

SOLID WASTE MANAGEMENT IN ARMENIAN CITIES

(The experience of the USAID-funded Armenia Local Government Program – Phase 3 [LGP3], implemented by RTI International (RTI) * from 2005 to 2010 under Contract Number EPP-I-01-04-00037-00, Task Order 4.)

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1 Acknowledgements

RTI International is grateful to the U.S. Agency for International Development (USAID); their Democracy and Governance Office Armenia; and Ms. Bella Markarian, COTR, for her consistent support enabling the authors to summarize their five years of activity for the Service Delivery Component of the Armenia Local Government Program – Phase 3 (LGP3).

The authors have enjoyed working with Mr. Sam Coxson and Mr. Robert Bodo, Chiefs of Party in Armenia for LGP3. This paper has been developed within a good work environment, resulting from wise project management that led to the project's successful results.

2 Introduction

Street sweeping, waste collection, and waste disposal are the most publicly visible activities of municipal services. The great majority of public and community complaints about waste management arise from insufficient waste collection and disposal services. Waste collection, consequently, receives a high political priority in many countries [1].

According to the Armenian Law on Local Self Government, garbage collection and disposal service is one of the mandatory functions of local governments. Solid waste management remains the most problematic challenge for cities' leadership. To illustrate, a baseline study of 40 Armenian cities showed that it remains the first service priority for 33 of these cities [2]. The main problems in this field of solid waste management can be grouped into four performance areas: (1) lack of legislative background and a poor management system, (2) lack of appropriate equipment, (3) lack of financial capacities, and (4) a weak relationship with the public in the cities.

Through LGP3, RTI's efforts assisted Armenian cities in overcoming these problems through co-financing projects that procure, together with the partner cities, solid waste collection services and disposal trucks. In addition, LGP3 arranged participatory development of solid waste performance management plans/strategies, using international expertise and based on previous experience [3, 4, 5].

To aid in drafting these plans/strategies, each city establishes a working group and a standing committee, consisting of members from city staff, practitioners and staff from solid waste entities, local nongovernmental organization (NGO) representatives, and citizens. The drafted performance management plans/strategies are then used by the municipalities to improve their solid waste collection and disposal service. The planning extends to the year 2015, and thus includes long-, medium-, and short-term commitments [6, 7].

This paper is based on the practical results gained by the USAID-funded LGP3, implemented by RTI from 2005 to 2010. During this period, LGP3 implemented various types

of projects, mainly grouped into two categories: (1) co-financing and (2) technical assistance. The latter included training, provision of a series of workshops and seminars, trainings of trainers (TOTs), and more. These two implementation categories established a synergistic effect: the success of technical assistance was reinforced by positive results gained from the operation of newly obtained special trucks (rear- or side-loading hydraulic compactor trucks). The project implementation process and results analysis, through the duration of the project years, are represented herewith.

3 Improvement of Service Delivery of Solid Waste Collection and Disposal

3.1 Acquisition of Equipment and Garbage Trucks through Co-financing

In the late nineties, many communal enterprises in Armenia that were under the jurisdiction of local governments were privatized [8]. A number of organizational types were created: open joint stock companies (OJSCs), closed joint stock companies (CJSCs), limited liability companies (LLCs), individual entrepreneurs, and others. In many cases, during the privatization process, the equipment and the truck fleet that were specialized for solid waste (SW) services were typically dispersed across several companies and individuals [9]. Often, equipment in communities was privatized to individuals or enterprises from outside the community. Even in cases where equipment in initial stages of privatization remained in the community, it was later sold. Thus, in many cases, especially in small and medium-sized communities, privatization led to loss of equipment and specialized trucks allotted for SW collection and disposal. Equipment and fleets for SW collection and disposal under the Soviet system had traditionally been bought and delivered by the state in a centralized way. Now, after the collapse of this system, local governments cannot afford to buy new equipment or renew fleets by their own means.

The abovementioned equipment dispersal, and the fact that the last time the current fleet was replenished was long ago (in the eighties), exacerbated the problem of the obvious lack of a technical fleet for SW collection in Armenia. A preliminary baseline study on service delivery had shown that the majority of cities considered the problem of SW management one of their highest priorities. Out of 40 cities, 33 considered that SW management and the current equipment fleet is an area that should be developed and substantially improved, and, therefore, they rated it as the highest priority among other services [2].

The USAID-funded LGP3 program, implemented by RTI, established co-financing projects for several cities in Armenia, aimed at improving service delivery. Each partner city provided 20% matching funds to procure specialized garbage trucks that are either rear- or side-loading hydraulic

compactor trucks with a mechanical- or hand-loading system. As a result, 28 cities have now obtained 29 garbage trucks of various types. Truck procurement was organized with LGP3 contributing 80% of the truck cost. In addition, four communities obtained utility trucks for street cleaning/sweeping [3]. Table 1, below, provides data on the types of trucks purchased.

Table 1: Types and Number of Trucks Obtained and Delivered through the Co-financing Project

Type of garbage trucks on the chassis of ZIL	Quantity
Rear mechanical- and hand-loading (MKZ 10)	4
Side mechanical-loading (KO 449 - 10)	19
Rear hand-loading (MKZ)	6
Total number of garbage trucks	29
Utility trucks for street cleaning (MDK)	4
Total number of trucks	33

Note: ZIL is the manufacturer of specialized MKZ, KO, and MDK trucks.

3.2 Performance Management Plan/Strategy in Communities

As mentioned prior, there was an acute need to acquire trucks for SW collection and disposal. However, the problem of SW management (collection and disposal of garbage) was not limited by lack of equipment alone. Suspense of centralized funding and state subsidies for these services, collapse of SW management institutions and infrastructure, and loss of standards/norms and human resources are just a partial list of reasons for this context. All of these problems resulted in cities' SW management remaining at a critically poor level. To effectively alleviate some of these problems, USAID's LGP3 project activities, implemented by RTI, involved the core elements of technical assistance and training, along with development of SW management performance plans/strategies.

Planning is essential to keep pace with the increasing demand by the population to keep the environment clean [11]. Because municipalities and service providers are often busy with their daily routine activities and do not generally place attention on mid- and long-term development, it is all the more important to conduct strategic planning in view of a prospective, comparatively long duration of development.

In addition, democracy means that the public should be influential in setting the strategic framework for public services and that the users of public services should be consulted about their needs and wishes [8]. Waste management touches on the interests of a wide range of stakeholders. Therefore, it is especially essential to involve different stakeholders to link the strategic plan firmly to reality and to mobilize stakeholder involvement. The development

process of such a performance management plan contains several steps, starting with establishing a Working Group (WG) and a Standing Coordination Committee (SCC). Before the first development meeting, the municipalities are asked to establish a WG and SCC [5].

In Armenia, a WG consists of waste management practitioners (staff of a company providing SW services) and municipal communal department staff (who are more directly involved with SW collection and disposal). Other members who may be assigned to a WG include sanitary-epidemic regional specialists, NGO representatives, active citizens/council representatives, and other interested parties. Basically, a WG is a group that consists of professionals and citizens' representatives that conducts the appropriate strategic planning, and the SCC is intended as a group that monitors and coordinates the action plan resulting from the strategic plan.

The milestones for an entire activity of developing a Performance Management Plan/Strategy are illustrated in Table 2, below. The first meeting of this process (Inception Workshop) is organized to introduce scopes of work for WG and SCC members and to set a schedule for a series of meetings and trainings. The second WG meeting aims to define the most significant problems and the current context; conduct a strengths, weaknesses, opportunities, and threats (SWOT) analysis; and conduct an analysis of baseline features. Problems and the whole activity were divided into four main performance areas (see Introduction). To prioritize existing problems in SW management in certain cities, members of the WG also discuss indicators for how the proper prioritization of problems should be carried out.

Usually, WGs in cities are offered a set of criteria, and they may select criteria from the suggested list or add new ones if they wish. The most typical criteria selected by cities include (1) a budget assessment of problems (i.e., budget estimation of prospective project activity aimed to solve specific problems), (2) the health and environmental impact of problem solutions, (3) the extent of public assistance, and (4) the number of potential beneficiaries (see Table 3).

Normally, depending on the specifics of a city, a WG might give a different preference for indicators, as mentioned in the table. After definition of the weight (multiplier) of each indicator by the methodology that is well described in several publications [4, 5], a WG proceeds with defining scores of projects/problem solutions to allow further prioritization. The scores are determined by multiplying the weight of the certain indicator (already decided by the group) by the unit, which is defined by each WG member individually. The final calculation of the average of total scores will point out the rate of prioritization. The prioritization of projects is very important, especially in the context of limited financial resources.

Table 2: Initial Activities with WG and SCC Members to Develop a Solid Waste (SW) Management Strategy

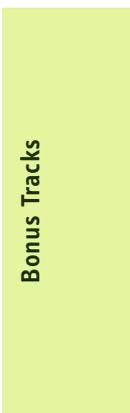
N/N	Activity Description	Participants
1	Initial meeting with the Committee and Working Group (WG) to briefly introduce the project and the activities	Committee and WG
2	Participatory detection of existing SW problems in the city in four major areas: 1. Legal framework and service management for SW collection; 2. SW collection and disposal; 3. Financial sustainability of the service provision; 4. Public awareness and participation.	WG
3	Financial analysis of projects suggested as a solution to the mentioned problems (budget assessment of projects). DEFINITION OF CRITERIA 1.....2.....3.....4.....	WG/Service Provider
4	Selection of problems' prioritizing criteria, setting weighting and scoring system	WG
5	Definition of strategic goals for each problem area and definition of SW strategy vision	WG
6	Meetings on customer awareness and participation, and introduction of data analysis of phone surveys	Committee and WG
7	Training on estimating: 1. the unit cost for garbage collection, transportation, and positioning 2. the service delivery payments,	Service Provider
8	Development and presentation of the strategic plan	Committee and WG
9	Approval of the strategic plan by the local council	Council meeting with Committee and WG participation
Other Activities Carried Out by LGP3/RTI		
a	Installation and training on e-system of phone-based public opinion survey	
b	Conducting phone-based surveys of 400 citizens about the quality of garbage removal service and citizen readiness to pay for the service	
c	Installation and training on software, enabling proper tracking record of service fee collection receipts	
d	Delivery of 30,000 copies of double receipts	

Table 3: Indicators for Project Prioritization*

Assessment Indicator	Unit	Weight
Indicator: Budget estimation of proposed solution		
< \$ 1000	4	A
\$1000-\$ 5000	3	
\$5000-\$10000	2	
> \$10000	1	
Indicator: Health and environmental impact		
No	1	B
Low	2	
Fair	3	
High	4	
Indicator: Number of beneficiaries		
< 25%	1	C
25%-50%	2	
50%-75%	3	
75%-100%	4	
Indicator: Public support		
No	1	D
Low	2	
Fair	3	
High	4	

*Prioritization rate = unit x weight

Each project is supposed to solve a certain problem or problems. All projects are grouped into four main areas, and the structure of goals for these areas and the proper vision of the strategy are defined by the WG, with assistance from RTI's facilitators. A general structure and the content for vision, goals, and objectives are presented below (see Figure 1). After formulation of the vision, performance areas are determined, each with specific goals. Each goal involves a certain number of projects/solutions, and each project has its own objective. The latter is formulated according to the individual problems raised; therefore, these objectives are unique and more specific. The WG will also provide objective results. The objectives are grouped by performance areas, and each of them presents a separate strategic goal (see Figure 1). Thus, included in the strategy are a set of projects—an action plan—to be implemented during the specified years. This strategy might help cities not only to solve problems in a planned way, but it can also be used to plan and control activities.



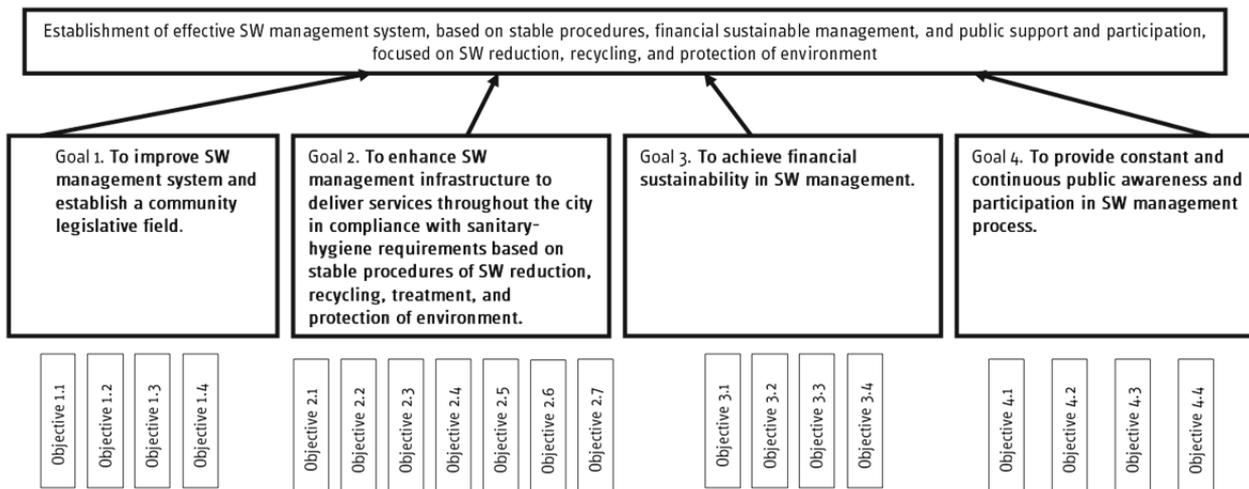


Figure 1. Solid Waste Management Strategic Vision, Goals, and Objectives

Based on objectives in the strategy, an action plan was developed that includes several projects to be implemented. Based on prioritization and taking the feasibility of implementation into account, the projects are then grouped into current, short-term, and long-term projects.

3.3 Dynamics of Context Changes of SW Performance Management in Armenian Cities

There was an acute need to evaluate project impact, which includes both effectiveness of truck operation and performance management, in general. To assess changes in cities, first a baseline study related to service delivery/SW management was conducted, and second, some indicators were selected, through which progress, if any, could be measured and evaluated. Those indicators are the number of served population (coverage), the number of contracts signed between customers and service providers, revenues versus expenses/breakeven, and citizen satisfaction with services (see Table 4).

To evaluate the current context (provision of a baseline study), a questionnaire was developed, through which the quality and quantity of service provision was stated.

Also, in order to assess the level of treatment of clients and service users, a baseline survey on customer satisfaction was provided through the automated phone survey special software. In each city, 400 respondents were asked 10 questions to indicate both the quality and quantity of the service, and the willingness of customers to pay for services. To reach financial sustainability, the public service of SW management should be businesslike, which means that service users should be served by the service provider as a “customer.”

During the transition period (from centralized provision of services to a system of having control over a local, more limited area), a culture of non-payment for these services became established, resulting in, among other things, poor quality of services and insufficient efforts to enforce user fee collections. In Armenia, low rates of fee collection relate not only to housing maintenance [12], but also to other services. In turn, the “non-payment” of fees limits the service provider in treating customers properly. Thus, SW management, with this vicious cycle background, becomes one of the problem services that is chronically suffering from lack of money and has remained at a poor level of quality in Armenia since the beginning of the nineties.

Distribution of LGP3 partner cities by population size

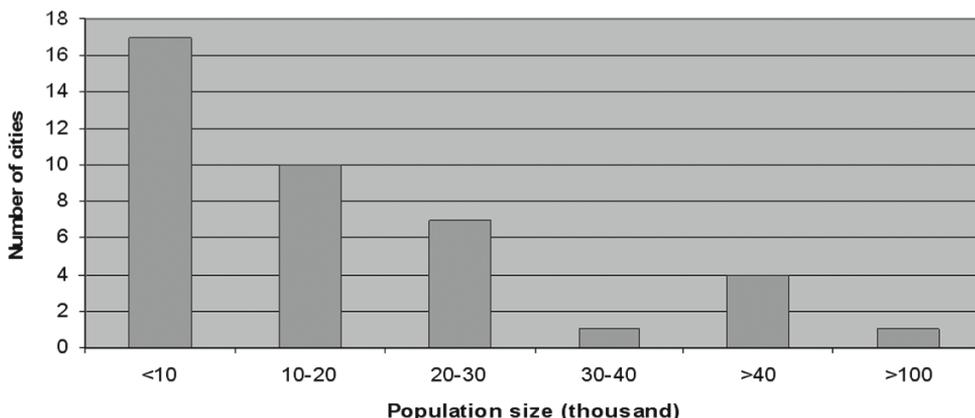


Figure 2. Distribution of LGP3 partner cities by population size

Table 4: Performance Indicators

Performance indicators	Definition of indicators and measuring unit
1. Relative number of population served (coverage)	<u>Definition:</u> SW management covers more districts and accordingly more segments of population are served <u>Unit:</u> Ratio of general and served population, in%
2. Quantity of SW actually collected and removed to landfill vs. SW produced	<u>Definition:</u> Increase of the part of produced SW that is collected and removed to landfill <u>Unit:</u> Ratio of SW quantity actually collected and removed to landfill to SW quantity produced in urban sites and subject to removing to the landfill, in %
3. Frequency of SW collection and removal (frequency)	
1) Apartment Buildings	<u>Definition:</u> Frequency of emptying the garbage bins and removing to landfill per unit period of time in apartment buildings <u>Unit:</u> Times/day
2) Private houses	<u>Definition:</u> Frequency of emptying the garbage bins and removing to landfill per unit period of time in private houses <u>Unit:</u> Times/day
4. Filling volume of garbage bins at apartment buildings (a bell method is used for private houses)	<u>Definition:</u> Increase of filling volumes or quantities of garbage cans <u>Unit:</u> Ratio of volume of garbage cans to SW quantity produced, in %
5. Relative growth of collection of payments for service	<u>Definition:</u> Increase of payment collections <u>Unit:</u> Ratio of rates between fees actually collected and potential (while serving all over the community)
6. Breakeven (revenues vs. expenses)	<u>Definition:</u> Decrease of unit cost of service and increase of revenues <u>Unit:</u> Ratio of general expenses for delivery of service to revenues received from payments and sale of recyclable SW, in %
7. Customer satisfaction for service delivery	<u>Definition:</u> Pursuant to conducted surveys, increase of the beneficiaries who are pleased with the level of delivered service <u>Unit:</u> Ratio of satisfied beneficiaries within the survey to total number of beneficiaries, in %

To evaluate the implementation of the Performance Management Plan, LGP3/RTI staff set the following indicators (see Table 4) to assess the performance of each city. All data collected during the baseline study, as well as during the follow up, are divided into two areas: (1) data collected from apartment buildings and (2) data collected from private houses.

4 Service Providers

Before Armenia's independence from the Soviet Union and in the early years after independence, the state housing stock and utilities—water, sewerage, SW, landscaping, and care for green areas—were managed, maintained, and repaired by the official state housing—communal maintenance organizations, called “ZHEKs” in Armenia. Responsibility for maintenance of the housing stock and utilities was transferred to local governments under Government Decrees 42, 51, and 116 of 1997, and “ZHEKs” were converted into joint stock enterprises and incorporated within local government structures. Later, most of these enterprises were privatized [9].

Currently in Armenia, enterprises involved in SW collection and disposal are of two types: (1) commercial (for-profit) organizations and (2) noncommercial (not-for-profit) organizations. Commercial organizations are usually open or closed joint stock companies, limited liability companies, and also individual entrepreneurs. The commercial organizations can be of mixed ownership, and the municipality can have a share and be one of the shareholders. Noncommercial organizations carrying out the duties of SW management in cities are also of different types: Community Noncommercial Organizations (CNCO), Budget Organizations (BO), Condominium Associations, and others.

Noncommercial service providers are mostly owned by municipalities (except in those cases when the service is provided by condominium associations) and are public organizations. Commercial organizations are classified into three types of organizations: (1) public organizations—closed joint stock companies (CJSCs) (or rarely limited liability companies [LLCs]) that are 100% owned by municipalities and NGOs (in some cases those establishing LLCs); (2) private organizations—LLCs 100% owned by private entities and individual entrepreneurs; and (3) private organizations—open

Ratio of public and private companies

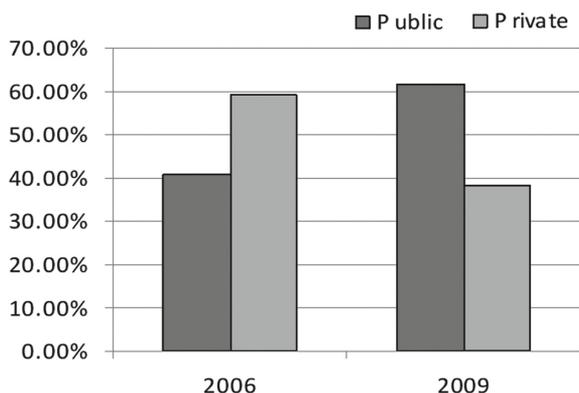


Figure 3: Public and Private Companies/SW Service Providers

joint stock companies (OJSCs), where a municipality owns a share of 18–34% of the total package.

Thus, the public organizations are both commercial and noncommercial (with noncommercial organizations being public without exception), while private organizations are solely commercial.

Since 2006, municipalities have set out to change the status of companies providing SW collection and disposal services. Many municipalities are initiating the establishment of SW public companies, thus increasing the public sector’s share of the SW market. Figure 3 shows the increase in the number of public companies at the expense of the number of private ones.

This trend can be explained by several reasons. One very significant reason is that private companies have not upgraded their equipment fleet since the late eighties (since the start of privatization of state/community-owned communal enterprises). Private companies are still using technology and equipment more than 20 years old. The

equipment is obsolete, and maintenance is very expensive and difficult. A large percentage of equipment is out of order and not being used anymore. When municipalities announce tenders to provide services for SW collection and disposal, private companies often do not have the specialized trucks necessary to fulfill the contracts.

Provision of SW services is now a mandatory function for local governments. Because private companies are not properly carrying out the business of solid waste management, municipalities would like to shift this business to public companies. This shift from private to public enterprises has already happened in many cities. Another motivation to shift SW services from private enterprises to public companies is that nonprofit organizations do not pay income taxes. This means that they can possibly charge less for the same service, or, more realistically, they can be operated more profitably, because expense-to-revenue ratios will be lower.

Comparing differences between services organized by public and private enterprises is very interesting. Figure 4 shows the results of an analysis based on data from 30 partner cities, where we compared public and private enterprises, using administrative costs as a determinant.

The data reveal that the public enterprises are spending more money on administrative issues. Figure 4 shows that on average, the ratio of administrative cost to the total expenses of public enterprises is higher than that of private enterprises, although in many cases, administrative expenses are very high (more than 70%) even in private enterprises.

In Figure 4, the means of the two groups are different. To ensure that this difference is statistically significant, an independent samples T test has been provided for equality of means. A null hypothesis will be that the mean of admini-

Comparison of administrative costs for public and private enterprises

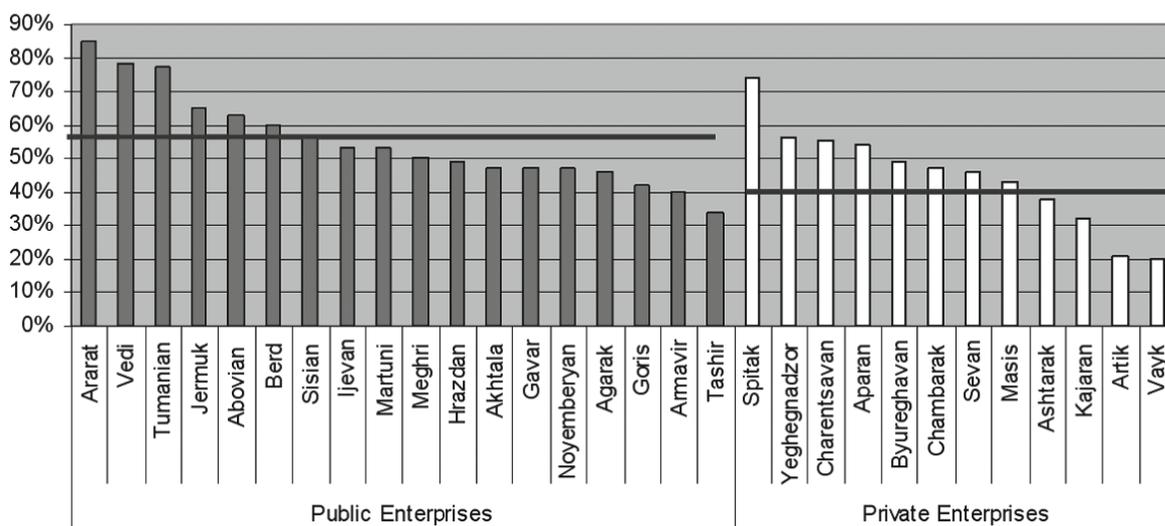


Figure 4: Share of Administrative Costs in Public and Private Enterprises

strative expenses of public enterprises is the same as the mean of that of private enterprises. In other words, there is no difference between average administrative expenses for public enterprises and those for private ones. Consequently, these two groups—both private and public enterprises—are part of the same assembly.

We can formulate this in the following way:

$$H_0: \mu_1 = \mu_2$$

where

H_0 = the null hypothesis

μ_1 = the mean of administrative expenses of public enterprises

μ_2 = the mean of administrative expenses of private enterprises

According to the testing provided by the Statistical Package for the Social Sciences (SPSS), null hypothesis is rejected at the level of 10% of significance. The mean of administrative expenses for private enterprises significantly differs from the mean of administrative expenses for public ones, so we can state that private enterprises spend less money on administrative issues than public ones do.

For all SW companies in the LGP3 project cities, we calculated the unit cost of SW collection and disposal service (per capita and per cubic meter). (We adopted the volume of garbage [in cubic meters] as our garbage unit.) While calculating garbage unit service cost, several factors were considered (e.g., oil and lubricant consumption, administrative expenses, salaries, and taxes). Figure 5 shows the estimated cost of services per cubic meter of garbage taking these factors into account. Visually, the average estimated cost per cubic meter displayed for public enterprises does not differ much from the estimated cost for private ones.

We applied the same T test to unit cost as was applied to administrative costs. The testing provided by SPSS, null hypothesis of equality of means of the two groups of “public” and “private,” is not rejected at the level of 10% of significance. The mean of expenses disbursed by private enterprises for one cubic meter of garbage collection and disposal service does not significantly differ from the mean of expenses disbursed by public enterprises for one cubic meter of garbage. Stated differently, there is no statistically significant difference between the cost of SW collection and disposal provided by private and public organizations.

4.1 Number of Population Served (Coverage)

One of the important characteristics to consider in SW service is the coverage area, or number of population served. In many cities, the service provider, regardless of whether it is private or public, cannot organize service to cover all districts of a city. There are several reasons for not covering all districts:

- Expenses to provide service exceed the revenues. In remote districts or for houses off the main streets, service providers have difficulty arranging the garbage pick-up. Customers in these houses or districts are scattered, so population density is lower than in areas with apartment buildings. This means that fewer people are paying, while expenses for the collection are higher or at least similar to the expenses in the areas with apartment buildings.
- Access difficulties. Some districts are physically hard to reach. Streets are narrow and sloping, unpaved and ruined; and houses are difficult to access. Again, those areas usually have private houses rather than apartment buildings.

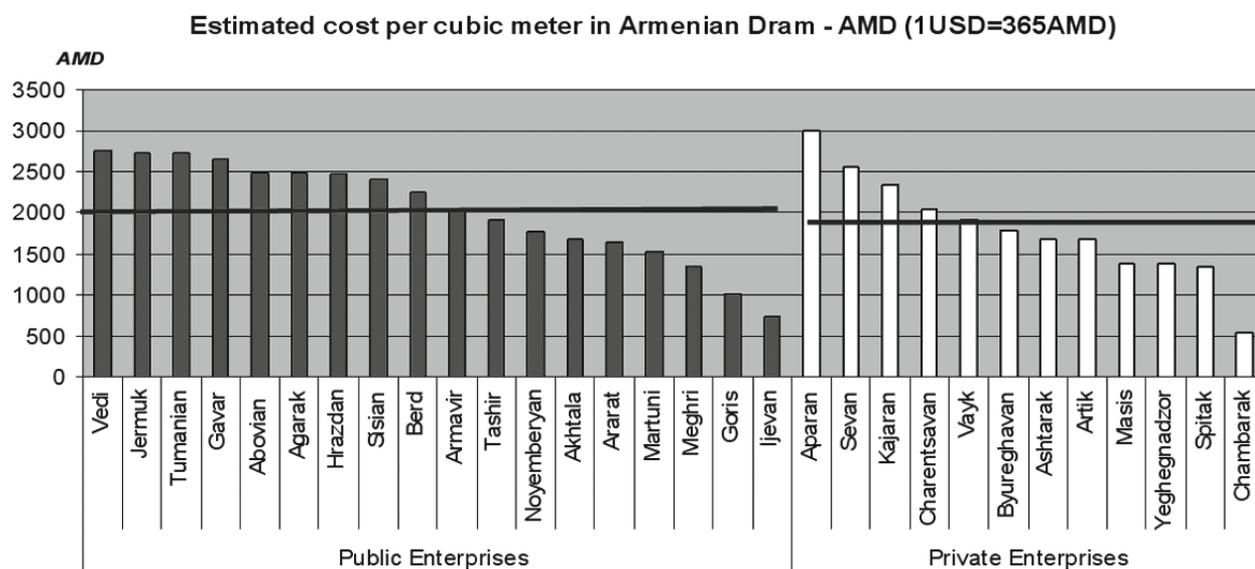


Figure 5: Estimation of the Cost of Collection and Disposal for One Cubic Meter of Solid Waste

Bonus Tracks

- Not In My Backyard (NIMBY).

In districts where service is difficult to organize, one of the solutions offered is to install garbage bins that allow a service provider to empty the bins every two or three days rather than every day (depending on the number of bins installed and amount of garbage produced). Unfortunately, this solution often engenders a NIMBY attitude. No one wants these types of bins in his/her vicinity, creating the so-called NIMBY syndrome. This syndrome is widespread around the world [13]. Consequently, service in these districts remains poor, or service is not provided at all. Usually, these districts have private houses. Installation of garbage bins is easier in apartment buildings, and the NIMBY syndrome does not occur, because there are usually places to install garbage bins that are agreeable to all residents.

The comparison of the follow-up and baseline surveys showed that many positive changes occurred during the implementation period of SW Performance Management in Armenia (see Figure 6).

There has been a considerable increase in coverage during the implementation of the Performance Management Plan. The baseline data and analysis of 24 cities showed that in some cities there were no services at all in the districts with private houses. The follow-up surveys, however, show that in a majority of cities, the service in the districts with private houses has been started (established), and consequently, the coverage has increased. At present, the increase in population served in private houses is 30%, in apartment buildings the increase is 11%, and the increase in service to legal entities is around 22%.

For apartment buildings and private houses, the change is statistically significant (the null hypothesis of equality of means is rejected at the level of 5% of significance). The data from the baseline studies (2006) and the follow-up surveys (2009) show a statistically significant difference between their respective means.

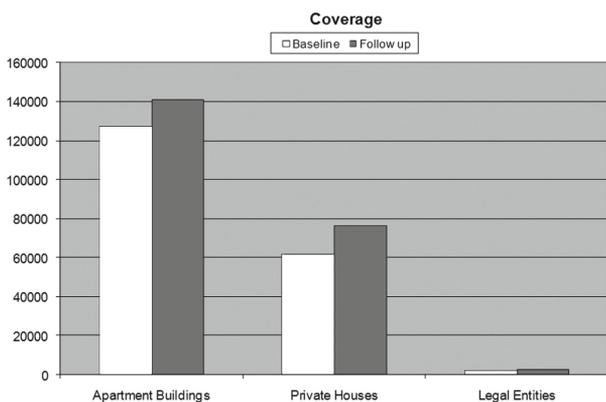


Figure 6: Coverage of Solid Waste Collection and Disposal

4.2 Number of Contracts Signed between the Service Provider and Customers

One of the main indicators of SW service quality is the number of contracts signed between service providers and customers (residents or legal entities). The actual contracts offer technical details of the quality of services, but the number of contracts signed between service providers and customers, while expressing the quantity of services, also indicates an increase of trust by customers.

A non-payment cycle usually starts with residents refusing to sign contracts for SW collection and disposal. The SW collection service is specific and differs from other services (e.g., electricity, gas, and water supply). It is very difficult to establish control over residents. If a customer does not want to pay for his/her water supply, for example, there is leverage—cut off the non-payer’s water service until he/she pays. The same leverage cannot be applied to SW collection. Technically, it is impossible to discontinue service only for those customers who are reluctant to pay, because the service is fundamentally offered to the community as a whole. Residents who refuse to sign a contract may choose to dump their garbage illegally, but the residents who do sign a contract still need the service.

Starting in 2008, LGP3/RTI staff developed a template for contracts between service providers and customers/residents. LGP3 is working consistently with cities to increase the number of contracts on the principle that “service through contracts should be mandatory.”

The comparison of follow-up and baseline surveys for contracts is indicated in Figure 7 below.

The increase in the number of contracts signed with residents living in apartment buildings is 15%; the increase in contracts for private houses is 70%; and the increase in contracts signed with legal entities is around 30%.

For apartment buildings and private houses, the change is statistically significant (the null hypothesis of equality of means is rejected at the level of 10% of significance for apartment buildings and 5% for private houses). There is a statistically significant difference between the means of the baseline study and follow-up survey—2006 versus 2009—in regard to number of contracts signed.

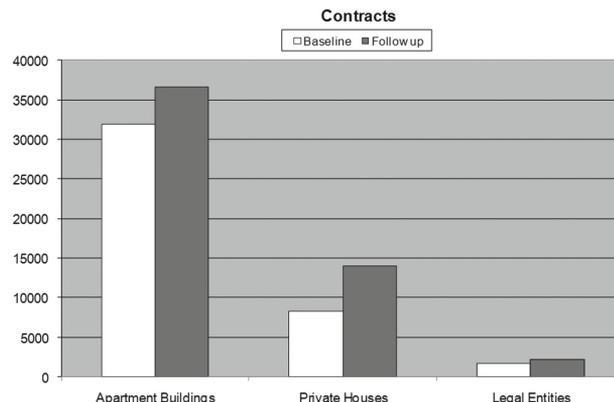


Figure 7: Number of Contracts Signed between Service Providers and Customers

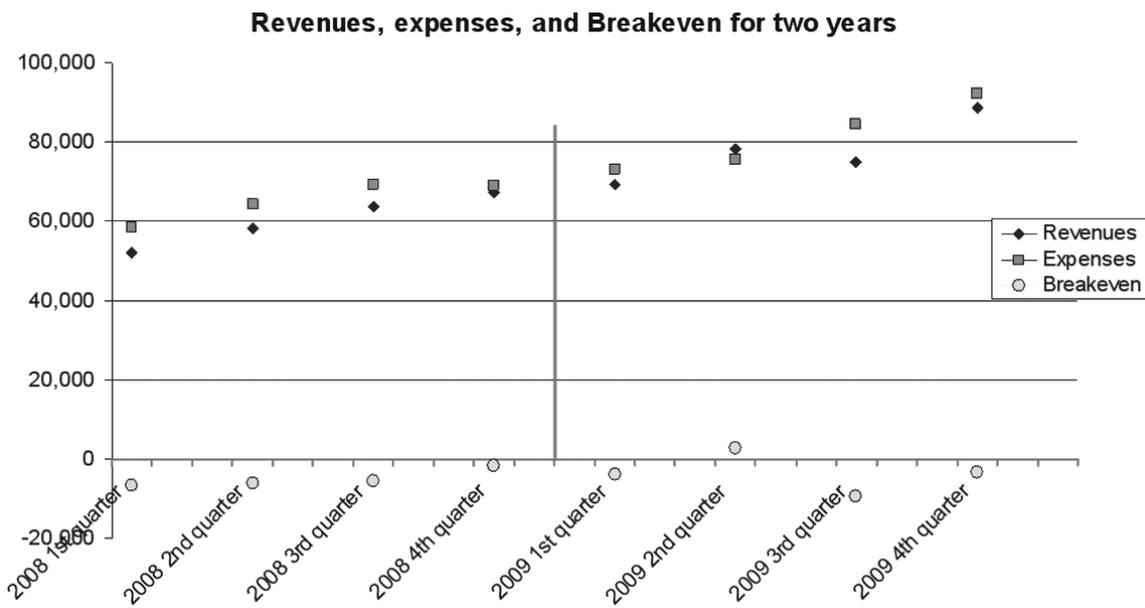


Figure 8: Revenues, Expenses, and Breakeven for Two Years in Partner Cities

4.3 Revenues and Expenses

SW collection and disposal in Armenia is being provided by private or public enterprises (the latter established by municipalities). Both types of enterprises are interested in collecting user fees, because they are the principle source of income. While private organizations (LLC, CJSC, and OJSC) are interested in gaining profit from the business of SW collection and disposal, public organizations are more interested in reaching breakeven. LGP3/RTI is working with partner cities to analyze revenue and expenses data.

Reaching breakeven is becoming crucial for public enterprises, because if income does not cover the expenses incurred by these types of organizations, the municipal budget is expected to cover the rest of the expenses. In other words, in the case of user fees not being paid or being partially paid, the enterprise providing the service cannot cover the expenses and must “rely” on the public municipal budget. This means waiting until the municipal budget covers expenses to pay salaries and buy lubricants, fuel, and equipment. Although SW collection and disposal is a service that

should be businesslike, with expenses that should be covered by clients/customers or citizens who receive the service, the final burden of covering expenses actually falls upon the municipal budget.

Private service providers are more inclined to strive for breakeven than public ones. As we mentioned above, they spend less on administrative issues, which are a major part of total expenses. The analysis of revenues versus expenses shows that private enterprises are more successful in getting closer to the breakeven point. It is surprising that some private enterprises still survive, having a negative balance with regard to revenues versus expenses (the latter prevails). However, in the majority of cases, SW collection service is provided along with street cleaning, and organizations that have a negative balance redirect SW collection expenses and list them as city street cleaning expenses, which are largely funded by the municipal budget.

Table 5 shows that in 2009 a deficit occurred more often for public service providers than for private ones (11 and 3, respectively). At the same time, more private companies than public ones worked with surplus (6 and 1, respectively). With regard to breakeven, private service providers seem to be better off than public ones.

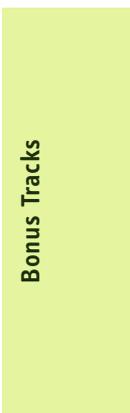
Table 5: Deficit, Breakeven, and Surplus for Public and Private Service Providers in 2009*

Service Provider Ownership Type	2009			
	Deficit	Breakeven	Surplus	Total
Public	11	1	1	13
Private	3	2	6	11
Total	14	3	7	24

*The terms “deficit,” “breakeven,” and “surplus” are defined as the difference between revenues and expenses. A negative balance is a deficit, a positive is a surplus, and a breakeven is reached whenever revenues and expenses are equal.

4.4 Prospective Financial Sustainability

The abovementioned negative balance of revenues versus expenses, either for public or private enterprises, could be changed to a positive one if municipalities and companies would view SW management not only as a commitment to fulfill (a mandatory public service), but also as a real and pure revenue-generating tool, which would entail service expansion (quantity) and increase in quality. To increase both quantity and quality of service, SW service consolidation in at least two or more communities has several advantages.



Some of the local governments in Armenia with skilled and professional staff and sufficient financial means to deliver SW removal service to customers could generate income by organizing SW removal service in underserved and weaker municipalities or villages, through the unification of SW management.

Some municipalities and villages (especially the hundreds of smaller ones with populations of a few hundred people) have extremely scarce financial resources to fulfill their mandatory functions; they are understaffed and have a weak capacity. Unifying SW management in those weak communities would be an important step.

The prevalence of weak municipalities suggests that a move to create consolidated SW service management and establish Inter-Community Unions will be more than justified in the Armenian context. Besides generating income, it will lead to other positive environmental outcomes:

- Establishment of centralized (enlarged) regional landfills, causing less environmental damage, versus several separate, small landfills scattered over a region.
- Establishment of a solid base for SW recycling in cities, citizen participation in recycling, and as a consequence, a habit of purposeful citizen engagement.
- Public-private partnerships (PPPs) for the recycling business, which will lead to the reduction of SW production in cities.

LGP3 conducted a preliminary study and pilot survey to learn about citizen attitudes about SW separation and recycling in Armenia. Source reduction through separation of garbage (SW separation, provided by residents, at the place where garbage is produced and before its disposal to landfills) will be a crucial behavior change for citizens and will set a new level of quality in the SW management business.

However, are citizens psychologically ready to provide household waste separation and source reduction in Armenia? A survey conducted in Vanadzor (a population of over 100,000) revealed positive overall results. Table 6 summarizes the answers to one of the nine questions contained in the survey.

Table 6. Are You Ready to Remove Garbage after Separation if Favourable Conditions Are Created?

Yes	No	Difficult/Refuse to answer
98%	1.2%	0.8%

The results shown above indicate that recycling in Armenia is demand driven.

Moreover, the seasonal measurements in five selected pilot cities in Armenia (organized and conducted by Magdeburg University, Germany, Department of Mechanical Engineering, Institute of Logistics and Material Handling Systems, under the guidance of Dr. Hartwig Haase) show a potential to reduce garbage production of up to 70%, on average. This creates a context that recycling could also prospec-

tively be business driven, and is confirmed by surveys conducted by LGP3 of some private firms starting to work on recycling in Armenia.

These results lead us to state that there should not be serious obstacles to incorporation of the recycling component in SW collection and disposal service in Armenia, nor to involvement of citizens in this collaboration.

4.5 Customer Satisfaction for Service Delivery

(Comparison of results of the citizen-satisfaction baseline study and follow-up phone surveys in 25 cities)

The phone survey on citizen satisfaction for SW management in cities was conducted using the special software "Citizen Opinion Polling," which is an automated information system developed by the author Emin Zavaryan (see for example, <http://www.eurasia.org/programs/grantSearch.aspx>) and installed in LGP3 partner cities by RTI. The survey contains ten questions, asked of citizens chosen by random, automated selection. Of the ten questions for analysis, two questions indicate quality of services. The first of these two survey questions to be analyzed is, "How do you rate SW management (SWM) in your street/building in general?" It is a direct question, and citizens have the chance to assess the context of the quality of garbage management in their city.

The second question for analysis is, "How often is the SW disposal usually carried out in your street/building?" This question directly shows the frequency of garbage pickup and also relates to the quality of services provided in cities. In each survey, approximately 400 respondents were questioned.

LGP3 program staff wanted to ascertain if the quality of services had changed (increased) during program involvement, and if the program-backed cities now have qualified services. More specifically, it was worthwhile to follow up on citizen satisfaction with SW management services, tracking changes (if any) before cities got specialized trucks for SW collection and disposal and technical assistance. Accordingly, the surveys were named first (baseline) and second (follow-up) survey.

How Do You Rate SWM in Your Street/Building in General?

Answers to the question "How do you rate SWM in your street/building in general?" were aggregated by respondents living in apartment buildings and those living in private houses. This division is provided because a different approach is applied to SW collection service in these two categories, and in most cases, the quality of services also differs crucially.

The answers were rated on the following scale:

1. at least good
2. satisfactory
3. unsatisfactory
4. it is difficult to answer

Quality of SWM in 25 cities

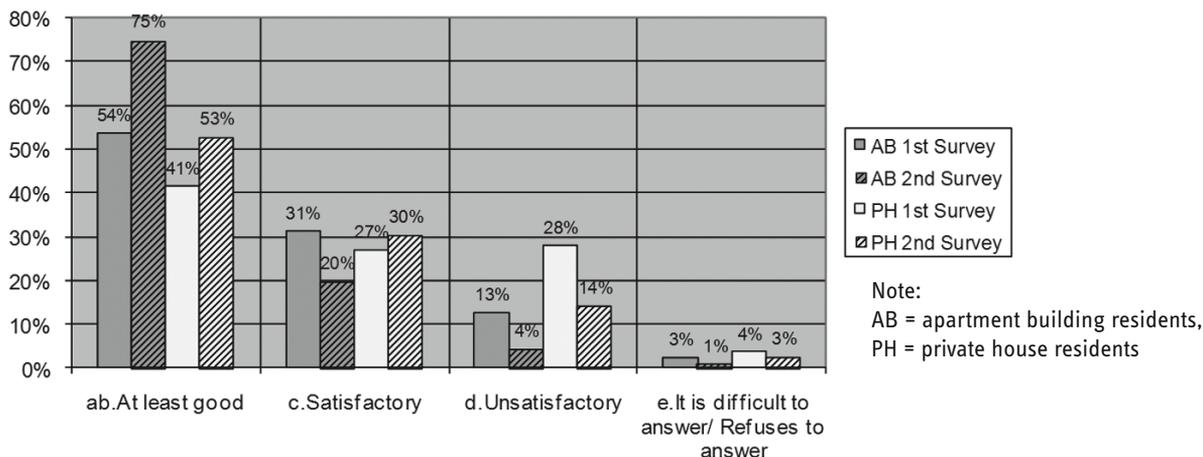


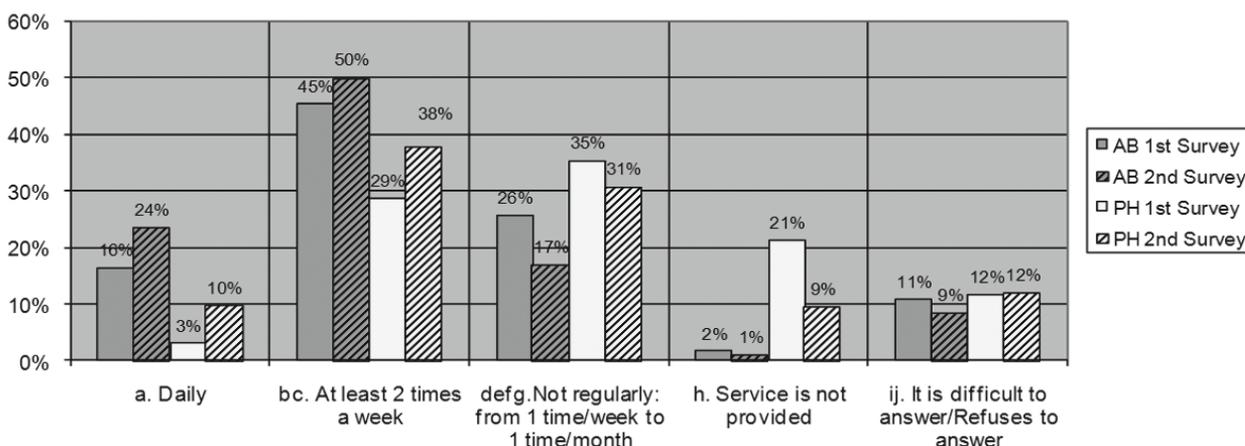
Figure 9: Summary of Surveys in 25 Cities on the Question “How Do You Rate SWM in Your Street/Building in General?” (Quality of SW Collection and Disposal)

In all cities, we see a certain decrease in “unsatisfactory” responses during the follow-up survey. This decrease is especially notable in the responses of private house residents—50% on average (see Figure 9 summarizing the two surveys). The number of those people who are unsatisfied with the service is reduced by more than half. These findings substantiate the fact that LGP3 made positive changes in SW collection service, and the context of service for private houses has significantly changed and improved. Accordingly, answers from private house owners of “at least good” increased by 12%. However, the increase in the assessment “at least good” is more notable in the answers of apartment building dwellers—21% on average.

Thus, the follow-up survey in 25 cities where LGP3 provided assistance to municipalities on SWM indicates a notable shift from answers of “unsatisfactory” and “satisfactory” toward answers of “at least good” in both types of districts—apartment buildings and private houses. A similar trend is in place with questions expressing the frequency of garbage pickup in different districts by private houses and apartment buildings. We compared a baseline survey provided in the initial stage of the LGP3 activity to a follow-up survey started in 2009. This trend corroborates the shift in results in the responses to the previous question of “quality of services.”

Figure 10 shows the increase in frequency of SW collection and disposal in cities and summarizes the results of surveys in 25 cities on the frequency of garbage pickup. According to the responses, the daily pickup service increased for both

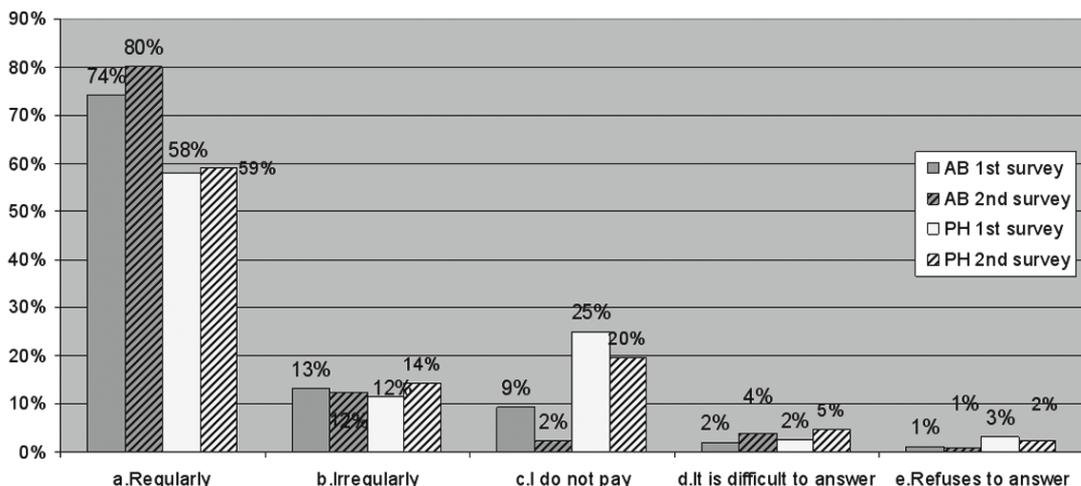
Frequency of SWM



Note: AB = apartment building residents, PH = private house residents

Figure 10: Summary of Surveys in 25 Cities on the Question, “How Often Is the SW Disposal Usually Carried Out in Your Street/Building?” (Frequency of SW Pickup from Bins)

Willingness to pay in 25 cities



Note: AB = apartment building residents, PH = private house residents

Figure 11: Summary of Surveys in 25 Cities on the Question, “Do You Pay for SW Collection and Disposal?”

private houses and apartment buildings. The responses on frequency of “at least two times in a week” increased for both apartment buildings and private houses, while the response “not regularly” (which includes a range with less frequency) decreased in both districts. Of note, the answer “the service is not provided at all” decreased substantially (by more than half) in the districts with private houses. There is a notable shift from responses of “service is not provided at all” and “is not provided regularly” toward responses of “at least two times in a week” (mainly) and “daily” (to a lesser extent) for both apartment buildings and private houses.

4.6 Willingness to Pay

It is evident that SW collection and removal service for apartment buildings is conducted relatively better than the same service for private houses. This difference in quality stems in part from the difference in coverage—the number of population served is higher in apartment buildings than it is in private houses (see Figure 6)—and is evidenced in citizens’ answers to questions about quality (apartment building residents are more satisfied than those in private houses (see Figure 11). Accordingly, the willingness to pay for services is higher in apartment buildings residents (according to their responses in surveys). This propensity started with the baseline survey and continued through the follow-up surveys.

Based on the results of the surveys, we can conclude that compared to private house residents, apartment building customers have a higher willingness to pay for SW services, but the capability to pay is almost equal in both places. Local authorities usually explain the poor rate of customer payment as being a social condition of the residents. We accept that the social condition of residents can play an important role in collection of revenues, and that the payer should first be capable of paying. However, according to results discussed in the previous paragraph, the quality of service is more influential than social conditions when it comes to a willingness to pay. The social conditions of respondents living in private houses and apartment buildings are approximately the same, but the willingness to pay is in direct proportion to the quality of services. This is also true for other services [12].

5 Conclusions

- Technical assistance/training programs and projects that ensure equipment for municipal service improvement reinforce each other, and the best result is achieved when those two types of assistance are provided together.
- A co-financing procurement mechanism is good leverage for a non-biased definition of priority of services. It enables municipalities to become accustomed to and ready for more advanced borrowing mechanisms.
- In the development of a Performance Management Strategy on SW collection and disposal service, various stakeholders should be involved, and citizen representation be included.
- SW Management service is much more efficient and transparent when a written contract or agreement exists between customers and service providers.
- Private enterprises incur less administrative expenses than public ones.
- The majority of private enterprises succeed in reaching breakeven, and their revenues are higher than their expenses. Fewer public enterprises than private enterprises were able to reach breakeven.
- There is a tendency to convert private enterprises into public ones.
- There is no statistically significant difference between unit costs of service provided by public enterprises and those provided by private enterprises. That means there is no difference in the efficiency of services provided by either private or public enterprises. That might be one reason for the propensity of municipalities to convert the service provided by private enterprises into one provided by public companies.
- There should be no serious obstacles to incorporating the recycling component in SW collection and disposal service in Armenia. The recycling in Armenia has attractive prospects.
- Separation of the two services—sanitary cleaning and SW collection and disposal—may lead to more efficient, client-oriented SW management. If these services are not separated, there is a chance for enterprises to cover expenditures at the expenses of the public budget.
- Citizen satisfaction was raised during the period between our two surveys (up to four years' interval), and the comparison between the baseline survey and follow-up surveys has shown positive change in quality of service, frequency of pickup, and willingness to pay.
- Willingness to pay is connected to and in direct proportion to quality of services.

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