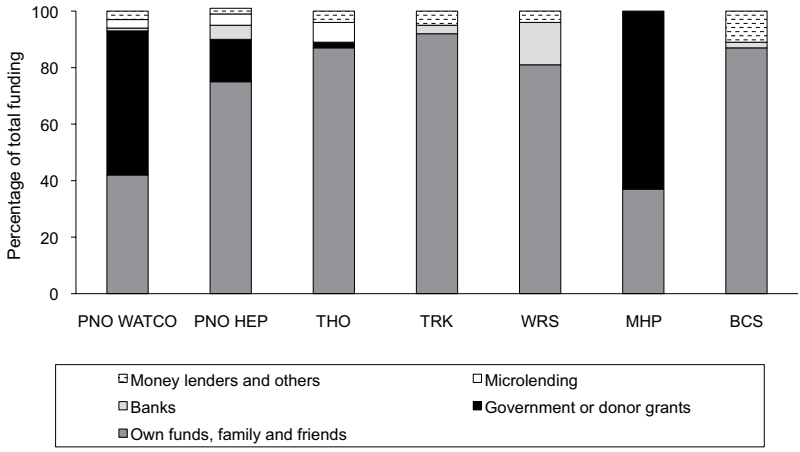
Note: WATCO = Water cooperative.

a. Revenue minus cost of goods sold

The shrinking customer bases of most MHPs have affected their financial condition. Most surveyed operators report not being able to cover operating costs and post significant financial losses. Conversely, operations that have managed to maintain their customer base report high operating margins, in the range of 40–80 percent.

Except for network providers, SPSPs rely mainly on self-financing. Own funds account for over 80 percent of total investment by THOs, TRKs, WRSs, and BCSs with the rest being provided by either private money lenders or other nontraditional sources of funding (figure IID.11). Network providers have been able to access government or donor funding, which represents 50 percent and 63 percent of total investment in cooperative PNOs and MHPs, respectively. Other PNOs have also been able to obtain government or donor funding for 15 percent of their total funding; this financing has been directed primarily to community-based organizations. Microlending has played a minor role in SPSP funding and WRSs are the only operators accessing bank financing.

Figure IID.11 Average Funding Sources by Type of SPSP



Source: SPSP survey in Philippines 2006.

Note: WATCO = Water cooperative; HEP = Housing estate provider

Business perspective

The prospects of SPSPs vary according to the degree of competition faced by each type and the demand for their services. Most PNOs had a positive outlook for their businesses. Over 80 percent of cooperative and private PNOs and 100 percent of community-based PNOs were either very satisfied or satisfied with their current business situation. The majority of them (80 percent of cooperative and private PNOs and 60 percent of community-based PNOs) also report that their businesses have improved compared with conditions two years ago, and they expect further improvements in the coming two years. This positive outlook seems to be partially driven by the limited competition to which PNOs are exposed. Only those located in Rizal province, where the Manila concessionaires recently entered, seem to feel seriously threatened by competition. In addition, over 90 percent of the cooperative PNOs see the potential to expand their networks to the unconnected households in their operating areas. Not surprisingly, most PNOs (77 percent) are considering investing in fixed assets during the subsequent year to expand or improve operations.

WRSs operate in an attractive and highly competitive market, and the majority of them have positive outlooks and expect market conditions to improve in the next two years. Attractive operating margins and low investment requirements result in a high creation rate in this market segment and the trend is expected to continue: the vast majority of WRSs

expect competition to further increase in the near future. Nevertheless, only a fourth of respondents are considering investing in fixed assets in the following 12 months, reflecting the recent establishment of most operators rather than unattractive business prospects.

THOs and TRKs are less optimistic about the future. THOs operate in relatively competitive markets with half of them feeling competitive pressure from piped network providers (public utilities, private companies, or cooperatives). Most respondents expect current conditions to continue over the next two years, but a third anticipate increased competition from piped network providers. Just a fourth of respondents are considering investing in fixed assets, using own funds, during the following year to improve efficiency. Most TRKs (75 percent) report that they operate in highly competitive areas and other TRKs are the main competitors, but water utilities are also perceived as a threat, particularly in Metro Manila. In addition, about half of the respondents expect competition to further increase in the near future, while the remainder expect the status quo to prevail. Thus, it is not surprising that only a couple of TRKs were considering investing in fixed assets during the following year.

Prospects for surveyed electricity SPSPs are less promising. Although MHPs are located in remote areas, about two-thirds fear being displaced by the arrival of electric cooperatives in their areas of operation. In general, the level of competition from other operators is expected to increase. MHPs display mixed attitudes toward the future. When asked about their expectations regarding business conditions over the next two years, a slight majority expect the current situation to continue whereas the remaining two-thirds have a strongly negative outlook. BCSs operate in a highly competitive environment and almost half of the operators expect their business prospects to deteriorate as a result of competition from expanding rural utilities. Overall, only one-third of the BCSs surveyed plan to undertake additional investments.

Licensing and regulation

Licensing varies significantly across SPSPs. WRSs are the most formal category of SPSP. All WRSs are licensed by local bodies authorized to issue sanitary permits and to supervise the quality of bottled water.[52] PNOs usually operate with some form of authorization, which is issued by different entities depending on the business type. Over 80 percent of cooperative PNOs operate under some form of authorization (license or operating permit), which in most cases are issued by municipal authorities or by barangay captains. The National Water Resource Board (NWRB) has issued Certificates of Public

52. The Code on Sanitation of the Philippines (PD 856).

Convenience to only 37 percent of cooperative PNOs. The NWRB issues licenses to private PNOs, while local authorities or the Housing and Land Use Regulatory Board issue operating permits for community-based PNOs. TRKs usually hold licenses or permits issued by authorities at the municipal or barangay level. In contrast, only a minority of THOs hold an operating permit issued by local authorities and no scheme is registered with NWRB, the proper licensing body. Although no specific licensing mechanism has been devised for MHPs, some schemes operate under an authorization letter from the Department of Energy. BCSs are not regarded as electricity operators and, therefore, are not subject to any specific licensing regime. About half of the battery chargers surveyed hold commercial licenses issued by local authorities, while the others are completely informal operations.

Supervision also varies by type of SPSP, but most SPSPs agree that inspections were easily handled and did not bring negative consequences. About half of WRSs had received one or more inspections from licensing authorities, and relations with inspectors are usually described as "easy." If anything, many WRSs would like to see public authorities take a more active role to discourage alleged unfair trade practices. Among cooperative PNOs, 38 percent received inspections in the year preceding the survey, and one-quarter of those inspections resulted in a fine or written reprimand, or both. Most MHPs received inspections covering technical and environmental issues while only a handful of THOs and no TRK operators did.

Conclusions and Recommendations

While electricity SPSPs are marginal in the Philippines, water SPSPs play an important role in the provision of water by serving clients that public utilities are not able or willing to serve. Given the current conditions of service provision in Philippines, it is unlikely that public water utilities will be able to serve these market segments in the near future. If anything, the rapid urbanization in the country is putting further pressure on public utilities. The deficit in water supply provides a strong argument to search for and promote different modes of service provision. As the country experience shows, piped network providers and hose operators (through innovative schemes with water utilities) can play a key role in improving and expanding water service provision, given the proper environment.

The survey found that SPSPs provide valuable services that are competitive with public utilities in the case of piped network providers, but the prices of point source vendors and mobile providers are high, particularly affecting poor consumers. However, these providers have small-scale operations and limited access to finance, and just a few perform basic water treatment processes, if any. The main policy issues are how to facilitate their

expansion while ensuring the water they supply meets national water quality standards.

There are also lessons to be learned from the reforms done for electric cooperatives, which have been able to expand significantly. The policy and regulatory environment for water cooperatives could be improved following the experience in the electricity sector. For instance, a regulatory standard that allows SPSPs to build networks that could gradually be absorbed into the main network would be a useful step towards eventually reaching full coverage in urban areas. In addition, recent policy changes might facilitate the expansion of water SPSPS. For instance, the Supreme Court ruling allowing SPSPs to work in areas which are not served by other utilities provides an opportunity for more SPSP work. Finally, recent discussions on creating financing schemes for water SPSPs offer an opportunity for reforms in the future.

The findings of this survey should provide the basis for in-country discussions regarding strategies to promote service expansion, particularly of network providers. The topic merits further discussion by practitioners and policy makers to identify the most appropriate solutions for the Philippines. In addition, further research may be required to deepen the knowledge on SPSPs, such as possibilities for scaling up the operations of piped network and hose operators. Similarly, a deeper analysis of the limited access of SPSPs to sources of finance could shed light on the changes required to improve it. The water quality of piped network operators is another issue that could be explored to assess the need to improve the water treatment processes of those providers. A final topic for further research is the perception that other stakeholders, such as customers, local governments, utilities, and financiers, have of SPSPs.

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