
Privatizing Solid Waste Management Services in Developing Countries

Lessons learned from private sector involvement in the delivery of solid waste collection and disposal services

PROCEEDINGS PAPER

Seminar Sponsor

Office of Housing and Urban Programs
U.S. Agency for International Development

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International City/County Management Association

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ABSTRACT

Seminar Proceedings:

Privatizing Solid Waste Management Services in Developing Countries

Members of the donor community, U.S. government agencies, and the private sector met in November 1991 to examine the feasibility of privatizing municipal solid waste management services in developing countries. The seminar featured lessons learned from nine USAID-funded case studies as well as from the overseas experiences of U.S. waste management service companies and other donors. Key findings included the need for political commitment to implement privatization strategies, financial autonomy and accountability to insure cost-effectiveness, adoption of a comprehensive systems approach to service delivery, and the institutional capacity to manage private contractors. The seminar also offered valuable insights into the opportunities and constraints for U.S. waste management firms and manufacturers in developing country markets.

The Introduction and Lessons Learned sections of this report provide a summation of the seminar proceedings. The remainder of the report consists of the papers or presentations issued by the seminar participants themselves. This latter section contains more detailed practical information and pertinent insights on the privatization of solid waste management services from leading experts in the field.

INTRODUCTION

Increasingly, to improve efficiency and lower costs, municipal governments are turning to the private sector as an alternative provider of urban services. In developing countries, this trend is reinforced by the inability of local authorities to keep pace with rapid and unregulated urban growth. One of the most visible signs of this lapse in the provision of basic municipal services is in the collection and disposal of solid wastes.

In recognition of this growing challenge to municipal officials, the Office of Housing and Urban Programs was awarded a grant under the Private Provision of Social Services Initiative to demonstrate the feasibility of privatizing solid waste management services. To undertake this activity, the Office, in collaboration with the International City/County Management Association (ICMA), designed a two-phased approach to develop and implement privatization strategies.

Phase I consists of a review of a municipality's existing waste collection and disposal system. The product of this analysis is a list of recommendations designed to both improve existing services and identify opportunities for private sector participation. The goal of this phase is to provide municipal decision-makers with practical, local options. Where applicable, Phase II provides for additional technical assistance, aimed primarily at producing a contract between a public authority and a private firm (or firms) for the delivery of waste management services.

By mid-1991, the Office had conducted Phase I studies for municipalities in six countries: Botswana, Costa Rica, Honduras, Ecuador, Swaziland, and Morocco. Similar studies had been conducted in Bolivia, Indonesia, and Haiti under complementary Mission and Bureau programs. To provide a forum for evaluating these experiences, the Office held a day-long seminar in Washington, D.C., on November 19, 1991.

The morning session featured lessons learned from the nine, Agency-sponsored case studies. The afternoon session was devoted to a discussion of the developing country experiences of an independent consultant who has worked extensively for the World Bank, and representatives of two multinational waste management firms, Browning-Ferris Industries and Waste Management, Inc. Despite the consensus that each city's waste management system requires a case-by-case analysis and site-specific solutions, the following universal lessons emerged from the presentations and audience discussion:

- **Political Commitment.** No privatization effort can succeed without firm support from the city's political leadership. For example, the common overstaffing of municipal sanitation departments that results from political nepotism or powerful unions is a problem that cannot be overcome without significant political commitment.
- **Financial Autonomy.** The financial autonomy of a city's public works functions is essential if those services are to be delivered efficiently and on a continual basis. To provide steady, uninterrupted service, municipal managers need direct access to funds earmarked for waste management. One tool they can use to plan their budgets and allocate money is the Enterprise Fund. In the case of solid waste services, money targeted for waste management is kept separate from other municipal funds.

Additionally, the adoption of appropriate service fees, particularly for industrial and commercial clients, is strongly encouraged as a means to provide viable and equitable waste management financing.

- ***Comprehensive Planning.*** Municipalities must view collection and disposal services within the context of a comprehensive planning approach. Such an approach incorporates all facets of the solid waste management process, including elements such as recycling, legislation, regulation, and enforcement. This is especially important if portions of the system will be privatized to ensure that the private sector components fit into, and are supported by, an appropriate overall waste management program.
- ***Financial Accountability.*** A full understanding of the true costs of service delivery, and the magnitude and sources of financing required to sustain it, are prerequisites for any privatization plan. It is essential both for local governments (in negotiating and evaluating private contracts) and private enterprises (in calculating expenses and profit margins) to know the actual, unsubsidized costs of providing waste management services.
- ***Municipal Responsibility.*** Municipalities must embrace privatization from a position of strength. They cannot relinquish total responsibility of waste management services to private firms but must instead precisely define their tasks in contracts and carefully monitor their performance. Otherwise, in the absence of firm municipal control and true competition, a powerful monopoly or cartel may evolve, resulting in unchecked exploitation of the government and the public.
- ***U.S. Technology Transfer.*** U.S. technology, equipment, and management expertise are competitive internationally and are often favored by municipal officials worldwide. More aggressive marketing by American companies is necessary and should yield export opportunities for waste management goods and services.

These six themes are presented in greater detail in the following Lessons Learned section.

The following individuals contributed to this report: Robert MacLeod, Steven McCoy-Thompson, Rick Hughes, and Simpson Lawson.

LESSONS LEARNED

The seminar featured seven presentations. The first four speakers presented lessons learned from nine USAID-funded case studies. Frank Ohnesorgen, Urban Advisor to ICMA, summarized his findings from municipalities in Botswana, Swaziland, Honduras, Ecuador, Costa Rica, and Morocco. Susan Hall, a fellowship student from Harvard University, offered her observations of the semi-private Municipal Cleansing Enterprise in Bandung, Indonesia. Robert Donovan, Director of waste management services for the City of Phoenix and a consultant to Price Waterhouse, reviewed the efforts to privatize collection services and operation of the municipal landfill in La Paz, Bolivia. Philip Roark, of the Water and Sanitation for Health (WASH) project, discussed issues constraining privatization efforts in Port-au-Prince, Haiti.

In the afternoon, three remaining speakers provided additional lessons learned. Sandra Cointreau Levine, an independent consultant who has participated in a number of assignments with the World Bank, presented an overview of the relationship between privatization and municipal responsibility. Elizabeth Schueler commented on Waste Management Incorporated's experiences in Latin America. George Sanderlin reported on Browning-Ferris Industries's activities in the Pacific Rim. Both industry representatives listed the conditions necessary to interest U.S. waste management firms in business opportunities in developing countries.

Six universal themes of critical importance in planning and implementing a privatization strategy emerged from the presentations and audience discussion. These include: (1) political commitment; (2) financial autonomy; (3) comprehensive planning; (4) cost accountability; (5) municipal responsibility; and (6) where appropriate, U.S. expertise and technology transfer.

1. Political Commitment

The single most important component of a privatization strategy is the political commitment to implement it. Municipal leaders must first recognize the need and desire for improvements in the waste management system. This recognition must then be translated into proactive financial, regulatory, and enforcement policies that support private sector participation in the delivery of waste collection and disposal services.

Frank Ohnesorgen cited examples of wide differences in political will in his experiences in Latin America and Africa. For example, the support of the mayor and her staff in Tegucigalpa, Honduras, resulted in significant progress toward reshaping the city's waste management system. In contrast, the presence of a strong union and the apparent tolerance of corruption and nepotism by municipal officials in Guayaquil, Ecuador, presented significant barriers to change. In both cases, communication between local officials and the public, as well as between the mayor and city council, was a major factor in generating political will and in determining the relative success of these programs.

Similarly, Robert Donovan's team in La Paz, Bolivia, found that division and poor communication among elected officials inhibited their efforts to introduce privatization options. Susan Hall, on the other hand, attributed much of the success for developing

an efficient semi-private waste management operation in Bandung, Indonesia, to the support and commitment of the mayor.

2. Financial Autonomy

To be self-sufficient, waste management systems require an autonomous, reliable source of funds. This presents a major problem in developing countries where sanitation department budgets are drawn from a central government or municipal general fund. Consequently, this leaves money for solid waste collection and disposal services dependant on irregular collection cycles, competing demands from various municipal agencies, and changing national agendas.

Frank Ohnesorgen and others recommended the creation of an enterprise fund for waste management, an idea modeled after the U.S. system of financing and operating wastewater treatment plants authorized by the Clean Water Act. Under this type of arrangement, money designated for waste management, or raised from fees for service, is isolated from other municipal funds and used exclusively for the operation and maintenance of waste management services.

Taking a pragmatic view of this situation, Sandra Cointreau Levine commented on the instability of municipal finances. "Political influence is so high that you don't know from one two-year period to the next whether there is going to be any budget for solid-waste systems. So we encourage self-sustaining financing, not because it's morally correct, but because the political influence is so strong we want the agency to have a little bit of independence."

Many of the seminar participants echoed this sentiment, supporting increased use of fees for service, particularly for commercial and industrial clients. The majority of cities do not distinguish between high volume waste producers and lower volume residential clients. The revenues collected for services rendered, whether through taxes or fees, is not related to either the ability to pay or the actual demand for services. As a result, high volume users' waste disposal needs are often subsidized. The largest hotel in Tegucigalpa, Honduras, for example, generates two truckloads of garbage daily, yet pays the same amount for the service as a household.

3. Comprehensive Planning

No single segment of the solid waste management system can operate in isolation. Instead, a comprehensive planning approach is required that efficiently integrates a range of waste management services and supporting policies.

Services should be carefully matched to needs in order to develop cost efficient systems and reduce wear and tear on equipment. According to several seminar participants, cities in developing countries tend to provide too much service in certain sectors (e.g., Morocco provides daily service to residential areas where only about one-third of the households put out waste on a given day). Citizen education may be a necessary component of a program aimed at changing service levels and tailoring services to needs.

Changes in the waste management system should take into account the health and welfare of scavengers as well as the impact their well-established activities have on sanitary operations of the system. In some cities, the recycling scavengers provide is recognized as a valuable resource and their efforts are directed into positive channels. For example, a Colombian city has curbed clandestine dumping by licensing scavengers and working with them to improve operations. In another instance, a cooperative formed by a local priest provides schools, health care and recycling assistance to residents of a Guayaquil landfill in Ecuador.

Finally, in the context of a comprehensive systems approach to solid waste management, there was widespread recognition that legislative, regulatory, and enforcement mechanisms are often ineffective. George Sanderlin pointed out that the legislative and regulatory framework is important not only to set the stage for enforcement among waste producers, but also to provide important standards that facilitate the selection and oversight of private waste management companies.

4. Financial Accountability

An accurate assessment of the costs incurred in the solid waste management system is critical, but often lacking. Whether it is a question of managing the operation and maintaining the system, determining an appropriate fee structure for users, or negotiating with private enterprises, this financial information is essential. Most solid waste management agencies in developing countries, however, do not have sufficient records and data bases to accurately establish and measure the key financial aspects of the operation.

All seminar participants emphasized the need for developing this type of accurate financial and accounting data on existing waste management systems. In the case of privatization of services, this information is especially important to negotiate a fair contract with private companies, to ensure that they can realistically provide the service required, and to ascertain whether the financing promised to these enterprises will indeed be available.

Sandra Cointreau Levine, however, added the caveat that privatization may entail additional, hidden costs (e.g., private enterprises may pay more for capital than governments which receive preferential financing terms; in another case, unions in some countries may have more leverage on labor rates for private enterprises than when negotiating with government agencies). These costs must be taken into consideration in the financial planning and evaluation of the privatization decision.

5. Municipal Responsibility

One important lesson of privatizing solid waste management services in the U.S. is that municipalities run a great risk if they give up too much responsibility and control. In the end, citizens will hold municipal leaders responsible if prices are too high or service levels too low for expected public services. Care must be taken to ensure that private sector companies are truly operating cost-effectively and that they are maintaining high

standards of service delivery. A critical theme stressed by each of the seminar participants was that, while privatization can be a welcome option, by itself it is not a panacea for improving municipal services.

Lack of sufficient competition among service providers may put a municipality at risk. A monopoly or cartel can extract high prices, especially if the city has completely divested itself of public operations and would have to re-create these services from scratch. Even in the U.S., with a wealth of private contractors and operators, free market competition is not necessarily efficient enough to make privatization cost-effective. Ms. Levine pointed to the experience of San Jose, CA, which was paying inflated prices for waste collection and disposal. The city was only able to lower its costs by fostering a new, competitive firm. This enabled the city to cut its costs by a significant amount—33% for disposal and 23% for collection.

Competition can also be ensured by maintaining a parallel public service operation to serve certain sectors or geographic areas. Mr. Donovan cited his own experience in the city of Phoenix, AZ, where public and private waste management operations compete for the opportunity to service five separate districts. This competition has resulted in improvements in the efficiency of both types of operations. In addition, the experience gained in public sector operations has proven invaluable in ensuring that the price of bids from private sector companies are kept to a minimum.

Aside from the issue of assuring efficiency and cost-effectiveness through competition, municipal leaders must retain control of externalities that are of much greater concern to them than to private enterprises. “Conflicts of interest between environmental quality and profitability are inherent in the solid waste business,” declared Ms. Hall. “Any system that simply adopts private enterprise practices without strong safeguards to ensure that environmental quality is maintained runs the risk of creating more problems than it solves.”

6. U.S. Technology Transfer

Solid waste managers in developing countries repeatedly tout American equipment as the best available. Latin American managers, for example, told Mr. Ohnesorgen that “you can’t compare a Leech or Heil Packer to a Hino or an Italian or Argentine truck.” Mack and Peterbuilt trucks also have excellent reputations, and Caterpillar has far surpassed the rest in its sales and distribution network. Seminar participants indicated that there is a significant opportunity for U.S. vehicle and equipment manufacturers to expand and capitalize on these relatively untapped markets.

Another area of need where U.S. companies have particular expertise is in the provision of fleet maintenance services. One of the largest problems faced by municipal waste management services in developing countries is the difficulty in keeping expensive capital equipment operational. Lack of maintenance technicians, shortage of replacement parts, corruption, and insufficient management skills are all to blame, and U.S. companies such as the Ryder organization are experienced in providing fleet services and could address these needs.

Beyond equipment and maintenance needs, there are additional opportunities for introducing American expertise and management skills. In this vein, it was noted that U.S. corporations which have developed consulting divisions for transferring their particular expertise abroad can also capitalize on the need for advice and technical management assistance in developing countries. An excellent point of entry for U.S. firms, this area of great need provides a relatively low risk opportunity to test the market, gain valuable market knowledge, and develop a reputation and “brand loyalty” for U.S. products and expertise.

According to George Sanderlin, one of the greatest disincentives for companies entering developing countries’ waste management markets is their insecurity in receiving prompt payment for services rendered. This risk is associated with the inability to obtain sufficiently long contracts to ensure recovery of capital- intensive, front-end expenses or the lack of confidence in the government’s ability to guarantee payment of the contract. One way to reduce risk is through the provision of surety bonds that guarantee payment to the company in the event that the municipality cannot meet its obligations.

These six themes, along with other important observations, are discussed in greater detail in the following seminar papers and presentations.

APPROACHES TO SOLID WASTE MANAGEMENT:

USAID'S EXPERIENCES IN BOTSWANA, SWAZILAND, HONDURAS, ECUADOR, COSTA RICA, AND MOROCCO

Frank Ohnesorgen

International City/County Management Association

The fundamental problem with solid waste systems in the developing countries I've worked with is the lack of management skills. People don't understand that solid waste has to be approached systematically. It's not just a problem of collection. It's not just a problem of disposal. A systematic approach is needed.

For example, you can't have good disposal and collection systems if you don't have laws and regulations that require people to put out garbage. Without enforcement and information people will dump along the sides of road and create bigger problems. Education campaigns stressing the need for bringing garbage to landfills are needed for both industry and residents.

Lessons Learned

Although the six projects I've worked with are on three different continents, they have some common characteristics. These are the lessons I learned, my observations, and my conclusions.

One key observation concerns collection. There's really not a lack of service in most of these countries; in fact, there is too much service. People are collecting garbage six or seven times a week throughout the city. Most U.S. cities provide garbage collection twice a week. The countries I visited have enough resources and enough people, but when you provide daily collection you put a strain on your personnel and equipment. This is not cost-effective.

I've been on routes with collection crews in Morocco who provide daily service. People put out a handful of garbage; the biggest container I saw would hold about five gallons.

Only about 30 percent of the residents put out garbage. Nevertheless, the trucks, manned by 12 to 14 men each, continue to make their runs.

You ask the workers and the solid waste operators of these municipalities why they provide such frequent service. "Our garbage decomposes quicker so we've got to get rid of it sooner," they reply. In reality, however, climate is not nearly as great a factor if the garbage is handled correctly. In Phoenix summer temperatures reach 110 to 118 degrees Fahrenheit. New Orleans and Miami have hot, humid climates. Yet all three cities provide service only twice a week. I just came from San Pedro Sula, Honduras, where it rained virtually every day I was there. They provide adequate service with two collections a week. The key here is citizen education. If citizens can be educated and convinced that service will come on schedule, fewer collection days are needed.

Lack of Self-Confidence

In developing countries there's a tremendous lack of self-confidence about the services they provide. You talk to them about privatization and about collecting fees and they say: "Well, it can't be done here. You can do it in the States because you have money; we can't do it here."

What they're looking for is some kind of program in their own region—in Latin America or Africa—that they can see as a model. In some of the A.I.D.-sponsored projects we've been trying to establish reasonable models. We're trying to set up a model of a regional landfill in Costa Rica. We were able to get seven cities to sign off on guarantees that they would work together to provide service for a population of about 120,000. I spent about 30 days talking to mayors, neighborhood groups, municipal councils, pressure groups, and school teachers. The educational process went very well. There was strong political and administrative support, and citizens backed it 100 percent.

However, this project is still on hold, and they're still looking for a model. You can develop an environmentally sound landfill in the states, but we don't have anything in Latin America to demonstrate that technology.

If a project doesn't have the backing of local politicians from its inception, it's not going to get done. A project in Botswana provides a case in point. Our team found a town council there that was hesitant because its members didn't understand the problems. The team did a great job of educating them. Before the project ended it had the complete support of the council.

Corruption in a Time of Cholera

Political response in Guayaquil, the largest city in Ecuador, was at the opposite end of the spectrum. Thirty-seven people died there from cholera in a single month. A national health emergency had been declared twice in the city. We went there at the request of the federal government. When I was there last April people were burning garbage in the streets to get rid of the flies and the rats. There was a problem with the sewers.

However, the local council, the mayor, and the sindicatos (the unions) have the city in a strangle hold. There is so much corruption. The only way to break the strangle hold is to privatize the city 100 percent. Union members protect their jobs. The job of foreman, for example, is often passed from father to son whether or not the son has adequate qualifications. In addition, most people on the payroll don't have to work; they can pay someone else to do their job. So hundreds of people are on the payroll who don't even show up for work.

I have found, in general, that there is absolutely no confidence in the reliability of the management of solid waste systems or in the quality of service these municipalities are providing. It's a sad situation because some cities do have good managers. We saw a good example of political will in Tegucigalpa, Honduras. In fact, we have had more success in that project than in any other, and with an investment of only two or three weeks of technical assistance.

Here, the local manager made many of the recommendations. But the trick was generating the political will of the mayor and local council. This guy was an excellent manager with sound concepts, but he failed to gain the confidence of the mayor, the council and the citizens until we provided the technical assistance and approved his recommendations, after incorporating some of our own. Now the mayor and his aides are giving tremendous support to the city's solid waste programs, which have followed all of these recommendations. The project has almost been completed.

Collection for services in developing countries is one of the biggest problems; there's no operating money. They can't buy equipment. No basic service is reliable—water, sewer, whatever. This has eroded people's confidence. Confidence comes with service being provided on schedule and delivered consistently.

City Can't Escape Responsibility

Many politicians in these countries see privatization as a solution to all their problems. They don't realize that solid waste collection is a municipality's responsibility, not the responsibility of the private sector. They feel that if they contract the service their responsibility is going to go away. They fail to realize what will happen if the private sector doesn't perform—if the equipment breaks down and there is no back-up. People are still going to come back to the politician. Any country's constitution holds a municipality responsible for basic services. Politicians can't give that away.

Willingness to Pay

We were encouraged to find that people will pay for good service. In Costa Rica people actually raised their own fees 300–400 percent to get reliable service.

There are other countries—Honduras is probably the most vivid example—that don't have any drinking water. People are willing to pay outrageous prices, tolerating increases of 2,000 to 3,000 percent for drinking water that's not even healthy. So it is a misconception that basic services in developing countries cannot be made self-sufficient. They can be made self-sufficient. People are willing to pay for good, reliable service.

Latin Americans are beginning to see that services can be self-financed through service fees. I recommend financing services through enterprise funds. By financing a system through an enterprise fund a city can make waste management totally independent of the general fund. I've established such funds here in the States, and they work very well. The prototypical enterprise fund, authorized by the federal Clean Water Act, was designed to help local governments operate and maintain municipal wastewater treatment systems. Those funds are sustained by payments from firms that discharge pollutants into the treatment plants. The money cannot be used for any other municipal function. This model can be adapted for use as a financing mechanism for waste management.

Untapped Potential of Recycling

As I mentioned earlier, our approach to solid waste is the total-concept approach. Every country we visited has an informal recycling program and some of them have formal ones. The managers are not taking advantage of this because they don't understand an integrated system. They don't perceive that coordinating and improving recycling is part of their responsibility. In some of these countries they could recycle 70 percent to 80 percent of the waste.

The only formal recycling programs I've seen are in Swaziland and Botswana where the paper mills have their own garbage trucks. But there are no ordinances to require all the businesses to recycle. Neither the banks nor the USAID office recycle the tremendous amounts of paper they generate. Nobody is forcing them to recycle, yet the market is there and it doesn't cost the city a cent.

I obviously saw a lot of scavenging, and people actually live on some of the landfills. But the point to note here is that for years cities have treated these people as a menace and tried to drive them off the landfills. Instead, cities should learn to work with them. They are, in a sense, a resource because they recycle solid waste. We have to learn to work with them and train them, not work against them.

A priest is working with scavengers in Guayaquil. Not only does he help them recycle, he's formed a co-op that provides health services and schools. The cities are not taking advantage of the service these people could provide.

Composting Reduces the Size of the Waste Stream

I'm an advocate of composting because it recycles materials that would otherwise expand the volume of waste. I know it works because I have a friend whose composting business earns \$12 million a year and increases 15 percent annually. You don't need the fancy equipment that the Europeans are selling for millions of dollars to Latin America and Morocco. Those plants are sitting there rusting. All you need are common sense, labor, and space. If you would like more information about how to compost and how to manage it effectively, please feel free to contact me.

Countries such as Swaziland and Morocco and some Latin American nations fail to use potentially valuable ingredients for compost—waste from mercados (markets) and

abattoirs (slaughterhouses) and sawdust. The products would be invaluable in areas in need of fertile soil. We were able to set up composting units in Costa Rica and Honduras. These have proven to be quite successful despite the initial doubts of those involved.

Don't be Afraid to Use Non-Traditional Approaches

I would now like to make a series of brief recommendations based on what I found in most of the countries I visited:

First, as consultants, we shouldn't be afraid to use non-traditional approaches. One such approach worked in Tegucigalpa where squatters live on government-owned land in mountain settlements not served by roads or utilities. The squatters were throwing trash down the hillside, drawing angry complaints from a patronatos (neighborhood group). I asked one resident: "Would you be willing to bring down the garbage if the city provides some service?" He said, "Sure," and even agreed to pay a charge for the service. So the solid waste manager signed a contract with the community of some 3,000 residents. Under the agreement the squatters bring their garbage to the bottom of the hill every Saturday to toss it in waiting city garbage trucks, one truck for every 500 homes. They pay the city 535 lempiras, which covers wages of the drivers and other workers and 10 gallons of gas.

I tried to do the same thing in Morocco, and they thought I was crazy. Some are willing to try it; some are not.

Enterprise Funds

I recommend the enterprise fund as the best way to provide operating funds for solid waste management. Most of these cities don't have a consistent cash flow because they collect taxes once or twice a year, often leaving them without funds to buy parts and make repairs. The way to get consistent cash flow is to set up an enterprise fund into which service fees are paid.

Cities in developing countries say, "We can't get any revenues." Sure, cities can get revenues. The waste-collection department of the city of San Antonio, Texas, pays rent to the city for using the streets. We turned over \$5 million to the general budget. Tegucigalpa is doing that; I think it's going to work well. The city has also set up a \$90,000 fund for repairs and plans to establish an enterprise fund.

Businesses, especially, need to pay for the service they get. Businesses in the Third World pay for bringing in raw materials but don't pay for disposal of their waste. Consequently, the financial burden falls on the cities. In most of the cities I work with, industrial and commercial establishments generate 30 to 40 percent of the waste, and there are glaring inequities in charges. Every day two fully loaded garbage trucks leave Tegucigalpa's biggest hotel. The hotel pays two lempiras a month for the service, the same amount a household in a residential area pays. They're now going to change the fee structure.

Let Businesses Work with Businesses

The business and commercial sectors should see disposal as a cost for doing business. Even in the states, very few cities provide collections for businesses. It's all left to the private sector. That's where you really want privatization. You let businesses work with businesses.

Most municipalities are presently providing collection in only 40 percent to 60 percent of residential areas. About 30 percent of their collection system is devoted to commercial and industrial collection. If the commercial and industrial areas are privatized, then this 30 percent of the system can be used to increase residential collection, expanding total residential coverage to 70 percent to 90 percent.

U.S. Equipment is in Demand

In Morocco, or Honduras, or wherever—everybody wants American equipment, and American firms are not seizing the opportunity to supply it. American garbage equipment is the best. I'm not saying this because I'm American; managers in those countries will tell you this. You can't compare a Leech, or a Heil Packer to a Hino or vehicles manufactured in France, Italy, or Argentina. They can't even pack a two-to-one ratio. When you compare a Fiat or a Peugeot with a Mack or a Peterbilt, you find there is no comparison. And those cities are paying \$85,000 for Peugeots and Fiats. You can buy an American truck for \$55,000 or the mechanism for the works for about \$35,000. Not only are they competitive, they are good. People want them. They are more durable and reliable, and parts are easier to get because our manufacturers have better networks for parts distribution.

Tegucigalpa bought 40 Fiats. It takes three months to get a part for them from Argentina. Ninety percent of the fleet was down. In Morocco, where they've got brand-new Peugeots sitting in the garage, I asked why. A maintenance manager replied: "Peugeot, it's a very poor dealer of parts."

The only American company that markets aggressively is Caterpillar. Everywhere you go you see American Caterpillars. They train personnel to run landfills and to repair equipment, and other companies need to learn from this strategy.

Global Market for Garbage Cans

We need to show people in developing nations how to use garbage cans. One of the big problems in Morocco is that they don't use any sanitary containers. In the Medina, for example, they just throw slop on the street. The next morning crews sweep it up and put it in wicker baskets, spilling much of it back onto the street. Plastic bags, used increasingly in developing countries, are causing problems in landfills. Where are the American plastic companies? There are plastic companies all over Latin America, but nobody is selling garbage cans. And with proper citizen education people will learn to use them because it's in their own interests.

Although we have promoted recycling and composting where appropriate, I believe landfilling is the best disposal method to recommend in developing nations. These countries have all been burned, not only by Americans, but by French, Italians and Germans, selling them exotic systems to get rid of waste. I can show you four composting plants in Morocco that cost the cities \$15 million each. They're sitting there rusting. This shouldn't be confused with simple composting, which is highly effective. These plants are complicated, expensive, and difficult to repair. A gasification plant in Costa Rica that cost more than \$5 million is also idle. I can show you a \$26 million skeleton of a plant sold by the Italians to Ecuador. The Ecuadorans didn't know how to assemble it.

Seeking Refuge from U.S. Environmental Regulation

While we were talking with the mayor of a little town in Honduras, he showed us a letter and announced, happily, "An American company is going to solve all our problems of solid waste." The first two pages promised, among other things, a recycling plant. But on page 3, it said: "And the municipality shall agree to take an unlimited amount of garbage from the United States to process." What does that mean? It means they were going to dump garbage from the United States on them.

Last year the same thing happened in Costa Rica. I was in a meeting with a director of the Waste Products Commission. He said, "Would you like to set up a meeting with some guys from California?" I found these people wanted to build a tire-burning plant to generate electricity for the city of San Jose. The plant would burn tires from Los Angeles County. I asked, "What does the U.S. Environmental Protection Agency say about your plans?" One of the Californians replied, "They don't have any say in Costa Rica." I asked, "Is that why you are here?" He said, "Yes." I recommended they forget it.

A lot of technology is being sold to developing countries that doesn't work—or, as in these two cases, would work to the detriment of the host countries. But guys like these keep pressing on. It's sad because our people are doing it.

Vision of an Integrated System

In conclusion, I'd like to summarize my major findings.

Let me re-emphasize that all the components of a waste management system must be integrated. Collections must be made consistently, with crews and equipment matched to the scale of the job. The flow of funds to support this service also must be consistent, preferably channeled through a self-sustaining enterprise fund. Disposal must be made in a well-managed sanitary landfill. Composting, done with appropriate technology, helps enrich a country's soil while reducing the volume of organic materials in its waste stream. The recycling potential of the informal community should be recognized as an integral part of the total waste management system.

Once they recognize how each of these elements works and interacts with each other, cities can privatize waste management services with highly beneficial results. They must make sure, however, that the work they contract out is compatible with the total system, and they must carefully monitor the performance of the private firms that perform the services.

Finally, it is important to remember that none of this will happen unless the political leadership of a community supports it at both the policy and regulatory levels.

LESSONS FROM A SEMI-PRIVATE ENTERPRISE IN BANDUNG, INDONESIA

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To help clarify the contribution that private enterprise can make towards the management of municipal solid waste, I'd like to describe a study of a semi-privatized, waste-management agency in Bandung, Indonesia. The study had two objectives. First, we wanted to understand how to improve the management of solid waste in developing countries. Second, we wanted to understand what kind of contribution private enterprise might be able to make to those efforts.

Bandung, a city of about two million people, is one of the leading provincial capitals in Indonesia. In the early 1980s collection rates were extremely low, languishing at about 30 percent. Disposal consisted of open dumping and occasional burning with all the associated environmental hazards.

Bandung Forms a Hybrid Agency

In 1983, Bandung elected a new Mayor who offered a vision of a "clean, green, and flowerish city." He named Pa Djembar, a veteran administrator who had connections with the Asian Development Bank, to establish and direct a hybrid agency called PDK. This semi-private agency assumed the functions of the old, municipal solid-waste department.

This arrangement enabled the city to change the rules of the game under which solid waste was being managed. As a result, PDK became an innovative organization, capable of accomplishments beyond the reach of the old municipal department. This semi-privatized agency also became a vehicle through which the city could gradually move from a fully public waste management system to an increasingly privatized one.

I'd like to look at these achievements and some of the lessons they might hold for us. First, consider the new rules of the game. The new organization, PDK, was given one

very important new power: the authority to raise funds from independent sources. The local municipality was no longer the sole source of funding. PDK could go to the government, to the Asian Development Bank, or to other donors for loans.

PDK Gets a New Charge: Earn Profits

The agency was also given a very explicit and important new mandate, which was to be profitable. The objective was to reduce the waste agency's subsidy over time. The municipality counterbalanced this new authority by retaining a relatively strong influence in PDK's operations.

Some examples:

PDK was 100 percent owned by the municipality, which required accountability through very direct lines. The three senior directors in PDK remained political employees of the municipality. Before introducing new activities and projects, PDK had to screen its proposals through the municipality's planning committees. So the relationship between PDK and the municipality was, in effect, negotiated over time. There were no formal contracts that distinguished the municipality from PDK and private enterprise.

Both began to test the waters. What did it mean to introduce private enterprise in some form into the city's waste management system? What kinds of relationships could be developed between the new privatized waste agency and the old municipality? What impact did the new rules have on PDK's operations?

First of all, as a separate organization PDK gained full control over such crucial parts of the operation as truck maintenance, and the backlog for repairs dropped from about six months to a few weeks in fairly short order.

PDK also gained status. As a separate, recognizable unit, it was able to attract extraordinarily talented managers. Pa Djembar, for example, was attracted to the director's position by the opportunity to manage this new hybrid agency. He, in turn, was able to attract a stream of graduate recruits from the local Institute of Technology. So the city for the first time had the expertise of graduate engineers and bio-chemists to manage its waste system. As a separate organization, PDK had space. This enabled Pa Djembar to create a new culture—one that was committed to learning and innovation.

Djembar avoided the hierarchical, heavy-handed, dictatorial practices used by many Indonesian organizations. For example, he would hold round table discussions with groups of his street sweepers. He would ask them what problems they were encountering when they were collecting the garbage and solicit new ideas about improving their performance. Djembar also sent his operations director to other countries to seek new ideas.

Community Cooperation

Rebuffed in early efforts to compete in some communities, PDK embarked on a series of strategic alliances that helped it achieve goals that eluded the more traditional

municipal department. In 1985, when PDK was formed, residential waste collection was the responsibility of myriad community groups. Unfortunately, the standard of service of these small groups was very low. PDK initially decided to offer parallel collection services. This met with extraordinary resistance from the community groups, who resented having their turf invaded.

PDK found it needed to use a different approach. Using some of its financing leverage, the agency supplied the groups with some basic equipment, then trained their collectors and sweepers to improve the standard of service. By 1991, PDK was actively considering giving total responsibility of all the residential waste collection services to these community groups. The agency had learned that these alliances could be very powerful in helping it achieve its goals.

PDK formed a second strategic alliance to establish a manual composting unit, the only manual municipal unit in Indonesia. Unlike large mechanical units in other cities, this one turned out a steady stream of compost. The first ally in this venture was the Technology Institute, which provided research and development efforts to get this plant under way.

Then PDK asked the local agricultural extension college to analyze the needs of farmers and plantation owners to make sure there would actually be a market for compost. The agricultural college also helped educate the farmers and plantation owners and acted as a distribution channel. The composting project taught PDK that it was both important to employ appropriate technologies and to form partnerships to facilitate the application of such technologies.

PDK Develops New Skills and Capabilities

Independent sources of financing were critical to the success of PDK's innovations. In 1987, the Asian Development Bank offered the agency a multi-million dollar loan to help support a pilot sanitary landfill, the first of its kinds in Indonesia. PDK used this high profile financial leverage to steer what was an innovative but little-understood idea through the municipality's planning committees.

PDK found a French engineering contractor to help design and build the prototype for the landfill. It also enlisted the director of the Technology Institute, who had himself studied in France for six years and understood landfill technology. Djembar acted as a broker to help the French contractor and the local educator adapt their ideas to conditions in Indonesia.

The collaboration didn't stop there. One of the Institute's graduates, who had been recruited into the PDK team, worked alongside the Institute director. Gradually, the skills, capabilities, and new ideas the French contractor provided were increasingly internalized by PDK. So, essentially through a series of strategic alliances both with local community groups and the composting partners, PDK learned that it was possible to introduce innovations to improve waste management.

However, the sheer pressure of all these operational innovations, combined with a mandate to be profitable, created an intense need for much stronger financial management. To pay for these innovations and remain profitable, PDK embarked on a

series of schemes to increase its revenue base. First, it diversified, offering various segments of the community services they could afford. Then the agency started offering services to the street markets and to the commercial and industrial sectors.

Public Education Programs Established

For residential neighborhoods however, a different approach was used. PDK set up a series of public education programs and enforcement schemes to encourage the local communities to pay for services they were receiving. For example, a touring road show visited a couple of communities each month. PDK managers joined local community leaders to help the residents understand why waste management was important and why they should pay for it. These persuasive techniques were backed up by new regulations empowering local bailiffs to fine residents on the spot if they were caught dumping or if they failed to pay waste-collection fees.

The profitability mandate pushed the agency toward financially sustainable solutions. The composting project, for example, was profitable. Even the scavenging sector makes its contribution. The scavenger, in a sense, represents private enterprise on an informal basis. The reason these people are there is because they can make a living out of recycling materials that can be used in local industry much more profitably than virgin materials. In essence, PDK learned that to remain profitable it must sustain long-term growth. Thus, the operational innovations adopted in its earlier periods had to be accompanied by financial innovations.

Environmental Quality is a Major Concern

The strong municipal influence I mentioned earlier counterbalanced the agency's entrepreneurial drive and helped to institutionalize within PDK a tension between full-profit, innovative, private enterprise and a sense of public responsibility. This encouraged PDK to take environmental quality very seriously. For example, Pa Djembar's commitment to the mayor's vision of "a clean, green, and flowerish city" was a major motivating factor in establishing the composting and sanitary landfill units and in carrying out other objectives in an environmentally sound manner.

The four major lessons PDK learned in six years of operation can be summarized this way:

1. Competence is a key factor. To bring about change the agency needed talented managers. It needed to encourage learning and innovation.
2. PDK realized it didn't have to rely entirely on its own resources or its own competence. It could borrow competence by forming a series of strategic alliances and establishing a network of organizations that together could make a difference in the way the city managed its waste disposal.
3. Operational innovation must be matched with financial innovation if programs are to be sustained.

4. A semi-private agency with tension between its public brief and its private enterprise brief was a very useful vehicle for progressively introducing private enterprise into the city's waste-management system.

Shifting Responsibility to Private Sector Participants

To this last point I'd like to turn now. I think that in creating PDK the city learned that a semi-privatized waste-management agency could increasingly over time devolve responsibility for selected parts of the operation, particularly collections, to independent operators in the private sector. For example, on the informal side, the scavengers and even the local community groups were encouraged to take on responsibility for collections. The agency also began to negotiate formal arrangements with private entrepreneurs. By 1991, contractors accounted for about 10 percent of services provided to the commercial and industrial sectors.

The city also learned that through this semi-privatized agency it could still maintain control in some of the most challenging and environmentally sensitive parts of the waste management system, particularly on the disposal side. For example, PDK is exploring ways to convert the pilot disposal site into a full-fledged sanitary landfill.

Increasingly, PDK's responsibilities include training, guiding, licensing, and overseeing the private sector players. This is an extension of the strong role it played in training the local community groups.

Over the longer term, I think the city expects to rely on PDK to establish more formal mechanisms to guide the involvement of private sector players. The agency has seen waste management from both sides of the spectrum. It has seen it from the public-sector perspective. This has given managers a sense of responsibility and accountability. PDK has also seen waste management from the private enterprise perspective.

Toward a More Formalized System

Now the agency is beginning to help the municipality formalize the system of regulations and contracts that evolved from the somewhat informal negotiating relationships it established over the past six years.

The vision that I would like to leave with you is that private enterprise, to my mind, would operate most effectively as half of an interdependent network of both public and private systems, including foreign contractors, local companies, community groups, local learning institutes or private extension colleges, and consultants—a whole range of organizations and individuals that, together, seem to me to have the competence required to improve the city's waste system.

PRIVATE PROVISION OF SOLID WASTE MANAGEMENT SERVICES IN LA PAZ, BOLIVIA

Robert Donovan

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Estimates of the population in the municipality of La Paz range from 600,000 to one million. Many of its residents live on the city's upper slopes. They are not serviced by any roads at all and receive only marginal solid waste services. There's an intermediate area where service was difficult to provide. In the valleys, however, service is provided in a conventional manner—conventional in terms of what we're used to in the United States.

Residents of the upper slopes, not accessible by roads, can walk down to what we call a roll-off container and dump their garbage into it. Then these containers are hauled away by roll-off trucks.

The intermediate areas are serviced by dump trucks. These trucks are used because heavy, rear-loading trucks, which are the standard in the industry, cannot climb the roads on the steep hills when loaded. The rear-loaders are used on roads in the flatter, generally more affluent parts of the city.

La Paz has one of the most efficient transfer stations that I've ever seen. It cost a quarter of a million dollars, which is really cheap by U.S. standards. It has a computerized scale house. It is a nice facility.

Transfer stations are built as intermediate disposal sites when landfills are beyond the cost-effective hauling range of the standard, hydraulically equipped garbage truck. Semi-trailers, with the capacity of three to five garbage trucks, take the garbage from the transfer station to the landfill. Such a facility became necessary in La Paz after an older landfill, which had been used for about 40 years, washed down a slope into a creek during a period of heavy rainfall. They closed that landfill and built a new, state-of-the-art landfill outside the city.

Landfill Without Complete Operating Instructions

One of the first issues I want to discuss concerns problems surrounding this landfill. An excellent set of instructions was provided on how to develop the landfill. But clearly one of the first steps in operating a landfill is to determine how long it is going to last. You need to know how to measure it. Well, you measure it by calculating compacting ratio, cubic yards of garbage that you can compact. And you need survey equipment to do this.

First of all, the municipality wasn't aware of this process, and, second, it didn't have the money to buy the equipment needed to apply it. So you had a fairly sophisticated landfill provided, but the tools weren't provided. Neither was the information needed for life-cycle operation. The provider—I don't think it was U.S. equipment—walked away without making sure the municipality could operate the facility properly. We went to La Paz with the idea of privatizing the landfill, solid-waste collection, the transfer station, and street sweeping.

There are several reasons you might wish to privatize. The most often mentioned is the potential for cost savings. In La Paz that was certainly a consideration, or a stated consideration. In addition, political and labor issues might be motivating factors. When we got there we found that financial, labor, and political issues were all involved. I don't want to get into a lot of details because the politics and the legal system are clearly going to be different in just about every case, so no universal recommendation can be made. But you need to look in each case at what the political situation is. It's certainly going to determine what your options are.

Barriers to Privatization

I found Bolivian laws applicable to contracting very strange. Fortunately, we had an attorney in our group who was familiar with South American law. He saved us from making a lot of mistakes.

I'd like to discuss a question that is key to any privatization initiative: How do you know if you're saving money by privatizing if you don't know what your costs are? Clearly, if you really want to get the maximum bang for your buck you have to know what a municipality is spending for the services it is already providing. La Paz had a financial management system that had been in place for only about a year. This caused a problem. We could take a snapshot of about eight months of data. But taking such a reading without any kind of financial history raised key questions: What does it represent in terms of service growth? What is the life cycle cost? Equipment costs vary. For example, a garbage truck costs a lot more to operate in the third year than it does in the first year. Without this kind of cost data you're really taking a shot in the dark. And there just wasn't any historical data.

So the best thing we could do was take the information we had as a snapshot of current costs. I tried to apply to La Paz's limited cost data the experience I gained in overseeing competitive bidding in Phoenix, where I have a handle on what costs are. For example, I know that 48 percent of my direct costs for providing services are related to operations and maintenance and capital acquisition and amortization of the equipment.

It turned out that when we played all the numbers in La Paz the percentage was very similar there. This told me that if a similarity of this scale existed I could calculate back and forth from known data.

Methods of Privatization Reviewed

Once we had some insight on cost, we looked at several methods of privatization. We considered franchising, contracting, and competing. In contracting straight up, I say:

“ Here’s my known cost. I’m going to put a service level out to bid. If private contractors bid lower than what I’m paying to provide the service, I’ll give it to them.”

In franchising, you’re going to take an area and say, “Okay, contractor, this is your area to have, and you do everything.” I’m not a big proponent of franchising because the city loses control. The experience of San Jose, Calif., is a good example. That city is trying to wrest control of its solid waste collection back from a private contractor. The private contractor does everything in a franchise, including revenue collecting. If the city has a real problem it has no hammer with which to control services. Moreover, the franchise period is normally longer than the term of contracts. So if problems arise under the franchise the city must struggle with them longer than if it had contracted the same services.

Many Third World countries, I believe, could apply a technique we use in Phoenix even though the differences in scale are usually vast. La Paz, for example, generates 80,000 tons of commercial, industrial, and residential garbage annually while Phoenix generates 1.4 million tons.

In Phoenix, we compete against the private sector. The city knows what its approximate costs are. I have five districts that I bid. We always keep control of two of them. We put the other three out to bid. If a private contractor’s bid is lower than the cost at which I can provide the service, that firm is going to have the district. If I have the lowest cost, then I’m going to keep the district.

Why is this a good system that might be applied in privatization in Latin America, especially South America? An issue that arose in La Paz provides at least a partial answer. Officials there had a basic distrust of privatizing because of a fear of losing control of the service. To allay that fear, we divided the collection contract into two contracts so that there were overlapping levels of responsibility. The two successful contractors had approximately equal cuts of the city. So if one contractor failed to perform the other contractor could walk in and provide the service. Obviously, if the city has turned over control of its trucks, landfill, and transfer station, it loses control of its own destiny. By issuing two contracts La Paz hopes to minimize such a loss. A third contractor runs the landfill and transfer station.

To facilitate technology transfer to smaller firms, La Paz officials persuaded the successful contractors to help smaller waste management businesses get off the ground. We called these small firms microenterprises. They are servicing the areas that are inaccessible by trucks. They will work directly for, and be paid by, the contractors. These commercial marriages are based on the assumption that business management principles of the larger firms will rub off on the smaller ones.

Major Companies not Among Bidders

When we sought bids on the two collection contracts, we got seven or eight bidders, but Waste Management and BFI (Browning-Ferris Industries) were not among them. Neither was Laidlaw or firms from the larger European countries. I asked myself why. They have the technology and the management expertise. Imbo, a Chilean company, was selected on the basis of cost over a couple of other companies, for one of the contracts. Rokio, an Argentine firm, won the other collection contract. What these companies bring to the table is not significantly different from what the city is providing right now. The larger multi-national companies, I think, would have brought something more useful to the contract. They could have helped build internal business capability and perhaps could have formed joint ventures because this was a demonstration process for Bolivia. But they didn't come.

I called a couple of these companies to find out why they didn't respond to the bid solicitation. Their overwhelming concern was that they were exposing their capital. That's an interesting observation, and it tells me something. I think some direct communication needs to go on between certain groups. I haven't been in this business long enough to know which groups—whether it's the consultants or USAID—I don't know.

In this project, La Paz had all its equipment. It was providing trucks and landfill equipment that would have been serviceable through the five-year contract period. What capital exposure did these companies have? In discussing this with me, a couple of them said, "We just didn't know that." We might have gotten some of those players to the table if they had known their actual exposure to capital loss was minimal. This was their key concern, because garbage trucks are not cheap, I don't care where you buy them or who you buy them from.

Landfill equipment is even more expensive. An Auder scraper is a quarter-of-a-million-dollar investment. This kind of capital exposure for small contractors was a problem. But it was a turnoff to the multi-national companies. Maybe by dealing with the larger companies, one on one, and establishing some kind of rapport, the agencies involved in such transactions could give multi-nationals a better understanding of what these projects are all about.

Potential U.S. Business Participation

This raises some important questions. What opportunities can we look for in some of these areas? Where does the U.S. fit in? What can we do for these countries? What kinds of expertise can we provide?

Five fields come readily to mind:

- **Engineering.** This kind of expertise is urgently needed not only in Bolivia, but in neighboring Peru and in other countries in the region.
- **Equipment.** Depending on what your personnel costs are, equipment is either the single most expensive factor in solid waste collection and landfill operation or it's

the second most expensive. Fifty percent of my direct costs in Phoenix are for personnel, 48 percent are for equipment, and about 2 percent are for everything else.

In La Paz, they were running eighty pieces of collection equipment when they need about fifteen, with a spare ratio of about five trucks. This overdeployment of equipment was caused in part by the fact that frequency of service was too high; it was daily for all intents and purposes.

- **Maintenance.** The maintenance problem was a nightmare. People steal tools and parts. The San Mateo department didn't trust the equipment-maintenance department to work on the new trucks they just got. What does this tell us? Well, there are companies in the United States—Ryder, for example—that specialize in contracting fleet maintenance. In Bolivia, as in many American cities, fleet maintenance cost is disproportionately expensive. Their spare ratio of equipment is disproportionate to their needs because they can't turn equipment around in the shop fast enough. And their labor and parts costs are far too high.
- **Labor Relations.** Labor problems seem to abound. We weren't aware there was a union in Bolivia. Let me tell you, there's a very strong union there. When we got down there one of our key concerns was how we move the process forward without creating a general labor strike. After brainstorming that issue, we went back to USAID in Bolivia and they agreed to have some labor relations people work with residents and the labor groups. This worked very well. There was a strike but it didn't happen until after we had already contracted out. It was only indirectly related to the contract and was over in two days—probably the shortest strike in their history.
- **Financing.** You have to worry about your operating costs, your operating budget, capital acquisition, trucks, growth, replacement, landfill equipment for growth, landfill equipment for replacement, a new truck yard, and if you have to build a transfer station, acquisition of land.

Pervasive Problems of Capital Financing

In Phoenix, typically, we finance large capital projects like that with municipal bonds. Well, there is no bond market in Bolivia. I believe the trucks they were using were financed by the Japanese equivalent of USAID. But they must face the question of what they are going to do after those trucks run their useful lives. And this will happen soon unless they get a handle on maintenance. Problems of financing capital investment seem to be pervasive among Latin American countries. These questions must be answered: What are the costs?

How do you keep track of them? How do you recover revenue? I think an enterprise fund is an optimal solution for solid waste collections. It's also probably an optimal method of paying for a landfill. Commercial contractors ought to pay for the use of landfills. If you are not collecting from them you are losing easily recoverable revenue. If their truck comes across the scale you can bill them. This only works, however, if there is an effective enforcement mechanism.

Medical Waste Contaminates Landfills

Whenever you collect industrial, commercial, residential, and hospital waste you have a major contamination problem. We're getting pretty smart in U.S. landfills in addressing this issue. But why create a problem in countries we're working in now that will require getting them into a remediation mode? It costs us \$20 million to clean up a landfill. It costs us \$10 million to put garbage in it in the first place. Let's nix that problem in developing nations before we end up spending USAID money for remediating landfills.

The big problems in La Paz were hazardous waste and medical waste. Hospital waste, including surgical waste, is going directly to the dumps. In one landfill people were dumping on top of this waste and dogs pawed through it. These were major ways that disease spreads. The threat was compounded in one area when a landfill slid downhill and into a valley, polluting a stream that flowed near a vegetable garden. Fifteen cases of cholera were reported in that valley. Those kinds of problems can be resolved if we work with this new, state-of-the-art landfill.

Final Thoughts

In conclusion, I'd like to emphasize—re-emphasize in some cases—some lessons that emerged from our experiences in La Paz that might guide teams such as ours in carrying out future assignments in developing countries. First, I'd like to underscore the importance of knowing your costs. For optimal results, you should have costs to a minimal level and services at a maximum level of efficiency before privatizing. Thus, projected cost savings will significantly increase.

For example: If I can get private enterprise to manage a function for \$700 that's costing me \$800 to do myself, I've saved something. But I could have saved even more if I had been efficient enough to perform the service for \$600, and thus had a lower baseline figure from which to negotiate. So I challenge public officials exploring opportunities to privatize to take costs down to rock bottom if at all possible.

Some other thoughts that might make the work of assistance teams more effective:

- Before the field visit, try to understand fully the nature of the project, the needs of the client, and the people and skills required to meet those needs. Discussing client expectations will help a team determine what the end product will be and what it will take to achieve it.
- Lack of information is a recurring problem in many developing countries. A short reconnaissance visit to assess the prospect of gaining information in a timely manner might be helpful. During such a visit it might be useful to present the client with a list of sources of data the team will need upon arrival.
- Access to reliable support services is crucial to the success of a project. Because not all team members may be familiar with the host-country language, translation services are important. Access to computers, printers, telephones, and facsimile equipment was essential to the progress of our project.

- Team members that design project strategy and draft bid documents should evaluate proposals of the companies responding to bid invitations. A technical understanding of the project is necessary to prevent awarding contracts to a low bidder who might not have the expertise to provide a better service. A final review of bid documents by all team members with an eye toward analysis of technical, legal, management, financial, and other aspects will enhance the quality of the document.

Call to Action to Prevent Problems

It has taken the United States years to realize that managing the solid waste stream requires a comprehensive set of legislative and community actions to avoid current disposal problems. Programs that promote actions such as recycling have reduced energy consumption and preserved our natural resources. Introducing these concepts, which place solid waste collection and disposal in a macro system, may prevent problems that we are struggling to solve.

SOLID WASTE MANAGEMENT IN PORT-AU-PRINCE, HAITI

Philip Roark

Associate Director, Water and Sanitation for Health (WASH) Project

This report is a summary of WASH activities related to solid waste management in Port-au-Prince, Haiti, from December 1989 to the present. Currently, U.S. assistance to Haiti, including all WASH activities, has been suspended in response to the September military takeover of the government. Several waste management activities which were being carried out or were under consideration have also been suspended.

History of WASH Activities

At the request of the USAID Mission, in December 1989 WASH sent a two-person team to review a proposal for the privatization of solid waste in Port-au-Prince. The proposal was submitted to USAID by a Haitian PVO with broad entrepreneurial experience primarily in the health sector, but including solid waste management. Much of the proposal was found to be on target, but several significant flaws were cited. In particular, there was insufficient evidence in the proposal regarding the market for waste management services and the mechanism for financing these services.

Based on the potential for privatization of solid waste, it was decided to carry out a market survey of the sector. In September 1990 a survey was undertaken which covered waste producers, waste collectors, compost users, and other recycling options. This information was used to formulate recommendations for managing the waste sector and a financial analysis was carried out utilizing four possible scenarios. This report was submitted to the government for review.

In the fall of 1990, the USAID Mission decided to launch an emergency clean-up program to help facilitate the national elections scheduled for December. The Mission, believing that a clean city would increase voter turnout, provided \$400,000 of PL-480 money for the effort. The emergency plan provided that the PVO that wrote the original project proposal would manage the operation and that private sector participation would

be maximized. WASH provided a consultant for one month to monitor the operation. The emergency plan was continued for six months until after the presidential inauguration in February 1991.

In March, WASH designed a workshop for an interagency task force created during the emergency program to debate the issues surrounding solid waste management. About 80 participants from national government, mayors' offices, community groups, and environmental organizations met for two days and achieved consensus on most issues, however with some significant exceptions.

In May, a working group of representatives from the Ministry of Public Works, the mayors' council, and WASH met to design a long-term plan for waste management. This plan has received extensive review and debate but has not yet been endorsed by the government. In anticipation of the plan's acceptance, the Cooperative Housing Foundation fielded a long-term consultant in July to begin working with community groups on their role in waste management. In September the coup took place, aid was cut off, and all related activities were stopped.

Findings of Surveys

The objective of this activity was to carry out a survey of solid waste management (SWM) for households, businesses, and industries in metropolitan Port-au-Prince. A total of 404 households, 30 businesses, and 11 industries were surveyed as representative samples of waste producers. In addition, information was gathered from both the government agency and representatives of small businesses and individual entrepreneurs engaged in waste collection. The disposal of solid wastes was also studied with special emphasis on composting as a productive use for wastes and on the proper use of landfills.

The daily production of solid wastes in Port-au-Prince is estimated at 1,152 tons (1991). The capacity of Service Metropolitan de Collecte des Residus Solides (SMCRS), the government organization responsible for collecting these wastes, is less than one-quarter of this total. Temporary landfills within the city have encouraged a situation where only a small volume of waste is being transported outside the city while the rest accumulates visibly every day.

Household

- Only about 24 percent of households receive waste collection service from SMCRS.
- Among those who receive service from SMCRS, the majority are dissatisfied.
- About 21 percent presently pay a total of \$1.27 million per year for waste collection by private entrepreneurs.
- Most households dispose of waste themselves, primarily by dumping it in ravines or public areas, or by burning.
- About 48 percent are willing to pay for reliable waste collection at an average cost of \$2.07 per week.

- Significant amounts of nonorganic waste are recycled, but only minor amounts of organic materials are composted.
- A majority of households would be willing to participate in a community organization to manage wastes.

Commercial

- About 40 percent of businesses receive waste collection service from SMCRS.
- Of these, 48 percent are dissatisfied.
- 34 percent pay for waste collection by private entrepreneurs.
- The remainder dispose of waste by dumping it in public areas.
- 57 percent are willing to pay for waste collection at an average of \$5.25 per week, or about \$.45 per employee.
- 43 percent regularly purchase recycled items, especially paper cartons and plastic containers.
- Few businesses are interested in participating in a community organization for waste management.

Industry

- All industries surveyed rely on their own means of waste disposal. Most use an old uncontrolled landfill about 25 km from Port-au-Prince.
- In terms of volume of waste disposed of within the city, industry contributes the least among the three groups.
- Industries presently spend an average of \$1.45 per employee per month for waste disposal.
- 69 percent are willing to continue to pay for private collection services at the present level.

Waste collectors

- There are only a few formal entrepreneurs with trucks in the waste collection business at present, but they expressed a great interest in expanded opportunities.
- Individuals with wheelbarrows who derive income from waste collection serve about 20 percent of households and 7 percent of businesses.

Compost

- Compost from municipal waste sources is not used at present.

- According to the survey, the potential market for compost is about 50 cubic meters per day.
- Although the market price of compost is probably less than the estimated production cost, the benefits in land reclamation and in reducing the landfill volume are significant.

CONCLUSIONS AND RECOMMENDATIONS

Present Conditions

The sorry state of solid waste management in the metropolitan area of Port-au-Prince is painfully visible. Garbage and trash pile up on the streets and in drainage canals, and even more abundantly, in ravines and open areas. This report does not consider the impacts on public health which are probably significant. In addition, waste accumulation is responsible for the blockage of drainage canals, disruption of traffic, air and water pollution, curtailment of business and industrial activities, reduction of tourism, and an overall pessimism related to a deteriorating quality of life.

SMCRS proved to be ineffective as the government agency responsible for waste management. Part of the problem is a lack of financial support from the government of Haiti, and there is no evidence that this is about to change.

Presently, the household, commercial, and industrial sectors collectively spend at least \$2 million annually for waste collection. For the household and commercial groups, payment is generally made to small entrepreneurs or individuals. There are few businesses equipped with trucks for handling wastes, but there are hundreds of individuals with wheelbarrows who collect and dispose of wastes. For the industrial and part of the commercial groups, expenditures are incurred for their own staff to dispose of garbage.

Prospects for Change

Any recommendations for improving waste management will have to include a means of financing such operations. According to the survey, there is a great willingness to pay for reliable waste collection and disposal amounting to \$20 million annually. The household sector, which presently receives only limited service, accounts for the large majority of this potential payment. Clearly, there is reason to believe that waste management could be independently funded by direct payment for services provided.

Several scenarios were considered in determining the best operation capable of managing all the wastes generated in Port-au-Prince, including the poorest neighborhoods. One scenario indicates that sufficient revenues would be generated for proper waste management to the household sector by having all income classes contribute only about one-third of what they proposed in the survey of willingness to pay. A second scenario indicates that sufficient revenues may be obtained by a progressive fee structure that requires no payment from the poorest classes.

Recycling and Composting

Recycling presently is a common practice in Port-au-Prince. Households and businesses reuse many materials and purchase recycled products. In most cases these materials (including paper/cartons, plastic containers, and building materials) are not transformed but kept intact for reuse. Discarded items, primarily in the more affluent zone, are recycled by scavengers and sold for profit. Few materials of value are thrown away and little change is needed to improve these practices.

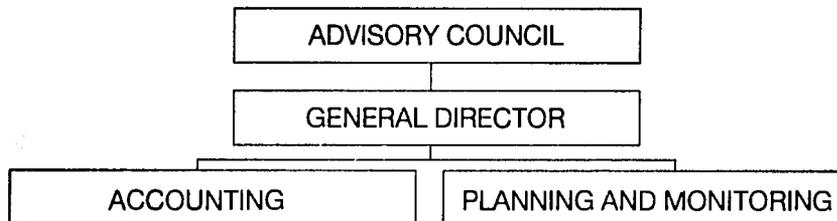
Organic materials suitable for composting, however, are indeed being wasted. In consideration of the significant need to improve Haitian soils, attention must be drawn to composting. While this report has pointed to a relatively small market for the purchase of compost, the economic benefits of improving land resources are believed to be significant and critical to the long-term future of Haiti.

Proposed Organization of SMCRS

The proposed new organization of SMCRS (shown in Figure 1) will consist of three offices—general director's office, accounting, and planning and monitoring.

Figure 1

NEW ORGANIZATION OF SMCRS



-
- **General Director.** This office will consist of personnel as shown in Figure 2. It will be headed by a director skilled in management and experienced in operation of a garbage collection and disposal system. He will be responsible for overall day-to-day management of SMCRS and for achieving required levels of garbage service throughout the metropolitan zone. He will receive guidance on policy issues and work plans from an advisory council.

Figure 2

SMCRS PERSONNEL

<i>General Director</i>	<i>Planning and Monitoring</i>
1 Director	1 Urban planner
1 Secretary	1 Engineer
2 Office support staff	1 Environmentalist
	1 Public relations/sociologist
	1 Computer/statistician
<i>Accounting</i>	8 Monitors
1 Assistant director	3 Secretaries
2 Accountants	6 Office support staff
2 Contract managers	
2 Secretaries	
2 Office support staff	

■ **Accounting Office.** The accounting office will manage the funds earmarked for SMCRS which will be generated from fees attached to either property taxes or electric bills. This office will also manage the contracts with private entrepreneurs.

■ **Planning Office.** This office will collect data and provide planning to optimize the efficiency of the system. It will monitor private sector operations and educate the public on citizens' roles in keeping the city clean. The office will be sensitive to providing quality service to customers (residential, commercial, and industrial waste producers) and maintaining a healthy urban environment. It will also be responsible for the preparation of contracts for private sector participation and the selection of entrepreneurs. The planning office and the accounting office will work together in administering the contracts.

■ **Advisory Council.** The council will provide policy guidance on SMCRS management. The council will consist of representatives from government, private sector, and community organizations with a stake in waste management. The council will consist of representatives from the following organizations:

- Ministry of Public Works
- Ministry of Health
- Mayors of metropolitan area
- Chamber of Commerce/industry
- Hotels and tourism
- Community organizations

- **Private Entrepreneurs.** Private entrepreneurs will be contracted by SMCRS to provide collection of garbage and to operate landfill and composting sites. They will be selected competitively in accordance with conditions publicly announced by SMCRS. Waste collectors will supply their own trucks and related equipment and incur all maintenance costs. They will be compensated for delivery of wastes to specified sites on a unit volume basis. These sites may be landfills, transfer stations, or compost sites. Operators of landfills and compost sites will also work under production agreements related to quantity of waste handled.
- **Operational Zones.** The metropolitan zone will be divided into about 106 collection zones which correspond to waste production quantities of 18 cubic meters daily (about 3,000 households). The collection zones are proportioned to allow waste collection by small entrepreneurs with one medium-sized (6 ton) truck. Entrepreneurs with several trucks can contract for several zones. Entrepreneurs will naturally supply combinations of trucks and other equipment based on the most efficient match for the zone.
- **Contracts.** Requests for bids will be made by SMCRS for each operational zone with transport to a specified site. Entrepreneurs selected will be given five-year contracts with unit volume fees for waste delivered to be negotiated annually.
- **Street Cleaning.** Municipal street cleaners will continue their present work by placing waste at specified collection points along the street which will then be collected by contractors.
- **Community Groups.** Community groups in *communautés populaires* which are inaccessible will be asked to place garbage at specified collection points along the street or in garbage containers along accessible streets. Citizens will necessarily carry their garbage some distance to accomplish this task. Modest fees will be paid to community groups to assure this work. (The Cooperative Housing Foundation, with funds from USAID, will provide assistance to these groups.)
- **Landfills.** At present, one official landfill exists at Truittier, but it has been closed temporarily because of neighborhood objections. It will be necessary to pave a portion (3 kms) of the road to reopen this landfill. A second landfill will be located to the south of Port-au-Prince and about half of the waste will be discharged there. If landfills cannot be sited within 20 km of the city, transfer facilities will be established to lower transportation costs.
- **Environmental Considerations.** Landfills will be selected to avoid negative environmental effects. The site at Truittier will be analyzed to determine its effect on groundwater supplies. (WASH assistance may be utilized for this study.)
- **Waste Collection.** SMCRS will establish norms of service for each collection zone depending on the character of each neighborhood (residential, commercial, industrial, governmental, and *communautés populaires*).

A collection schedule indicating specific days and the weekly cycle will be announced for each neighborhood. Customers will be required to place their waste at specified sites or in specified containers (*communautés populaires* will have

containers on trailers which will be pulled by tractors to the landfills). Collectors will be required to rigidly follow the established norms of service. In zones with heavy daytime traffic, night collection will be required. Entrepreneurs will naturally choose the most efficient means of collection since their profits are correlated to sound operational procedures.

Toxic and hazardous materials will be handled by collectors specifically contracted for that purpose. Medical waste, for example, will be collected and disposed of at designated areas of the landfill in a rigidly supervised manner.

- **Recycling.** SMCRS will encourage entrepreneurs interested in recycling. For example, contracts may be let for collecting items of commercial interest such as office paper or bottles. It is expected that most entrepreneurs contracted for waste collection will recycle all items of value.
- **Composting.** Entrepreneurs and community organizations will be encouraged to begin small-scale composting operations to serve customers needing compost for gardening. Waste from specific zones can be channeled to composting sites. Once the collection and disposal of waste is firmly established, large-scale composting arrangements will be investigated to prolong the life of landfill sites and to supply soil supplements to agriculture and reforestation projects.

Financial Analysis

Costs Included in the Analysis

Three alternatives were considered for the collection and treatment of solid waste in the metropolitan zone of Port-au-Prince. A financial analysis was completed for each of these alternatives. The following costs were included in the analysis.

- Equipment for collection and treatment including the costs of initial investment, depreciation, operation and maintenance, and personnel
- Landfills including investment costs for rehabilitation and repair of the access road at Truittier and also the establishment of a new site south of Port-au-Prince
- A transfer station was included as an alternative. The station was designed with a storage capacity for solid waste of one day's production.

Alternatives

The alternatives considered were determined as a function of the distance of the landfill from Port-au-Prince.

- Landfills close to Port-au-Prince

It was assumed that the landfill at Truittier will be utilized after the access road is paved. It was also assumed that a second site south of Port-au-Prince will be opened.

- Landfills far from Port-au-Prince

This alternative assumes the use of two landfills located about 20 kilometers from Port-au-Prince.

- Landfills located far from Port-au-Prince but with a transfer station

The transfer station was added to avoid traffic congestion and to use larger trucks which are more economical for long distance transport.

Summary of Financial Analysis

The results of the financial analysis and the cash flow for each alternative are shown in Tables 1, 2, and 3. These tables also show the “percentage collected” which refers to the proportion of waste collected in comparison to the total waste generated.

Conclusions

The relative costs for each of the alternatives are shown in the accompanying tables. If landfills are located close to the city (less than 10 kilometers), significant savings (about 14 percent) can be seen. The cost of using a transfer station does not appear to be justified under the scenario considered. The total costs naturally mount as waste collection is increased from 50 percent to 100 percent, but the cost per ton is 21 percent less which suggests that total collection should be the goal.

Table 1

**ALTERNATIVE I:
LANDFILLS CLOSE TO PORT-AU-PRINCE**

Percentage Collected	Annual Costs (000s US\$)					Cost/Ton
	Year 1	Year 2	Year 3	Year 4	Year 5	
50	4723	5030	5317	5612	5918	\$22.04
60	5283	5601	5960	6270	6651	20.52
70	5853	6184	655	96986	6428	19.48
80	6407	6737	7113	7597	8096	18.51
90	6960	7291	7766	8250	8750	17.86
100	7434	7868	8446	8934	9538	17.39

Table 2**ALTERNATIVE II:
LANDFILLS LOCATED FAR FROM PORT-AU-PRINCE**

Percentage Collected	Annual Costs (000s US\$)					Cost/Ton
	Year 1	Year 2	Year 3	Year 4	Year 5	
50	5277	5584	5871	6266	6671	\$24.54
60	5964	6282	6642	7050	7533	23.03
70	6313	6702	7077	7584	7946	21.83
80	7252	7640	8114	8597	9195	21.00
90	7805	8294	8868	9450	9948	20.28
100	8470	9058	9632	10215	12813	19.80

Table 3**ALTERNATIVE III:
LANDFILLS LOCATED FAR FROM PORT-AU-PRINCE
WITH TRANSFER STATION**

Percentage Collected	Annual Costs (000s US\$)					Cost/Ton
	Year 1	Year 2	Year 3	Year 4	Year 5	
50	5953	6514	6801	7293	7633	\$28.22
60	6889	7300	7660	8516	8932	27.93
70	7427	8227	8578	9158	9787	25.38
80	8417	9060	9411	10025	10655	24.44
90	9824	9766	10117	10990	11842	23.66
100	9830	10630	11081	11786	12526	22.93

LESSONS LEARNED

The following list is a summary of some lessons that may be useful for future solid waste management projects in Haiti or elsewhere.

- Working in a politically evolving environment is difficult and poses problems in defining project goals and determining success.
- Generating interest within the private sector in transporting wastes is comparatively easy.

- Persuading the government to let go of its role in waste collection is difficult, especially if it sees profits involved and/or jobs to be awarded.
- Selecting a mechanism for fee collection is the single most difficult decision.
- A long time period is needed to build a constituency among the government and the general public. Workshops are helpful.
- Special attention is needed for the poorest communities to assure their cooperation. Incentives are needed.
- More research is needed on economic costs of poor waste management to convince policymakers of the importance of proper management.

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CONCEPTUAL ISSUES AND EXPERIENCES IN DEVELOPING COUNTRIES

December, 1991

Sandra Cointreau-Levine

INTRODUCTION

Solid waste management is a service for which local government is responsible. The service is *nonexclusive*, meaning that once it is provided it benefits the overall public welfare, not only the residents that specifically receive service. The service is also *nonrivalled*, meaning that any resident can enjoy the benefits of the service without diminishing the benefit to anyone else (15). Beyond this, it is difficult to exclude from service those who do not pay, because it is *essential* to the public welfare (30).

These qualities of being nonexclusive, nonrivalled and essential place responsibility for solid waste management squarely within the public domain. This does not, however, mean that local government has to accomplish the task of solid waste service delivery entirely with its own staff, its own equipment, and its own monies. This is where the opportunity to involve the private sector comes in.

This paper poses the question of whether to privatize municipal solid waste (MSW) services. Government and the private sector come to this question from two entirely different perspectives. For the private sector, the fundamental mandate is whether it will make money. For government, whether it will save money through privatization is only one of many considerations. Government's considerations must necessarily adhere to known public values and address macro-economic issues beyond price of service.

Private sector participation is a possible opportunity — not a panacea. Private sector participation should be examined as a means of introducing efficiency (and thus lowering costs) and mobilizing private investment (and thus expanding upon resources available for urban infrastructure and equipment) in situations where existing service delivery is either too costly or inadequate. Despite some obvious pitfalls of privatizing MSW services, some of which are outlined below, and in light of the opportunities for cost savings, this paper provides some thoughts on when and how to involve the private sector.

CONTEXTUAL ISSUES OF PRIVATE SECTOR PARTICIPATION IN MUNICIPAL SOLID WASTE SERVICES

There are a number of macro-contextual issues which need to be addressed in developing policies and strategic plans for private sector participation in MSW services. The macro-contextual issues discussed below include those of efficiency, accountability, management, laws, finance, and costs.

Efficiency Context

According to the World Bank's *World Development Report, 1991*, public spending in developing countries is relatively high for their level of development and provides very low returns. Total government expenditure is roughly 20% of GNP in Low Income Countries and 30% of GNP in Middle Income Countries. The report asserts that there is a "need for smaller, more efficient public sectors and a more dynamic private sector". It further states that privatization "is not to be undertaken as end in itself, but as a means to an end: to use resources more efficiently." (41)

Within local governments of developing countries, expenditure for MSW service is usually from 20% to 50% of total municipal revenues. Even at such a high level of expenditure, the level of MSW service is low and only 50% to 70% of the MSW is collected. In response to this high level of expenditure and low level of service, the main argument raised for MSW privatization is that the private sector might be more *efficient* than the public sector in providing services. Private sector efficiency is said to derive from management flexibility, freedom of action, greater financial discipline, and accountability to market forces (11). Presumably, in a competitive environment, private firms must perform efficiently in order to make a profit and to maintain their position in the market place.

This argument certainly holds in places where the competitive environment is well developed. There are, for example, more than 10,000 private firms involved in MSW service within the USA, where more than 80% of the nation's MSW is collected by private firms (29). Of the USA's publicly owned MSW facilities, 7% of the landfills and 73% of the resource recovery facilities are operated by private contractors (34).

Reported efficiencies captured by the private sector in the USA, Canada, and Great Britain involved smaller crews, younger crews, lower absenteeism, lower wages, lower benefits costs, more flexible scheduling, efficient vehicle routing, better designed vehicles, managerial incentives, faster repairs, vehicle standardization, and competition (15,20,26,29,37,39).

Many of these same efficiencies are reported by developing countries which have involved the private sector in MSW services. For example, substantially lower wages and lower benefits costs have been reported for private sector collection workers in Seoul, Korea; Jakarta, Indonesia; and Bogota, Colombia — cities where a portion of the MSW collection service is conducted by private contractors. Seoul reports that government collection workers make 50% more than private sector collection workers (10,18). Bogota reports that the private sector has a new standardized fleet, while the

city is operating with an old and highly diversified fleet — factors which significantly complicate vehicle productivity. Also, in Bogota the average age of the private sector work force is about 25 years old, while the city's work force has an average age of about 40 years old (10).

Tenured government workers have traditional patterns of behavior which may limit their productivity, and which government may find difficult to curtail. For example, Bangkok, Thailand; Bogota, Colombia; and Mexico City, Mexico have reported a traditional practice of sorting out recyclable materials from the MSW while working within their assigned collection areas. The time taken for sorting activity ranges from 10% in Mexico City to 30% in Bogota and 40% in Bangkok of the time available in the collection zone (10).

In dealing with inefficiencies in government, the first response should be to determine whether they can be corrected within the public service. In other words, to build on what exists which is working, and to fix only what is not working. If the government does not have the political will to make necessary changes to improve efficiency or the workers will not accept change, it may be necessary to create a competitive environment by contracting out a *portion* of the public service. However, introducing some private sector service will produce the desired result only if there is follow-up monitoring of public versus private service delivery and feed-back into the continuous negotiations between management and labor for improvements in efficiency.

Involvement of the private sector in MSW service is not the only way of introducing competition as a means of stimulating greater efficiency. Indonesia promotes efficiency with local government MSW service by sponsoring an annual city cleanliness competition, called the ADIPURA Awards. This competition stimulates political commitment to placing a priority on MSW services.

Accountability Context

“But efficiency, at base, is merely one aspect of a more fundamental quality — accountability...The term suggests the idea of taking “into account” the consequences of one's actions for the welfare of others.” according to Donahue in his book *The Privatization Decision* (15). Government, because it represents the public at large, has a special obligation to be accountable to public values. In this capacity, each government needs to carefully weigh the decision to privatize “by the yardstick of *fidelity to the public's values*, whatever they may be. If the citizenry cares about *how* goods and services are produced, about how equitably they are distributed, about the pay, benefits, and working conditions of those who produce them, then any legitimate measure of efficiency must incorporate these concerns.” (15)

In most developing countries, MSW service involves labor-intensive street sweeping and waste collection techniques. Because labor costs are relatively low, labor-intensive techniques are appropriate. There are roughly 2,000 MSW workers for every 1 million urban residents in developing countries, with labor intensity ranging between a high of about 5,000 per million residents in some Central Asian cities and a low of 1,000 per million residents in some Latin American cities (9,48).

Local governments in developing countries often provide patronage through jobs in the MSW agency, the employment roles are bulging with extra employees, many whom work very little and some whom don't work at all. One expected outcome of privatizing MSW services is that government employment roles would be reduced. This, however, is not necessarily the case. Many of these extra employees are office clerks and assistants. After privatizing MSW service, there is seldom the political will to do little more than shift MSW workers to another department and retain most of the office employees in place. The role of government as employer needs to be weighed as part of the privatization decision, especially given the recognition that the direct and indirect costs of high unemployment are significantly borne by government.

In many developing countries, MSW workers in the private sector are paid much less than government workers, enjoy fewer vacation days, and receive fewer benefits (10,15,18,39). Because the jobs in the private sector are less secure, the MSW workers may also work much harder. The extent to which government may wish to exploit these disparities between public and private sector workers is one of the social issues involved in deciding whether to privatize.

Because government MSW workers typically have job security, the average age of the government workers is higher than the average age of the private sector workers. MSW collection is an arduous job. In developing countries, an average collection worker will lift and load from 1 to 2 tonnes of MSW daily. Studies in the USA have shown that an older work force is less productive than a younger work force, and comments from solid waste managers in developing countries indicate that the same is true for them (10,37). This raises a social issue, especially for labor-surplus countries wherein these essentially older unskilled workers might not have other work opportunities available to them if they are fired from the MSW service.

After the turn of the 20th century, labor unions came into being in industrialized countries. The impetus for their creation was a response to an unrestrained free market economy which rested heavily on the exploitation of unskilled workers, including child labor. Through this self-organization of labor into a collective bargaining power were working conditions and wages upgraded. In turn, labor unions contributed to the development of a major middle class in industrialized countries, within which many of the people are skilled and unskilled laborers.

Much of the privatization push in major cities of industrialized countries, as well as many of the cities in Latin America, is a reaction over restrictive labor practices which limit productivity and an attempt to weaken the power of labor unions. While it is clear that, in many cases, the unions' requirements are limiting productivity and escalating costs, it is doubtful whether "union busting" is the way to solve this problem. Introducing private sector involvement in just a portion of MSW service area might be enough to further negotiations with labor unions and obtain a reasonable level of cooperation. Given that a first principle of most developing countries is to promote the evolution of a middle class, governments need to examine how to conduct privatization in a manner which does not widen the gap between the rich and the poor.

One reason why local governments are anxious to privatize is that they see it as a way to avoid accountability. MSW service is highly visible and uncollected waste generates strong sentiments among constituents. After privatizing, government is prone to point a

finger at the private sector whenever citizens are unhappy with the service being received. Because MSW is a complex service involving daily optimization of vehicle and labor productivities, bureaucrats may long to escape dealing with it and take an arm's-length approach by privatizing (15).

Management Context

One of the most frequently cited advantages of the private sector over government is its management flexibility. Private sector management has greater ease in firing personnel for nonperformance and providing upward mobility for workers with good performance. Also, the private sector is not constrained to government hours and overtime constraints. This has been an important factor in the privatization of services in Bogota, Colombia. There, the city's MSW collection workers have a union contract for a 6.5 hour work day, with overtime at double salary for any extra hours of work. Because the difficulty with obtaining authorization for overtime pay, the city is constrained to being able to collect only one full load per daily shift. On the other hand, the private sector operates on an 8 hour daily shift basis. Bogota is privatizing MSW collection — one zone at a time — and continues trying to obtain enough cooperation from the government union to be able to provide efficient service in the remaining publicly served zones (10).

Studies of how best to achieve efficient MSW management have shown that low costs happen in cities where the span of management between manager/supervisor and worker is appropriate. When the span of management is too high, there is inadequate supervision of workers and worker productivity is low. When the span of management is too low, there is adequate supervision of workers but the supervisor productivity is low. Both extremes lead to unnecessarily high costs. Ideally, in order to obtain low cost service, the span of management for MSW collection systems should be about 1 supervisor for every 4 MSW vehicle crews (37). Most MSW agencies in developing countries have a span of management of about 1 supervisor to every 20 to 50 MSW crews. Also, government often provides inadequate salaries for supervisory positions, which makes it difficult to obtain qualified supervisors (32,38). If the private sector has greater ability to implement more appropriate management practices than government, there is obvious room for cost reduction through privatization.

Staffing ratios are important in maintenance as well as supervision. Ideally, there should be 1 mechanic for every 4 to 5 MSW vehicles (37). Most MSW agencies in developing countries commonly have 1 mechanic for every 10 to 15 vehicles. In addition to this problem, repair operations in developing countries are bogged down with burdensome bureaucratic procedures which dramatically increase the downtime of MSW vehicles. For a spare part to be purchased it typically takes 2 to 4 days to obtain the necessary quotations from suppliers and submit the lowest quote to higher authority for approval. Most vehicles are down for 3 to 6 days for relatively minor repairs. If the part has to be ordered from foreign suppliers, the vehicles are down for 3 to 6 months. For efficient MSW service, no more than 20% of the equipment should be out of service at any given time (37). However, in most developing countries, typically 25% to 50% of the operable fleet is down. Maintenance and repair service is one area where the private sector has typically been able to perform very effectively. Vehicles in private sector MSW fleets are seldom down for repair service for more than a half day.

Finance Context

Developing countries are hard pressed to obtain enough capital to finance their solid waste systems and burdened with political constraints limiting their ability to generate revenues. Privatization is one way to secure private sector finance of equipment or facilities, in return for contracts to provide service. The private sector might also be able to access capital from international capital markets (11).

But at what cost? In many developing countries, government can borrow at substantially lower interest rates than private firms; they are exempt from paying property tax on their facilities and equipment; they commonly can import machinery, spare parts, and even technical assistance without paying custom duties; and they can provide a service without paying VAT (value added taxes) (2,11,38). These costs which government avoids are eventually passed on to the public, and can be viewed as hidden subsidies to government. Prior to privatizing, government needs to analyze carefully the hidden costs of government service, through the hidden subsidies discussed above, versus the more transparent costs of private sector financing and ownership.

When MSW service is rendered by public means, there are costs related to political exploitation. These involve hidden costs of patronage and political manipulation of the purchase of equipment and facilities. On the other hand, awarding and administering contracts with private firms also provides “numerous opportunities for political manipulation” (38). This issue is particularly true in developing countries wherein governmental procurement regulations typically limit the term of contracts to one year, because of a reluctance to commit funding beyond the current budget. Every year the need for contract renewal is revisited and the opportunities for exploitation reappear. Costs, in the form of directly unproductive profit-seeking (DUP), to the economy at large include not only the transfers made to bureaucrats, but also the costs of lobbying (33).

Through privatization, because of restrictions on revenue generation which some local governments face, it is possible to arrange for direct user charges to cover costs. Most developing countries tend to privatize MSW service for the areas wherein there are predominantly upper income households and successful commercial establishments. If private service costs are covered directly by and matched to user charges within the service area, the opportunity is lost for government to source these wealthier residents for cross-subsidy of service to poorer residents. In the worse case scenario, the government contracts for this service and the cost recovery paid to government is less than the cost of the service — leading to a hidden cross-subsidy from poorer residents to cover the service for wealthier residents (35, 18).

The issue of cross-subsidy goes further still when one considers that there is commonly a tax paid to central government on income or profit which a private firm reports. The taxes collected by central government from private firms in one local jurisdiction do not necessarily return to that same jurisdiction. Intergovernmental recurrent transfers involve extensive nontransparent subsidies between taxpayers of different local government jurisdictions, and make up more than half of municipal revenues (7,14).

Legislative Context

Laws dramatically influence private sector in its assessment of whether to become involved in provision of MSW services. Reputable private companies want to have “a level playing field” in which they can compete fairly and without risk. For example, before they invest in building, owning, and operating a sanitary landfill for public use, they will want environmentally sound disposal to be required by law and for unsafe disposal practices to be penalized. Before spending money on development of bid documents in response to government procurements, they will want assurance that government will follow procurement regulations governing fair competition.

Few developing countries have private companies with expertise in MSW management. For foreign firms to take an interest in participating in MSW service in a developing country, an attractive environment for foreign investment needs to be created. Many developing countries have laws which restrict foreign ownership to only a minority share, but not do provide protection against liability if a local partner in the joint venture fails in performance. Laws in many developing countries restrict ownership of indigenous land or other property, limit immigration of foreign professionals needed for technology transfer to the local counterparts, prohibit repatriation of profit and repayment on investment capital, and demand high compensations to be paid to workers which are fired for non-performance or at the end of a contract period (2,10). At the same, there are few, if any, laws protecting a private firm from nonpayment by government for services rendered.

Institutional Context

Privatizing some aspects of MSW service delivery does not in any way take away the need for local government to be fully responsible for MSW service. For local government to effectively privatize some of its services, it would need to be strengthened (5). Only a local government organization with competent professional staff and adequately designated authority commensurate with responsibility would be fully able to develop, negotiate, manage, monitor, and enforce a competent contract instrument. If local government does not have political leadership with the will to upgrade and professionalize the staffing of the MSW agency as part of a decision to privatize MSW services, it is doubtful whether the private sector will be obliged to deliver service at a low cost.

Beyond the strengthening of local government, there are obvious needs to strengthen central government to deal with the contextual parameters raised above. According to the World Bank's *Urban Policy and Economic Development — An Agenda for the 1990s*, central government needs to “establish expectations of local performance” and “retain some degree of oversight to ensure accountability over some areas of local decision making” (7).

Some issues that are directly related to enabling privatization to realize low costs can be dealt with only at the national level. These issues include minimization of risks related to environmental regulatory changes, national inflation, currency convertibility, fuel prices, pricing policies, import bans or quotas, and taxes. These also include provision

of appropriate incentives such as guarantees for any borrowings, assumption of foreign exchange risk, tax incentives, customs duties exemptions, and special lines of credit (2,3,11,34).

Cost Context

And what is a “low cost”? At first glance, a low cost for service delivery by the private sector would be lower than the cost for government service. After government costs to monitor the performance of the private sector are added, a low cost for service delivery by the private sector would be still lower than the cost of government service. But what are the costs for government service? Accounting systems in most developing countries show cash flows rather than accruals, with no clear delineation between recurrent and capital expenditures. Also, there is no attempt to aggregate MSW costs incurred by the various agencies participating in the system. Furthermore, there is typically no attempt to keep track of depreciation, debt service, personnel benefits, land acquisition and human resettlement costs within the MSW accounting system. The result is that most developing countries believe their costs for MSW service to be less than 50% of what they really are.

Because costs are so little known in developing countries, the following paragraphs provide a review of costs. The primary reason for government to privatize is to save money. The costs provided below provide a framework to determine which parts of the MSW service incur the highest costs. Because most of the MSW expenditure is for collection, this should be the first service to examine for privatization opportunities.

A secondary reason for government to privatize is to obtain private sector financing. The costs below provide a framework to determine which parts of the MSW service require the greatest capital investment. Because MSW disposal and transfer systems are more capital-intensive than the collection and sweeping systems, these should be examined for privatization opportunities, recognizing the pitfalls outlined above which explain the higher cost of capital when provided by the private sector.

COSTS OF MUNICIPAL SOLID WASTE MANAGEMENT

In most cities within developing countries, MSW management costs consume from 20%-50% of municipal revenues. Despite the high level of expenditure made on MSW management, collection service levels are low, i.e., only 50 to 70% of urban residents receive service and most disposal is by unsafe open dumping.

Waste Generation and Income. The waste generation rates in developing countries are substantially lower than the rates in industrialized countries. However, the waste generation rates are not proportionally lower relative to income. Waste generation rates in developing countries are roughly 30% to 50% as high as those in industrialized countries, while the income levels are 2% to 10% as high, as indicated below (8).

	<i>Low Income Country</i>	<i>Middle Income Country</i>	<i>Industrialized Country</i>
MSW Quantity Tonne/capita/year	0.2 T	0.3 T	0.6 T
Average Income \$US/capita/year (in 1988 \$US)	350 \$/c/yr	1,950 \$/c/yr	17,500 \$/c/yr

MSW service consumes a higher share of income in developing countries than it does in industrialized countries. While labor costs are lower in developing countries, the purchase price of equipment is typically higher and fuel costs are greater. Also, for economic reasons, most residents do not discharge their wastes in easy-to-unload containers at convenient curbside locations.

Collection Costs. Approximately 95% of the MSW costs in most developing countries are attributable to collection and street sweeping. On the other hand, in industrialized countries, approximately 70% of the MSW costs are attributable to collection. For comparative purposes, the following collection costs (including all capital, debt service, operating, and maintenance costs) have been estimated by the author, based on municipal solid waste collection conditions observed in a wide range of countries in different regions of the world.

	<i>Low Income Country</i>	<i>Middle Income Country</i>	<i>Industrialized Country</i>
MSW Collection \$US/tonne	15 - 30 \$/T	30 - 70 \$/T	70 - 120 \$/T
% Capital	40%	30%	10%
% Labor	15%	40%	70%
% Other O&M	45%	30%	20%
MSW Collection \$US/capita/year	3 - 6 \$/c/yr	9 - 21 \$/c/yr	42 - 72 \$/c/yr
Collection Cost As a % of Income	0.9 - 1.7 %	0.5 - 1.1 %	0.2 - 0.4 %

Cleansing Costs. When citizens litter indiscriminantly and collection services are inadequate, a lot of waste accumulates in streets and on open lots. The costs for cleaning up these areas can be very high. The costs/tonne of public cleansing (including general clean up of open areas and street sweeping) are 2 to 3 times the costs/tonne of collection. The obvious way to minimize the expenditures required for street sweeping is through (1) public education, inspection, and enforcement of laws regulating citizen

behavior; and (2) adequate provision of collection service to all residents. For purposes of this discussion of municipal solid waste management costs, it would be reasonable to assume that a well-run city in a developing country would have no more than 10% of its total waste quantity collected through public cleansing and a well-run city in an industrialized country would have no more than 5% of its total waste quantity collected through public cleansing. Assuming that the costs/tonne are roughly 2 times higher, the costs for public cleansing are estimated below.

	<i>Low Income Country</i>	<i>Middle Income Country</i>	<i>Industrialized Country</i>
MSW Cleansing \$US/tonne	30 - 60 \$/T	60 - 140 \$/T	140 - 240 \$/T
% Capital	30%	20%	25%
% Labor	40%	70%	65%
% Other O&M	20%	10%	10%
MSW Cleansing \$US/capita/year	0.6 - 1.2 \$/c/yr	1.8 - 4.2 \$/c/yr	4.2 - 7.2 \$/c/yr
Cleansing Cost As a % of Income	0.2 - 0.3 %	0.1 - 0.2 %	0.02 - 0.04 %

Disposal Costs. If environmentally safe disposal were required, the most cost-effective technique for most cities in developing countries would be sanitary landfill.

Incineration is not technically viable because moisture contents are too high (i.e., typically between 45% and 85% moisture) and calorific contents are too low (i.e., typically between 900 and 1300 kcal/kg lower heating value). Refuse derived fuel technology is not viable because content of combustibles is too low (i.e., paper, plastic and textile typically constitute less than 25%). Compost is technically viable because the content of vegetable/putrescible material is high (i.e., typically more than 40%); however, the market is very poor because most farmers exist at subsistence levels and cannot afford to cover the cost of composting and transport of the compost product.

Because sanitary landfill design standards in industrialized countries impose strict requirements for environmental protection, the costs are substantially higher, yet do not require a larger fraction of per capita income for cost recovery. Sanitary landfill costs would generally fall within the ranges shown below.

	<i>Low Income Country</i>	<i>Middle Income Country</i>	<i>Industrialized Country</i>
MSW Disposal \$US/tonne	1 - 3 \$/T	3 - 10 \$/T	20 - 50 \$/T
% Capital	55%	50%	40%
% Labor	10%	20%	35%
% Other O&M	35%	30%	25%
MSW Disposal \$US/capita/year	0.2 - 0.6 \$/c/yr	0.9 - 3.3 \$/c/yr	12 - 30 \$/c/yr
Disposal Cost As a % of Income	0.05 - 0.2 %	0.05 - 0.2 %	0.05 - 0.2 %

Transfer Costs. In order to locate a suitable site for sanitary landfill, it may necessary to look beyond what would be viable transport distances for collection trucks. Generally, sanitary landfill costs, even when the costs for implementation of transfer stations and long distance haul in transfer vehicles are added, are substantially lower than other disposal techniques. Costs for transfer systems tend to fall within the ranges outlined below for various countries.

	<i>Low Income Country</i>	<i>Middle Income Country</i>	<i>Industrialized Country</i>
MSW Transfer \$US/tonne	3 - 5 \$/T	5 - 15 \$/T	15 - 20 \$/T
% Capital	65%	50%	35%
% Labor	10%	25%	45%
% Other O&M	25%	25%	20%
MSW Transfer \$US/capita/year	0.6 - 1.0 \$/c/yr	1.5 - 4.5 \$/c/yr	9.0 - 12.0 \$/c/yr
Transfer Cost As a % of Income	0.2 - 0.3 %	0.1 - 0.2 %	0.05 - 0.07%

Recycling Costs. Recycling can lessen the cost burden for collection and disposal of MSW. Source separation of recyclable materials, such as paper, glass, metal, and plastic, if followed by collection by private sector recyclers, can lead to a reduction in the waste quantities which the local government would have to collect and dispose. In low-income developing countries, recyclable materials comprise about 15% of the MSW stream. As an economy improves, residents are likely to consume more goods

with packaging and to generate more wastes. In middle-income developing countries, recyclable materials comprise about 30% of the MSW stream.

The above information provides some contextual and cost framework for resolving the question of whether to privatize selected MSW services. The next section discusses the various methods of privatizing.

PRIVATE SECTOR ARRANGEMENTS

For purposes of this paper, the types of privatization most common to solid waste management will be discussed, namely: contracting, franchise, concession, and open competition.

Contracting

MSW Collection Contracts. The greatest opportunity to privatize lies in having private firms provide collection service under contract with the local government. As noted by John D. Donahue in his comprehensive book on privatization in industrialized countries: "One key is the absence of barriers to entry. The service involves low economies of scale, technological simplicity, and moderate investment costs" (15). It is feasible for local firms with modest financial resources to enter into the business of solid waste collection. Study of privatization in Latin America showed that most of the firms were small to medium sized, indicating that there were virtually no barriers to entry (5). In Seoul, Korea, approximately 35% of the MSW is collected by 85 private contractors, each of which is a relatively small firm with an average of 6 vehicles (10).

Contracting for solid waste service holds real promise to developing countries as a way of lowering costs. In studies conducted in the USA, Canada and England, it has been well documented that contracting of solid waste collection service can be from 20% to 48% less costly than public service (15). In computing costs, it is important that the costs for monitoring the private sector be included in the analysis. The cost of monitoring has been estimated to average roughly 25% of overall costs (18).

Competition is the key to getting low cost solid waste service from private contractors. This was recently demonstrated in San Jose, California, USA. San Jose has had private collection and disposal of wastes for many years. In 1984 they re-examined the prices they were paying and decided that they might lower their costs of waste management by actively increasing competition. They focused attention on helping a competitive waste management firm develop a new landfill site, so that there would then be two private landfills owned by competing firms in the San Jose area. They also separated the procurement of disposal services from collection services. Furthermore, they contracted for disposal and collection by area, so that it would be possible to have more than one disposal contractor and more than one collection contractor for the city. In 1986, the disposal contract costs were 33% lower than what had been paid in the previous year and the collection contract costs were 23% lower. Over a 6 year contract period this amounted to savings of \$25 to \$31 million (20).

Bangkok, Thailand has been experimenting with private contracting of collection service. In 1987, Bangkok contracted for service of three districts. Costs for the

contract service appear to have been lower per tonne than costs for public service, and the private service was considered to be of adequate quality. However, there were some problems in measuring the output of the contractor correctly, and the cost differences between the private and public service were probably less than reported. In 1988, Jakarta, Indonesia began to experiment with private contracting, contracting for collection 261 sub-districts (10% of Jakarta's waste shed) (28). Jakarta has had problems in determining the true costs of public service and thus determining whether privatization has brought about savings. However, residents in the neighborhoods being served by the private sector expressed satisfaction with the quality of service and the price they were paying (10).

Contracting Transfer and Disposal. Contracting is a viable means of securing service so long as it is possible to adequately describe the outputs anticipated from the contract. Therefore, contracting is well suited for discreet activities within the solid waste system, such as the operation of a transfer station or sanitary landfill. In Caracas, Venezuela, a private firm operates the city's transfer station under contract with the solid waste organization (48). Similarly, in Buenos Aires, Argentina, and Bogota, Colombia, private firms operate the sanitary landfills under contract with the solid waste organization (5,10).

Leasing. Contracting to lease equipment, rather than to obtain service, is one way of obtaining equipment when the opportunity to borrow money for a capital investment is limited. In Santa Cruz, Bolivia, 70% of the solid waste collection fleet is leased from private firms. The firms provide the vehicles, as well as the drivers, fuel, and maintenance (48).

When leasing equipment from local private owners, one has to take whatever is available. In developing countries, the available equipment for solid waste service leasing typically has been fully depreciated during private sector use in construction or haulage. Most leasing involves open tipper trucks or bulldozers which are readily available from construction contractors, especially in recent years when construction activity has declined in most developing countries. Until this year, Metro-Manila has been heavily dependent on leased trucks for use in solid waste collection. In 1989, private contracts provided, through leasing agreements, 76% of the solid waste collection fleet (i.e., 432 open tipper trucks). Because the trucks were old, it was typical for 30% of the fleet to be down for repairs on any given day (10).

Because solid waste collection is most efficient when appropriately designed vehicles are used, leasing of trucks from the open market is not generally recommended. To respond to this issue, the Cleansing Department of Jakarta, Indonesia, recently developed plans to purchase and lease appropriately designed solid waste collection trucks to qualifying contractors (44). To encourage the contractors to provide optimum operation and maintenance of the vehicles, and thus ensure the delivery of service over the long term, contractors will be entitled to assume ownership of the vehicles after a five-year lease period. While this arrangement holds promise toward development of the private sector, it is argued by some that the same outcome might have been more efficiently and quickly accomplished by providing finance to the private sector through a local development bank (11).

Public/Private Competition. Because public systems are often plagued by excessive people on the roles, old and inappropriate equipment, cumbersome procurement procedures for spare parts, inflexible work schedules, limitations on management changes, limited numbers of overseers, and strong worker unions, it is difficult for the public service to implement the changes necessary to match the efficiency of the private sector. Nevertheless, it has been shown that when the public service agency is placed in competition with private contractors and the public service agency is allowed to make the necessary adjustments to become competitive, the public agency has been able to attain costs comparable to the contractor's costs (15).

For this reason, the ideal arrangement may be a mix of public and private service — for example, contract for the collection of solid waste from some zones of the city, while retaining public service to the remaining zones. This is the way that Bangkok, Thailand, has approached private contract service of MSW collection in some districts. It is also the way that Bogota, Colombia, has recently contracted for MSW collection in 2 zones covering 40% of its service area. In Bogota, the competition between the private and public systems has led the city to streamline its roles by 30%, largely through attrition of unproductive office employees. It is also the basis for continued negotiations with the government labor union over work schedules, overtime pay, and worker performance requirements for collection workers (10).

When a mixed public/private system was put into place in Minneapolis, Minnesota, USA, in 1970, the city crews were initially more costly than the private contractors. However, after five years, the city's costs dropped toward the costs of the private contractors and the quality of service provided by the private contractors raised toward the standard set by the city crews (15). With a mix of public and private service, the natural tendency is to make both the public and private service providers more accountable. As a result, the public organization is motivated to become more efficient and the contractors recognize that the city can not be held hostage to cartels, monopolies, or collusion.

Phoenix, Arizona, USA, maintains a balance of public and private MSW collection service, which it believes is the foundation of preserving cost effectiveness. The city is divided into 5 zones for contracts of 7 year duration. At the time of tendering, the city competes with private companies. The private firms with the best offers are awarded contracts, and the city has always been able to maintain collection of at least 2 of the remaining zones (11).

Contract Specifications. In order to get competition, a key factor is a good tender document — one which recognizes the abilities and limitations of the local private sector and enables them to bid competitively toward providing an acceptable standard of service.

Because there has been extensive use of contracting as the primary mode of privatizing in the USA, there is substantial guidance available. Contracting issues are discussed and a model contract is provided in the excellent book entitled *Solid Waste Collection Practice* which was written by the American Public Works Association (38). Model contracts are also available in the USA from the National Solid Waste Management Association, whose members are predominantly private contractors, and the Solid

Waste Association of North America, whose members are largely from municipal government (22,23).

Monitoring. Monitoring performance of the private sector is very important. In general, costs for monitoring amount to 10 to 15% of the contract costs (37). Complaints about MSW service should be received by the local government, even when MSW service is being provided by private firms (37). Singapore has set up its complaint bureau for receipt of complaints about all public services. The central complaint bureau processes each complaint with the appropriate government agency and follows up on whether the problem resulting in the complaint has been adequately addressed, a process which they feel increases the accountability of each government agency (10).

In Kuala Lumpur, monitoring includes comparing the efficiency of the public service with the private contractor. They found that the private firms made more trips per vehicle per day and collected more waste on each trip. The result was that the private firms collected 8.5 tonnes/vehicle/day while the public service collected 5.7 tonnes/vehicle/day. In Hong Kong, at the privately run transfer station, monitoring includes 6 full-time inspectors from the local government. Operations are continuously observed and regular readings of pollution levels (e.g., noise, dust, odor) are made. In addition, the weigh-bridges at the transfer station are computerized and linked to the central computer in local government, so that all data on incoming and outgoing loads is immediately available to local government for performance monitoring (10).

In Bogota, Colombia, 2 private contractors service about 40% of the city's households and establishments, while the local government services about 55%. The city has hired a private company of consulting engineers to monitor both the public and private service delivery and provide a monthly report on performance by each. The cost of the monitoring contract amounts to 2.5% of the cost for contracting with the 2 private firms.

Length of Contract. For low costs to be achieved by contracting, it is generally agreed that the contract should have a long enough duration to enable the private sector to depreciate capital expenditures for appropriate equipment. In MSW collection contracts, given that collection vehicles have an economic life of 6 to 8 years under one shift utilization and a life of 4 to 5 years under intense utilization, the length of contract should be at least 4 years. In a well developed market where substantial competition and privatization already exists, the issue of length of contract is less important because a private firm can sell its collection vehicles to other contractors if their contract is not renewed. However, few developing countries are at this stage and length of contract is an issue to consider.

Many developing countries have limits on whether local government can contract beyond its current fiscal year and commit funds beyond its current budget allocation. As a result, the contracts for collection in Seoul, Korea are for one year only. For political reasons, some cities have contracts which have less than a year of duration (10). For example, the MSW collection contracts in Surabaya, Indonesia and truck leasing contracts in Manila, Philippines are for a 3 and 6 month periods, respectively (10,28).

Franchise

Local governments own all waste within their boundaries, once it has been discharged for collection and disposal. A local government has the authority to give exclusive franchise to qualified private firms for the right and responsibility to provide service to customers in various zones under its jurisdiction. In return for such an exclusive franchise, the private firms pay a license fee to the government. The firms subsequently charge their customers appropriate fees to cover the costs of service.

The fees charged may be regulated by ceilings fixed by municipal ordinance (38). Local government retains responsibility to monitor the performance of the private firms, including some regulation of user charges, and retains the right to renew or revoke licenses in accordance with pre-established criteria.

MSW Collection by Franchise. Franchise is applicable to solid waste systems because economies of service are attainable only when collection is done along a contiguous route or within an exclusive zone (15).

In contracting, the private firms are paid by local government from general revenues or through monies raised by direct user charges. On the other hand, in the franchise system, private firms must individually bear the cost of billing and collecting user charges. The cost of this is estimated to consume about 15% of revenue, and is one of the reasons why franchise does not usually result in the same low costs as contracting (15,37).

In 1988 the Lagos State Waste Disposal Board divided the city of Lagos, Nigeria, into zones and gave selected contractors the franchise to collect industrial wastes from these zones. The private firms cover their costs from collection of fees from their industrial clients, and the Board makes an income to cover its duties of monitoring and management.

Franchise is popular in cities in the USA, particularly with regard to collection of wastes from large generators such as large commercial establishments (i.e., hotels, department stores) and large industries. For example, New York City subdivides its metropolitan area into several franchise service areas and the private contractors have exclusive rights to service the large generators within their areas.

Franchise is also popular in small towns in the USA, where residents have the option of hauling their own waste to the local landfill or reaching a service agreement with the firm having the franchise. In the case of small towns, there is limited political clout for obtaining low cost service and residents can carry a high cost burden as a result.

Informal Sector MSW Collection. It is possible to work with community groups, nongovernmental organizations (NGOs), and cooperatives for conduct of solid waste services. This is particularly true with regard to service of low-income neighborhoods and recycling of secondary materials.

The informal sector provides waste collection services to low-income neighborhoods in many developing countries, especially in Latin America where government MSW service has not been able to keep pace with the huge influx of rural immigrants to the

cities marginal zones. It is common to see these areas served by individuals with donkey carts or old dump trucks. The unfortunate problem is that, because these informal sector collectors do not have equipment to travel far to the official landfill and they are also outside of the officially sanctioned system, they are prone to dump MSW illegally. In 1988 in Barranquilla, Colombia, there were more than 600 clandestine dumps, many of which were created by informal sector collectors using donkey carts. For this reason, it is worthwhile for government to explore organizing these collectors into a cooperative and developing a franchise arrangement where the rights *and* responsibilities of the informal sector collectors are defined.

In Indonesia, cities commonly work with the local leader of low-income neighborhoods to organize community efforts for self-delivery of waste to a communal depot or to hire and manage the neighborhoods workers who provide door-to-door collection by push cart. The local leader collects fees from residents to fully cover the neighborhood costs (e.g., salaries, supplies and equipment replacement) and keep the neighborhood system self-sustaining. The cities participate by sending trucks to pick up the portable roll-on containers and transport them to landfills to be discharged (10,21,44).

In Cairo, Egypt, an informal sector MSW collection system involving 12,000 workers has existed for the past century. The private collectors are part of a single community, known traditionally as the Zabbaleen. Over the past century, the private collectors provided collection free-of-charge to residents of upper-income neighborhoods, in return for the opportunity to recover and recycle the materials present in the wastes. For their livelihood, the private collectors sold recovered paper, plastic, glass and metal to manufacturing plants for recycling, and they raised pigs on the recovered organic wastes. Unfortunately, there was no incentive for the private collectors to provide collection from lower-income neighborhoods, as the waste from these neighborhoods did not have much recyclable material content.

With the assistance of local volunteer organizations and financing from the World Bank, the private collectors were provided with upgraded collection equipment so that they had the capacity to provide more service. They were also given assistance in networking with the residents of the lower-income neighborhoods so that private collection service arrangements could be developed. The outcome was the extension of private service to lower-income neighborhoods in return for payment of user charges by the residents. The basis of the charges was established so that the system could be self-sustaining.

Concession

Under concession arrangements, the private sector finances and owns (for period of time sufficient to depreciate investments and provide a reasonable return to the equity investors) MSW facilities (3). In return, the government typically grants and enables access to a specified quantity and quality of MSW and provides some form of “tipping fee”. In cases where government is the only purchaser of the product or output service of the concession, it will normally be required to enter into a binding long term agreement to purchase on a “take or pay” basis (3). The concession agreement might specify performance standards, methods of judging performance, penalties for delay or

nonperformance, risk assignment, insurance requirements, dispute resolution, standards for worker safety and health protection, and environmental protection standards (34).

Build, Own, Operate and Transfer (BOOT). Many developing countries are quite keen on the BOOT arrangement of privatization. BOOT involves the private sector in building, owning, operating and, after a pre-specified number of years, transferring infrastructure. They see the BOOT arrangement as a means of having the private sector finance facilities whose ownership will eventually be transferred over to government.

Hong Kong and a private firm reached a BOOT agreement several years ago for construction and operation of MSW transfer facilities (i.e., a transfer station and fleet of transfer trucks). Several firms were pre-qualified based on their prior experience in designing and operating transfer stations. The government's bidding document specified technical performance requirements (i.e., on-site storage, vehicle washing, compaction, and through-put requirements), environmental performance requirements (i.e., noise and odor detection at the station's perimeter, wastewater treatment, bird and rodent control, and air emission standards), equipment and building maintenance requirements, and equipment replacement schedules. The station is now built and operating. The government makes regular inspections to determine whether all of the contract performance specifications are being met (10).

BOOT agreements require meticulously developed specifications. Most importantly, they outline the regular maintenance requirements which the private sector must provide to the facilities as well as the final condition in which the facilities must be presented to the local government at the time of ownership transfer. Without such specifications, one could well anticipate that the facility would have a planned obsolescence matching the schedule for transfer (3,11).

Build, Own and Operate (BOO). A private firm, through turnkey contracting, may build, own and operate (BOO) a facility which provides solid waste service, such as transfer, disposal or resource recovery. Such turnkey contracts became a popular means of financing major resource recovery projects in the USA, where about half of the waste-to-energy plants are privately owned (17). Private ownership in the USA was encouraged by financial incentives established by the central government, including tax benefits and opportunities for accelerated depreciation (13).

BOO is not as popular with developing countries, because the private sector does not eventually transfer ownership of facilities to government. However, for many reasons, this is a much better arrangement to pursue for the following simple reason. If the private sector is willing to build, own and operate a MSW facility, it indicates that the fundamental risks and economic benefits have been satisfactorily managed to create a real-world market opportunity.

Surabaya, Indonesia and a private company reached a BOO arrangement about 25 years ago for implementation of a composting facility. Unfortunately, there was not adequate quality control of the MSW quality delivered to the facility by the local government nor adequate development of markets by the private sector. Also, the private firm did not choose the most appropriate technology for the local conditions. Given Indonesia's very low labor cost, a labor-intensive composting technique should have been built,

rather than a mechanized technique. Finally, under more favorable BOO arrangements, the firm would have received a tipping fee from the city which would have been priced to cover costs which might have otherwise been incurred for comparably safe disposal. The firm struggled along from many years but is presently not operating. For BOO arrangements to succeed, they need to be as carefully developed as BOOT arrangements.

In Buenos Aires, Argentina, a cooperative operates a composting operation on a site provided by government. The government pays a small tipping fee for the waste which the cooperative receives. To assist the cooperative with marketing, government encouraged privately owned trucking companies hauling fresh produce into the city to return to the agricultural area via the compost plant, and thus return to the farms with compost (11).

Build and Sell (BS). The most common way of obtaining major MSW facilities in developing countries has been the BS arrangement — build and sell. The BS arrangement has been implemented with embarrassing results in most developing countries. It is not a concession arrangement, but it doesn't actually fit well within any other definitions of privatization methods discussed in this section.

Most BS arrangements have originated from unsolicited proposals from a single vendor with unsupported claims that their techniques would capture the “gold in garbage” and lead to substantial revenues from sales of recovered resources (e.g., compost, steam, electricity). Unfortunately, the normal step of city-wide master planning and feasibility study to determine the most viable waste disposal option is often skipped or its results are ignored when decisions are made to enter BS agreements. Also, no attempt to review competitive alternatives or receive competitive bids has occurred.

As a result, BS arrangements have led to costly facilities which serve as little more than urban sculpture — impressive structures which can not and do not function. The examples of such urban sculptures standing idle in developing countries are too many to list, but to mention a few: the refuse derived fuel plant in Seoul, Korea; the composting plant and incinerators in Lagos, Nigeria.

MSW Recycling Concessions. Purely for the self-serving reason of reducing its work load and cutting its costs, if not for any more humanitarian and environmental reasons, local governments should do everything possible to encourage recycling from the source by private sector initiatives. The best way to encourage recycling is to provide financial incentives (e.g., low cost loans, loan guarantees, tax exemptions) and set up concession arrangements with the private sector, including the informal sector waste pickers.

At the heart of recycling is the buy-back center. The buy-back center purchases recyclable from individuals, processes them to meet industrial requirements, and sells them to industry. Because their buy-back activity could lead to significant reductions in the quantity of waste which the government has to collect, the government should be willing to provide them with financial support. For example, in New York City, New York, USA, buy-back centers are given a payment for every tonne of waste which they can demonstrate is recycled back to industry and, therefore, saved from land disposal.

Buy-back centers in most developing countries are purely market driven and receive no government support. Their profits are solely based on the difference in price received from industry versus the price paid to individuals (e.g., dumpsite waste pickers and door-to-door waste collectors). Unfortunately, until governments in developing countries stop open dumping and perceive that there is a cost associated with disposal, it is unlikely that they will give buy-back centers the equivalent of a “tipping fee” for every tonne recycled and thus diverted from disposal. However, in recognition of the savings in MSW collection costs which buy-back centers cause when they recover wastes directly from the source, local governments ought to provide some form of financial incentive.

In some cities of developing countries, there is a little competition among buy-back centers, because there is little competition among industries or because access to the waste is politically manipulated by local government officials. In these cities, the prices paid for recyclables are controlled and very low. As a result, the waste pickers enter a patronal relationship with one buyer and become highly dependent on that one buyer (36). During times of hardship, the waste pickers may need to borrow money from their patronal buyer and (because of the subsistence levels at which they are working) may remain forever indebted.

In other cities, where there is extensive competition among the buy-back centers and free access to the waste, the waste pickers can make a viable income. In Bangkok, Thailand, for example, where the free market is relatively well developed, there were in 1988 about 1,000 licensed buy-back centers. Competition in Bangkok is significant and earnings achieved by waste pickers and government MSW collection workers whom recycle are substantial.

In many cities of the developing world, there is a large workforce informally employed in waste picking at city dumps. There are, notably, about 8,000 waste pickers at the dumps of Jakarta, Indonesia, 10,000 in Mexico City, Mexico, and about 7,000 in Metro-Manila, Philippines (10). On the surface, friction exists between local governments and dumpsite waste pickers. To resolve the problem in Ciudad Juarez, Mexico, dumpsite waste pickers were organized into a recycling cooperative and the cooperative was given a concession to operate the city landfill (5). In Ecatepec, Mexico, dumpsite waste pickers were granted the concession to recycle at a city-operated landfill.

As with all private sector arrangements, it is important that such a concession arrangement clearly specify the rights and responsibilities of each party — the right of the cooperative to recover and sell the recyclables found in the waste brought to the landfill and the responsibility of the cooperative to operate the landfill to meet specified environmental standards — the right of the city to monitor the environmental conditions of the landfill and the responsibility of the city to bring a guaranteed quantity of municipal solid waste, exclusive of hazardous wastes, to the landfill.

Open Competition

In open competition (which is also sometimes called private subscription) of MSW collection services each household and commercial establishment hires the private

collection firm and pays the MSW removal fee which the firm charges (29). Generally, this form of privatizing MSW collection leads to substantially higher costs than government contracting with private firms and is often more costly than public service. When a number of competing firms operate in the same area, along the same streets, each loses the “economies of contiguity” which would be received if one firm served the area and picked up the waste from each establishment in turn (15).

MSW Collection. Private subscription has been found to be the most costly method of solid waste collection service for urban areas. Private subscription among solid waste collection firms takes away the opportunities of the economies of contiguity, as was illustrated by the Ibadan, Nigeria, example noted above. In addition, competitive firms must bear the cost of billing and collecting user charges from customers. Billing has been estimated in the USA to comprise about 15% of the total cost of service (37). Studies done in the USA, Canada, and England range in their assessment of the extent to which costs are elevated by private subscription, reporting that private subscription costs from 26% to 63% more than contracting (15).

In 1985, private franchise of residential collection was implemented in Ibadan, Nigeria. Ibadan’s municipal solid waste service area was divided into ten zones for privatization purposes. Firms able to pay a hefty license fee were allowed to apply to enter the business of solid waste collection. Six firms were selected, based on availability of equipment and business credentials, to clean the zones. Significant improvements in city cleanliness resulted. Unfortunately, some Ibadan residents complained that they were not given free choice to select their designated contractor.

In 1987, Ibadan switched to an private subscription system, wherein licensed private firms were allowed to compete for clients throughout the city. In time, local officials acknowledged that “it was cheaper for the firms to operate the same number of clients within a zone than to hop from Bodija to Manatan to Apata to Felele, etc., for the same number of customers.” (10)

MSW Recycling. Recycling of secondary materials (i.e., cans, bottles, paper, textiles) is commonly conducted under open competition arrangements. Various redemption centers, junk yards, or buy-back centers compete with each other to obtain recyclable materials and process them for sale to industry.

MSW Disposal. Once environmental regulations clearly specify minimum standards of safe disposal, open competition between private owners of disposal sites can occur. Where environmental protection is well-regulated, private firms can assume the risk of investing in safe disposal systems. As sites which do not meet environmental criteria are phased out of operation, there is increasing competition for clients among firms owning proper disposal sites. In the USA, it is not uncommon for a local government to have to transport its waste from 100 to 300 km to a privately owned sanitary landfill.

Maintenance and Repair. One of the most typical services for which governments turn to open competition is maintenance and repair service. For minor repairs of solid waste collection trucks, several quotations from private workshops are obtained within a matter of hours and the repair job is given to the lowest qualified bidder. For example, even though Bangkok, Thailand, operates a Central Garage for major repair and overhaul of the city’s entire fleet of rolling stock, equipment is sent by the Districts to

private workshops for minor repairs. The same situation occurs in Seoul, Korea (10). Both cities have enormous traffic congestion problems and it can take hours to drive across the city. It is expeditious and generally less expensive to have a minor repair done locally, in the vicinity of each District Office, than to send it to the Central Garage.

PUBLIC OR PRIVATE SERVICE DELIVERY — CRITERIA FOR CHOICE

As the above discussions show, where access to capital is limited, privatization offers opportunities through service and lease contracts and BOOT or BOO concessions for investments to be made by the private sector. Also, where there are government obstacles to efficiency, privatization offers opportunities for low cost service delivery to be provided by the private sector. Adding the element of competition to the realm of MSW service offers the potential for stimulating greater efficiencies within both the public and private sectors.

How does government resolve the question of whether to privatize a specific aspect of its service? Some criteria which need to be examined in answering this question are:

- ***Ease of Defining Outputs.*** Are the outputs definable for privatizing the service under consideration? What is government's ability to write performance specifications which clearly define outputs which the private sector would have to deliver as part of providing the service? What is government's ability to define performance measures which can be monitored and enforced?
- ***Efficiency.*** What are the political realities constraining government from providing efficient service (such as cost accountability, labor tenure, government wage scales, labor unions, government benefits, inflexible work arrangements, bureaucratic procurement procedures, and hiring/firing procedures), and can these constraints be removed? Is the private sector constrained in the same manner?
- ***Capability.*** Is there appreciation that expertise is essential for competent and low cost solid waste management? What are the differences in technical and financial resources (such as expertise and skills, ability to raise capital at a reasonable cost) between government and the private sector to build or buy, operate, and maintain MSW facilities or equipment? Does government have the capability to monitor performance, as well as the will to enforce contractual and/or license agreements with the private sector?
- ***Competition.*** Is the private sector adequately developed to ensure competition between a number of private firms or between the government and a few private firms? Are there significant barriers to entry or economies of scale which might limit competition? Would financial incentives or technical assistance better enable the private sector to participate in public service delivery? Is the government able and committed to conducting a competitive procurement?

- **Duplication.** Does the political will exist to make corresponding cuts in the government roles and assets when services are given to the private sector to conduct? Do the government's costs for monitoring offset the savings which might otherwise accrue from privatization?
- **Risk.** Does the regulatory framework exist to protect the private sector against risks (such as environmental damage, currency adjustments, inflation, political changes, and force majeure) so that prices for service are not unduly burdened with hidden costs for risk-protection? Does local government have adequate revenue generating capacity to meet its contractual agreements with the private sector and protect it from economic conditions which might affect transfers from central government?
- **Accountability.** Has government assessed whether privatization will disproportionately benefit an elite wealthy class with control over private capital, or whether market openings would be available to small and middle sized business and thus lead to some redistribution of income and power? Has government assessed the social issues of fair and safe working conditions and guaranteed minimum wage relative to privatization? Is government prepared to make provisions for livelihood assistance, including job training and employment networking, for displaced workers?
- **Costs.** Are the costs for public service known? Does government have the accounting information to determine whether privatization would offer MSW service delivery at a lower cost? Has there been sufficient city-wide strategic planning and feasibility study conducted to know whether the technology being offered by the private sector would result in low costs?

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PRIVATIZING WASTE SERVICES IN LATIN AMERICA

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There are some basic conditions our company looks for before we will consider undertaking waste-management projects in developing countries. In general, we look for stability—political and financial stability. But I should add that there are exceptions. We went into Kuwait right after the war, and that country certainly wasn't in the most stable position. But our work there has been profitable.

First, a government needs to ensure a company with which it is contracting that it will get paid according to the terms of the contract. That's a problem that we've had in various areas. To be able to guarantee scheduled payments a government obviously needs to determine where to generate the required revenue. This is a major problem for a lot of cities. The size and wealth of the community generally determine how difficult it will be to find financing for waste management.

Finance, Regulatory, and Enforcement Issues

Cities can impose fees on citizens or levy additional taxes. In Thailand there are some areas experiencing high levels of tourism that are considering taxing tourists to help pay for waste service. If there's an existing waste program in the city, there will be some funds in the budget for privatization. In the absence of such a program new sources must be sought.

Privatization is, in general, more efficient, and at times less expensive than public administration of waste management. But with privatization often comes additional environmental protection measures that the public sector hadn't envisioned. So it could be a more costly alternative initially. Ultimately, of course, a country that lacks such controls is likely to suffer severe environmental damages and incur even higher costs.

It is very important to us that a government have waste-control or environmental protection laws. People have little incentive for paying for waste services when they can just dump garbage in their back yard, or in someone else's back yard, or in a river or stream. Environmental laws, of course, have to be accompanied by a mechanism for enforcement.

A country's political and financial climate needs to be somewhat stable to attract a company like ours to invest there. Such factors as hyperinflation, multiple exchange rates, and frequent currency devaluations often make it difficult for governments to pay the company for services. Stabilization of these factors will reduce the company's risk investment risk.

Contractor Qualifications and Contract Conditions

There are a couple of things in the contracting process that are of special interest to us, specifically contractor qualifications and the bidding process. When a government is preparing its contract specifications it needs to have a clear idea of what it wants. Often they can't do that on their own. Our company seldom advises cities on how to do contracts. Rather, we usually come in afterward. But there are some exceptions. Right now in Argentina we have a bid in for a feasibility study. We're interested in seeing that the city we're working with offers exclusive rights to a certain group for a certain area. This will ensure that the bidding company knows exactly what it's getting into, and what kind of revenues it can generate. It also helps to ensure consistency of service. One thing that a private company can do very well is plan routes. And if the route remains consistent the city can save a tremendous amount of money.

The contract should be of sufficient length to allow us to get some of our initial costs back. The minimum length of a contract that we would consider depends on the condition we face in a given area. If we are bidding on an area where we have no operations, such as Thailand, or the Philippines, we may want a ten- to fifteen-year contract. That's a long period, but we would be required to move a lot of equipment and people over a great distance. That's extremely costly. On the other hand, we are already operating in Argentina so our costs would be less if we were to contract in another city or town in Argentina.

We like to be paid on a per-ton basis because that's a good way of measuring how much work we do. If payment is by household or by some kind of ambiguous cleanliness criteria, it's not really clear how much work we accomplished.

Evaluating and Monitoring Private Contractors

In issuing the contracts, the government needs to be very specific to ensure that the bidders are in a competitive process and are proposing equivalent services. The more specific they are in every respect, the easier it is to evaluate their proposals.

If a facility requires design, construction, and operation it is preferable that the government contract with just one company for all of the three components. If contracts are issued to three separate companies and something goes wrong it's difficult to identify which contractor is at fault.

We propose that the government impose penalties if services aren't performed as required. We recommend that cities pre-qualify companies that are bidding in a certain area. This will assure the government that the final bidders will offer performance and reliability and that they'll submit the most competitive offers. If companies with varying amounts of experience are bidding you're not really sure whether they possess equivalent capabilities. In evaluating the offers, the government can make checklists that include the following qualifications:

- Expertise in serving similar types of geographic areas, or in providing similar services;
- Demonstrated technological reliability; and
- Financial strength.

First-Hand Experiences in Latin America

I'd like to discuss some specific experiences we've had in Latin America. It has been mixed. We've been working there since 1980, when one of Waste Management's subsidiaries was awarded a contract to provide city cleaning services for 60 percent of Buenos Aires. We reduced the city's cost by more than 50 percent, which amounted to a saving of \$40 million. The contract was renewed a year after it was signed.

In another city, the government decided not to fulfill its contractual obligations. It didn't want us operating any longer and acted under a provision of the contract that allowed it to cancel the services. But the contract required that we be paid for termination expenses, including layoffs. Because of a change of administrations, we didn't receive any of that payment.

The second problem we've had is the failure of governments, particularly in Argentina and Venezuela, to pay us on time. The problem is more acute in Venezuela than Argentina. These situations can be attributed to numerous currency devaluations, hyperinflation, and other types of economic stress.

Another complication grows out of the Argentine labor laws. The protection they provide employees, makes it almost impossible, or excessively expensive, to dismiss anyone. You have to pay a terminated employee one month's salary times the number of years they have worked for the company.

Business in Venezuela is subject to provisions of the Andean Pact, which requires that foreign companies be minority owners of businesses. So, although we are a minority owner, we have responsibility for all of the operations of the company. That sometimes makes it difficult to get decisions made.

As a result of Venezuela's failure to pay on time, our partner company has borrowed heavily from Waste Management. Hence we've incurred a tremendous amount of debt.

A more general problem—and it occurs throughout the world—is that our experience in management is not viewed as something that is highly valued and we're seldom paid for it. The waste business is very difficult to manage, even in the United States. When

we enter a new market we bring with us really a tremendous amount of experience. But that's often not viewed as much of an asset. It's certainly not viewed as a transfer of technology.

Governments that decide to privatize must reorganize their internal waste management departments. They must realize, for example, that they are not going to save money if they keep the public employees of privatized divisions, who then have nothing to do.

Let me conclude on an encouraging note. Our company has had a lot of positive experiences from investing in Latin America. Argentina has just enacted its first hazardous waste law, which is a very positive step. We've been working on that and trying to get it in place. In the next couple of years the government should be able to claim a hazardous waste facility.

We've had the opportunity to train a tremendous number of people in Latin America. Our practice throughout the world is to bring Americans into a country in which we negotiate a new contract for a year or more. During this period we train local people. Then the Americans pull out, leaving the facilities under Latin management. A Cuban, for example, manages our Buenos Aires operation. Many employees we've trained in Latin America are all over the world right now. We've got an Argentine in Italy and another Cuban in Spain. They have been tremendously valuable to Waste Management.

PRIVATIZING MUNICIPAL SOLID WASTE SERVICES IN ASIA

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The Pacific rim of Asia is one of the fastest growing areas of the world; therefore, the need for sound solid waste control services is also growing. The U.S. has been involved, and will continue to be involved, in providing waste control infrastructure services and equipment to these countries.

The greatest opportunity for waste services in this part of the world is in the newly industrialized countries, the NICs, such as Hong Kong, Taiwan, and South Korea. These are typically the countries that have the highest per capita income in relation to their waste generation. As privatization unfolds in these and other countries, price competition remains stiff. Pacific area firms, such as those in Japan, are starting to gear up for this potential market. However, most countries in the Pacific rim don't have much operating experience outside their home country. Therefore, there are opportunities for companies in North America and Europe in developing waste infrastructure in Asia.

Five Key Components

There are five major components that can influence formal involvement of the private sector in waste control in Pacific rim countries. First, pollution abatement, specifically waste control, has to have a high priority on a nation's political agenda. Second, there has to be a workable legislative-regulatory framework to set the standards for waste control. Third, the laws and regulations for proper waste control have to be meaningfully enforced. The fourth ingredient that positively influences the private sector's involvement is appropriation of funds for waste control and its enforcement. The fifth component is a mechanism to make sure the funds are allocated properly and distributed to those private firms that are doing the work.

Let's examine the first component. There must be a recognized need and desire for improved methods of waste control. These improved methods can include cost reductions, technology adaptation, improved service levels, and decreased system down time.

Many countries in the Pacific rim have inadequate waste infrastructure. Typically, this is due to the fact that they have problems of greater magnitude. In Bangkok, Thailand, for example, problems caused by a high water table, and water and air pollution have a higher priority than solid waste control. Actually, better waste control methods will help minimize both water and air pollution.

Legal, Regulatory, and Financial Requirements

Once the political and economic realities move waste control to the top of a country's agenda there needs to be a legislative framework to set up regulations for enforcing sound waste management practices. This sets the stage for enforcement. It also provides a systematic review process for new waste handling techniques and technologies. A legislative and regulatory framework can also serve as a sort of referee between the formal and informal private waste service networks.

Minimal standards ensure citizens that the environment is important and that efforts are being made to protect it. The effect of all this is that the cost of poor waste control is borne internally by the generators of waste rather than externally by those who suffer because of poor ground water, air pollution, and cars that constantly need washing because of poor air quality.

Enforcement of laws and regulations is the third critical requirement for countries in the Pacific rim, or really anywhere in the developing world. Enforcement gives teeth to the regulatory statutes. Enforcement also helps keep a balance between the informal and the formal private sectors. For example, if a developing country spends heavily on a state-of-the-art landfill, and the informal sector is scavenging that landfill and living in it, regulations could be enforced to abate the health hazard such practices cause.

Countries that seek to privatize waste management must appropriate funds to attract competent companies. Without money to pay for a new landfill, waste-to-energy plant, or a transfer station, North American companies probably will not be very interested in these projects. Last but not least, the most important factor is the payment mechanism to the private sector. Major companies will not become involved in countries where methods of disbursement are not in place.

Informal Networks Can't be Ignored

Most Pacific rim countries have a very extensive and well-developed informal network. Scavengers in this informal network earn a livelihood by collecting and sorting waste, typically from commercial establishments. Self-employed recyclers go to the shops and factories and separate paper and metals. Then they take their bounty to the local recycling networks where the materials are sorted, consolidated, packaged, and shipped to market.

In Seoul, Korea, for example, some people live in or near landfills. These people can make a subsistence living by scavenging these materials before they're buried. However, if the waste went to a modern waste-to-energy plant rather than the landfill these people would have to scavenge in the collection process rather than in the disposal process. Some might even have to develop other ways to subsist. Any comprehensive system to manage waste must take into consideration the strong informal network that already exists. Otherwise, the formal system could become redundant.

An Example of Privatization in Hong Kong

My company's involvement in Hong Kong provides a good case study. Hong Kong is a fast developing, British-governed enclave that has gone about the privatization process in what I feel is the correct way. The Hong Kong government made a commitment to a clean environment and saw proper modern waste control as one way to do this. Regulations are in force there. Money was appropriated to enforce them and the private sector is getting paid for operating waste-control facilities.

Our company, BFI, is providing solid waste control services under contract to Hong Kong through a joint venture with Swire Engineering, Ltd., a publicly traded Hong Kong firm. The joint venture is called Swire BFI. We're developing, designing, constructing, and operating two transfer stations in Hong Kong. BFI affiliated with Swire because this firm had political expertise and knew the players and the local culture and business practices. Swire lined up the subcontractors needed to get this project off and running.

In 1988 Swire BFI was awarded a contract to build and operate a transfer station in Kowloon Bay, Hong Kong. This state-of-the-art facility, with deodorization, truck washing equipment, and dust collection and filtration systems, opened in April 1990. It's handling about 1,600 tons a day. Because of its sophisticated systems for controlling dust and odors, this station has encountered no objections from the neighborhood of high-rise apartments in which it is located.

The design and capital construction costs were reimbursed to Swire BFI after the inspection and start-up. From a private contractor's standpoint, this is an ideal situation because we don't have a capital risk threat extending over the life of the entire project. Furthermore, upfront reimbursement obviates potential risk our investment might have faced at the scheduled take-over of Hong Kong by the Chinese government in 1997. We're being paid for operations and maintenance under a fifteen-year contract.

Joint Venture has Government's Confidence

Swire BFI was recently awarded a contract to design, construct, and operate a second transfer station. It also won a large waste-shipment contract. The new station, which is called Island East, will process 1,200 tons a day.

The Swire BFI joint venture has proved to the Hong Kong government that the private sector can and will provide quality, cost-effective waste services. The government is so pleased with the results of its contracting effort for the projects we built that they're

considering contracting other services, such as tire recovery and temporary barge storage and handling for waste.

The Hong Kong government is developing tenders for the design, construction and operation of three large landfills. This extensive tendering process involves pre-qualification, which will ensure that firms with civil engineering experience in Hong Kong will respond to bid requests. After a firm passes pre-qualification, it will have to submit a more technical cost proposal. This could require providing information on leachate collection, ground water drainage, liner systems, borrow and cover materials, and gas control. The government is relying on private sector consultants to aid it in the tender-building and tender-review processes.

Lessons Learned

Asian firms lag behind their North American counterparts in both experience and technology. Waste-to-energy plants, for example, have been in existence in Europe for a long time. Now they're just becoming firmly established in North America. Most developing countries don't have extensively developed waste handling systems, and they need this technology. This need will increase in the future, as will the demand for such equipment as compactors, transfer trailers, and trucks.

To reiterate, there is a need for proper waste control in the Pacific rim. However, if countries in this region are going to attract North American firms, these prerequisites must be met:

- Waste control must be a priority;
- Rules must be developed and enforced;
- Funds have to be allocated;
- Local laws, customs, and business methods must be understood and complied with; and
- Payments to contractors must be assured.

My company learned an important lesson in Taiwan. We were planning a biomedical waste treatment facility in anticipation of the government's development of laws and regulations concerning biomedical waste treatment. But negotiations broke down when we found out that the government didn't enforce regulations for biomedical waste and had no intention of doing so.

As my competitor noted, payments to companies have long been delayed in some developing countries. Some nations owe millions of dollars to these companies. Their governments insist they will pay but fail to do so. This suggests there is an opportunity for a third party financial or insurance institution to cover some of the payment risks.

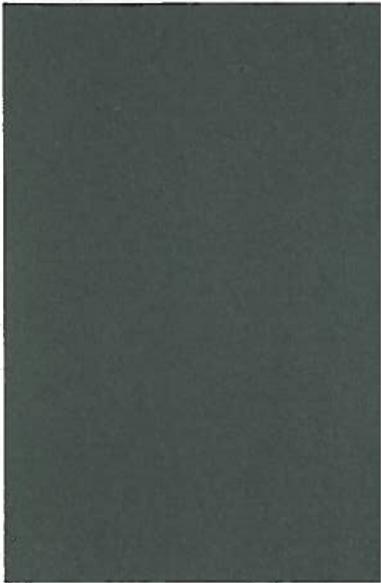
In conclusion, let me review what I've said about the components for successful private sector involvement in Asia's waste control systems. I've suggested the role of the informal sector in waste control needs to be taken into consideration. I've described a

real-life example of successful privatization—an environmentally sound and aesthetically compatible transfer station in the heart of a residential neighborhood. I talked about what expertise is most effective in developing a waste handling system in developing countries, and I noted lessons BFI has learned.

In summary, there are four keys to successful privatization of waste services in developing Asian countries:

- Waste control must be a priority;
- Regulations must be in place and be enforced;
- Funds must be allocated and distributed to ensure payment to contractors; and
- You must know that local laws, customs, and business practices must be taken into consideration.

If these steps are taken, Asian countries should be assured of the private involvement of experienced North American and European waste control firms.



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