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REGIONAL REVIEW OF ECONOMIC INSTRUMENTS FOR SOLID WASTE MANAGEMENT IN LATIN AMERICA AND THE CARIBBEAN

The regional situation and case studies about the private participation in Santiago and recycling in La Reina Municipality, Chile.

EXECUTIVE SUMMARY

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The purpose of this document is to present a brief summary of the economic instruments in use for solid waste management in the region and to present two case studies of such use in Chile. These case studies refer to the industrial organization for the collection and disposal of residential solid waste in the city of Santiago and the development of a collection and recycling scheme in the Municipality of La Reina, in Santiago.

This document presents, as a frame of reference based on the available bibliography, the main aspects related to the reality of solid waste management in Latin America. On this basis, we comment on the economic instruments that could theoretically be used to improve the usual problems of low coverage, poor service quality, pollution, etc, currently being observed in the region.

Following that, we comment upon the instruments that are being used in the various countries, analyzing their efficacy and efficiency in achieving the intended goals.

The solid waste situation in Chile and its institutional setting are presented in Chapter III, as a frame of reference for the case studies analyzed in this work.

These case studies essentially include the following: a description of specific problems faced and the explicit and implicit objectives used in their design; the characteristics of the instruments as such; the main problems and critical factors considered; an appraisal of the results obtained from its application; and the recommendations and lessons learned.

This study has a preliminary or exploratory nature, as more detailed quantitative information, that would allow a deeper evaluation and support of the analysis of the various issues, has not been available. This notwithstanding, the available qualitative elements are thought to be clear enough to guide the recommendations that follow from the analysis.

I. Regional solid waste management situation[1]

In the region, the solid waste sector is generally the responsibility of local governments (municipalities), which have searched various options to improve the service coverage and quality. An important share of the municipal budgets (between 20% and 50%) is spent on the administration and management of solid waste services.

In spite of the fact that this activity has high visibility and a high political profile in cities, the public resources destined for the needed investments and their operation have been insufficient. Average coverage for collection in large cities is about 89%, while for smaller cities, coverage fluctuates between 50% and 70%. The municipalities are faced with the additional pressure of the constant population and economic growth.

[1] In this study, region refers to Latin America and the Caribbean countries. Figures cited are taken from Acuirio, Guido, et.al. 1997.

In this setting, many countries have considered, to various degrees, the participation of a private sector initiative to solve the increasing demands of the sector. Currently, private operators under different participation schemes provide about 40% to 50% of the regional services. Even though the benefits of the participation of the private sector in service provision are evident, this requires significant monitoring and policing in addition to an adequate regulatory framework to mitigate the risks to the community, to the local governments and to the private operators themselves.

In general, the services' financing has come from national revenue transfers, from municipal tax revenues and, in a few cases, from tariffs charged on other public services. User charges have been of limited application and their efficacy has been weak.

Among the most relevant critical aspects for sector development it is necessary to mention the following:

- In general, the norms are dispersed among many legal bodies, with many duplications and contradictions. In this same context, a multiplicity of entities has responsibilities in the sector, a situation that implies coordination problems.
- Lack of institutional capacity of the executing and normative entities that must assume sector responsibility.
- Lack of information systems that allow the monitoring and integral evaluation of the solid waste services.
- Lack of medium and long term planning.
- Private sector participation requires greater transparency in the hiring process and better control of contract obligations, in order to assure an effective level of competition and to exploit economies of scale.
- To create public awareness on the real cost of solid waste management and on the importance of waste minimization.

II. Use of economic instruments

The use of economic instruments for the solution of environmental problems, and in particular for solid waste management, has become more relevant as a tool in order to improve upon the level and delivery conditions for the collection and disposal of wastes.

For purposes of this study, the term economic instrument is understood to refer to any policy, tool or action which has the purpose of affecting economic agents' behavior, in view of improving the efficiency, efficacy and equity in the allocation of resources, as well as the financing of the activity.

These economic instruments can be contrasted with those "command and control" actions which through norms, regulations, controls and sanctions, try to determine the standards to be followed by the economic agents in their decisions of what, how, when, where and how much to produce and consume.

Among the best known economic instruments applied in environmental issues in general, and in the provision of public services in particular, are user charges and taxes and subsidies that may affect consumption, production, product and production processes' changes, so that externalities that occur in waste production are "internalized".

In this study, those actions directed to creating or facilitating the operation of markets that through competition may produce price signals for socially efficient decision-making are also included. Among these instruments we find those related to the development of recyclable wastes and to the establishment of rules for private sector participation.

The bibliographical review on the application of economic instruments for solid waste management in the region shows that some of these instruments are being widely and significantly used, while for others only some isolated experiences are known.

Firstly, a frequently used instrument is user charges for the collection, transferal and disposal of solid wastes. A least in countries like Bolivia, Brasil, Chile, Colombia, Ecuador, Jamaica, Mexico y Venezuela there is experience with this instrument (Huber, Richard M., et. al., 1998).

It is usual, however, that for residential wastes these charges are fixed and must be paid periodically, unrelated to the volume, weight or type of waste being disposed of. In this case, the economic instrument is being directed exclusively to the achievement of cost recovery and not towards the reduction in generated wastes. For example, in the urban municipalities in Greater Santiago, where this instrument has been used for many years and is considered a successful case, recovery is about 55% of service cost.[2] The essential problem is that it is not possible to exclude from service those who do not pay, which makes it impossible to recover the total cost. The use of charges through territorial taxes has the inconvenience that collection costs are high, as it usually involves the use of legal mechanisms and, therefore, has a high non-payment rate.

A simple and cheap method for increasing recovery is to add this charge to the bill of some other utility. In Colombia, this unified utility bill is the usual practice in many cities, and it has been used recently also in Guayaquil, Ecuador and La Paz, Bolivia, where it is applied as a surcharge on the electricity bill (Huber, Richard M., et. al., 1998). This policy allows a higher level of recovery, and some degree of progressiveness (higher income families consume more electricity and therefore pay more for solid waste services), even though it generates a distortion in the electricity market, without increasing the efficiency in the solid waste market.

It seems that there are no experiences in Latin America of residential user charges based on volume, weight or type of waste. Even though the necessary technologies exist, the general understanding is that the controls needed for an effective application of this type of charges and to avoid fraud or abuses, substantially exceed the institutional capacity of local governments.

However, it is possible to highlight the cases of Chile, Colombia and Rio de Janeiro where non-residential user charges are directly related to the weight of the wastes being collected. In Santiago, Chile, for example, these users freely agree on the service conditions with the many existing private collection companies. Under this concept, users internalize at least the private costs of providing the service in their marginal consumption and production decisions, achieving a more efficient social solution. [3]

[2] See section IV, infra.

[3] A fully efficient solution would requiere that private costs are obtained in a competitive environment and that they include all social costs involved .

It is important to note that user charges should ideally distinguish among the costs related to providing the service in every and each of the stages involves, i.e., collection, transport, transfer, and final disposal. In this manner, a final user might opt, for example, to transport by his own means his wastes to a final disposal site, which would charge a fee related to that stage of the service. Differentiated charges by stage exist in countries such as Ecuador, Colombia, Venezuela and Chile (Huber, Richard M., et. al., 1998).

A second economic instrument extensively used in the region is the deposit and refund system for recyclable wastes. In countries such as Barbados, Brasil, Bolivia, Chile, Colombia, Ecuador, Jamaica, Mexico and Venezuela these systems exist for products like paper and cardboard, glass bottles, aluminum cans, tires and others (Huber, Richard M., et. al., 1998). Under this system a consumer, when buying an affected good, pays an amount that is reimbursed when the consumer returns the recyclable waste.

An interesting characteristic of this activity is that in most countries it is voluntary, based on the interest that many producers have in reusing the recyclable materials. Mexico is the only known exception to this rule, as used car batteries must be returned to acquire a new one (Huber, Richard M., et. al., 1998).

An interesting variant of the above refers to the initiatives that some municipalities have taken to organize this process. In many cases in Brasil and Chile,[4] these have organized and "formalized" waste collectors, so that they contribute in a better way to the collection and separation of recyclables, aminorating the social problem associated with these collectors.

Those schemes in which the private sector has been involved in the service for the collection, transferal and disposal of wastes, are included under the definition of economic instruments indicated above. The rationale for the above mentioned involvement has been the low levels of observed coverage, the high inefficiencies of municipal operators, lack of financial resources and the extensive number of illegal dumping.

To date private operators, under direct contract, service 40% to 50% of cities in Latin America. Studies indicate that there have been important cost reductions (50% in 5 cities studied) due to larger labor and vehicle productivity. Contract duration is about 5 to 8 years, with periodic re-bidding so that there is competition for the market (Bartone, Carl, 1999).

Lessons learned, among others, in this privatization process are the following: there is the need to develop an overall framework for private sector participation; there have been some justified increases in costs; cost recovery continues to be a problem; municipal labor issues need to be resolved previous to the process; municipal institutions for contract regulation need to be strengthened; and improvement of contract characteristics is needed (well defined standards, payment against results and regular monitoring).

[4] The Chilean case study presented below examines this experience for the Municipality of La Reina in Santiago.

III. The management of solid wastes in Chile

In general, the situation of the management of solid wastes in Chile does not differ from the problems already noted for the region as a whole. Some specific aspects are detailed in what follows.

The production of solid wastes in Chile has grown in the last decade as a consequence of higher living levels, higher urbanization and changes in consumption patterns. At the national level, the production of solid wastes has increased 28.6% in only four years, from 0.62 kg/person/day in 1996 to 0.82 kg/person/day in 2000 (INE, 2001). Industrial wastes at the national level reached 2,516,000 tons in 1998, according to estimates of the National Environmental Commission (CONAMA, 2000a), of which 37% are from the Metropolitan region

As the data from the Metropolitan Region indicate, the mix of solid wastes has shown some changes in the 1992 – 2000 period, with organic wastes having declined their share from 49% to 42%, and with a growing share of papers, cardboards and plastics, from 29% to 36% in the same period.

90% of the urban population in Chile has collection services, with a frequency that varies between one and three days per week. The main method for disposing home wastes is by using plastic bags put at the sidewalk in a small receptacle. In any case, over the last years the use of containers for depositing wastes has increased.

In 1981, a process was initiated by which the private sector had an increasing involvement in the waste collection stage, with the result that currently about 90% of the population has this service provided by private companies. This scheme operates through the subcontracting by the municipality of collection, transportation and disposal services. A detailed analysis of this experience for the metropolitan area of Santiago Chile is presented in the following section.

Currently about 85% of the country's urban population have final disposal by means of sanitary landfills. In the year 2000 there were a total of 246 sanitary landfills in the country, of which 72 have a legal sanitary authorization, and 77 have a useful life of less than 5 years. This notwithstanding, the existence of clandestine disposal sites is still significant (CONAMA, 2000b).

At the national level there is no specific legal framework for the management of solid wastes. Legislation affecting the sector is found dispersed in great many legal bodies of all types and origins, and with different legal hierarchy. Even though the responsibility for providing the service falls on the municipalities, entities like the Health Ministry, the Housing and Urban Development Ministry and the National Environmental Commission are also responsible in matters related to norms and controls.

IV. Case study of the collection and disposal of solid wastes in Santiago, Chile.

As a case study, this report considers the industrial organization for the provision of residential solid waste collection and disposal services in Santiago, Chile.

Fundamentally, since the early eighties the sector organization has consisted in each of the 56 municipalities that constitute the metropolitan area have openly bidden for the collection service with private companies. Up to that date the services were provided directly by the municipalities.

As a consequence of the 1982 - 1983 economic crisis, and following a tendency of that time towards the privatization of public services, the municipalities adopted a strategy for the externalization of services.

Tender documents have been relatively similar among each other, and they establish the parties' mutual obligations, including aspects such as exclusiveness of the collection area, 5 year contract duration, standards for the quality of the service (timetables, use of uniforms by employees, new and technically adequate vehicles, etc.), as well as the price to be paid by the municipalities, which generally is a fixed monthly payment.

The essential point of this experience, and which represents a difference from other cases in Latin America, is that each municipality has acted independently from the others, thereby generating an interesting number of companies that participate in these bids, inducing significant cost savings. Even though, only three companies control 60% of the market, current costs are only from US$ 7.7/ton to US$ 26.7/ton.[5] This compares to other significantly higher prices in the region, which vary between US$ 15/ton. and US$ 40/ton. (Bartone, Carl, 1999; Acurio Guido, et. al. 1997).

The rationality of this approach is based on the fact that there are no significant economies of scale at the residential waste collection stage. That is, average costs do not vary with the volume of wastes collected. Available data for Santiago, Chile allow us to corroborate this situation. Under these conditions it does not make sense to integrate the collection service in wider geographical areas. The presence of a high number of service providers (11), and some other 30 potential entrants, assure that there is sufficient competition to maintain minimum possible costs.

Among the problems of the system, that can be improved upon, we highlight the alleged lack of transparency in the awarding of some contracts, the lack of municipal policing which is based mostly on users' complaints, and the existence of numerous clandestine dumping sites.

Referring to transfer and final disposal, the association of the municipalities has been convenient for the purposes of bidding these activities to private companies. To date, there are 3 sanitary landfills, all of which compete, at some level, for the reception of wastes.

In this case, multimunicipal associations or companies, have jointly bid the service assuring each participant the delivery of wastes from their municipality, in exchange for a payment based on weight received. Contracts are long term (20 years) and they include the obligations set by the concessionaire to receive and adequately dispose of the wastes, complying with the pertinent technical and environmental norms. The concessionaire may also receive wastes from other users, mainly non-residential, freely setting the price to be charged. The rationale behind this scheme is that in the transfer and disposal activities there are significant economies of scale, according to which average costs decrease with the size of the sanitary landfill.

[5] According to data gathered by the consultant from different sources.

Current prices for disposal in Santiago are about US$ 4/ton and US$ 7/ton,[6] which are below the costs observed in other cities in the region, of about US$4-12/ton. (Acurio, Guido, et. al. 1997).

An interesting aspect of this process is that the bidders propose the sites for final disposal, and it is their obligation to buy it and obtain the permits. This permit processing is the most complex and risky aspect of the business, due to the environmental obligations that must be met, which in one case were imposed after the bidding, and the phenomenon of community rejection to having a sanitary landfill in their municipality.

V. Case study of recycling in La Reina Municipality[7]

The municipality of La Reina, in Santiago, Chile, faced a significant social problem in the early nineties, related to the activity of some 1,500 informal waste collectors ("cartoneros"). At the same time that Municipality, which contains the city's largest park area, had significant clean up expenditures.

To mitigate these elements, the municipality, together with a company in the waste management sector, took the initiative of organizing a system for the collection, separation and resale of recyclable products, especially paper, cardboard, glass and plastic.

The initiative consisted of organizing the activity by means of granting a permit to a company to install a collection center, provide the collectors (cartoneros) with a uniform and a container, and train them in the process of waste separation. The company signed an agreement with each cartonero establishing the price to be paid, fixed and adjustable for inflation, by weight and type of waste received.

Originally, the financing of the scheme was based on the resale of wastes that the company would make to manufacturers that demand this type of recyclable products. However, after two years of initial operations, and given the high volatility of the sale price for the recyclables, the permit was reformulated so that the company was authorized to sell space on the containers for publicity, generating additional and more stable revenues. At the same time the municipality exempted the company from the payments for the right of using public spaces for publicity.

Under this new financing scheme, the company operated successfully during the following six years. But in 2001, and as a consequence of a significant fall in the price of recyclable products and publicity sales related to the country's economic downturn, the scheme ceased to be feasible and the company closed operations.

To date the municipality and the company are negotiating a new type of arrangement to continue this activity.

33% of the municipality families (24,000) participated in the recycling program, with an average of 84 ton/month of commercialized products. The greatest recovery rates were for plastics and paper, reaching nearly 40% of the total generated waste. Taking into account that about 40.050

[6] According to data gathered by the consultant from different sources.

[7] The background information for this case study comes from in depth interviews to municipal authorities and to the owner of the operating company.

tons are disposed of yearly in the municipality of La Reina, the rate of recycled wastes reached on average about 2% of this total.

In terms of the social objective, the undertaking can be considered a success as they effectively allowed the mitigation of the negative impact of the cartoneros activity, improved the municipal image and its inhabitants' quality of life. From a financial point of view, the net saving was scarce, as only about 2% of the wastes were recycled annually.

Among the aspects to highlight from this experience we find that this initiative was financially feasible for many years, though not from revenues obtained by reselling recycled material; and there was a hidden subsidy in the fact the municipality did not charge for municipal publicity rights.

The aspects that could be corrected or improved upon, are the following: to bid the permit avoiding a direct negotiation, a better allocation of price variability risk between the company and the cartoneros, eliminating at the same time the risk that the cartoneros would sell to other competing buyers, and the establishment of a contract between the municipality and the company to define the rights and obligations of the parties.

VI. Conclusions and recommendations

The traditional approach for solid waste management used in the region has been that local governments, through their own companies or services, are directly in charge of the collection, transportation and final disposal of these wastes. Coupled with this action, numerous norms and regulations of "control and command" type are applied in order to eliminate or mitigate the externalities associated with the generation and disposal of these residues.

The option of using economic instruments has emerged, as an alternative to this approach, in order to improve the efficiency and efficacy of waste management. In a broad sense, these instruments operate through incentives that affect economic agents' decisions. Among them are included: the policy for setting user charges, all sorts of taxes and subsidies in related markets, and the development of markets for the provision of these services, including the involvement of private operators.

In this setting it is noted that the main economic instrument used in the region is the involvement of private operators for the collection, transport and final disposal of wastes. This experience has shown that such a scheme for industrial organization is feasible, and in general, has been successful, as an option for the management of solid wastes, if the central aim is to minimize the costs of providing the services. Its use could be increased throughout the region.

Although the results from this experience are favorable, the lessons learned indicate that there are many aspects that must be of special concern in their utilization. These aspects are related mainly to assuring that the service provision is carried out in an effective competitive framework, with clear and transparent rules, and with adequate policing mechanisms.

The particular case of Santiago, Chile, shows that, for these purposes the following initiatives has been successful: to leave the provision for collection open to competition and transportation services for non-residential users; to bid contracts competitively every 5 years at a municipal

level without including larger geographical areas; to have clear contracts; to use users complaints extensively as support to the policing and control of providers, to separate the provision and charges by service stages, and to bid a low number of sanitary disposal sites to exploit scale economies.

Another type of instrument that has spontaneously developed in many countries is deposit and refund systems for recyclable wastes, especially paper, cardboard, glass, aluminum cans and plastic. In this case, the companies that demand this type of materials have generated a significant market for the recycling of wastes, including their importation and exportation. In those countries where such systems have not been well developed a more detailed analysis is needed to identify the measurements that would allow the stimulation of such markets.

The issue of recycling is related to the social problem of informal collectors. There are experiences in which municipalities have organized these collectors to face this matter, trying to "formalize" their activity, improving their living conditions. The case study of La Reina in Santiago, shows that it is feasible to develop this type of scheme, although it required an significant subsidy to maintain its financial feasibility for over eight years.

For the purposes of achieving efficiency in resource allocation as an essential economic instrument are user charges. For this instrument to be really useful it is necessary that charges be directly related to the volume, weight and type of waste, and that these charges are actually collectable. Only in this manner it would be possible that users adjust their waste generation levels to a more adequate level.

The regional experience shows that, in most cases, these conditions are not met. Basically, user charges tend to be periodically fixed values, unrelated to waste generation, and in most cases collection is low. Initiatives to incorporate this charge in other public service's bill have helped to increase collection significantly (cases of many cities in Colombia, Guayaquil and La Paz), targeting at least an increase in the financing of this activity. Chile, Colombia and Rio de Janeiro are known cases where there are charges by weight, applicable mainly to non-residential wastes. This is an area where developed countries' experiences may be of great interest.

In addition to the above, it is necessary to highlight the potentially relevant use of taxes at the final disposal stage, taking into account the residual air, water and soil pollution that its normally caused at this stage. The internalization of this cost along the waste production chain would allow for the correction of an important externality of this activity. There is no experience in the use of this type of taxes in the region, partly due to the financial weaknesses of the municipalities, which are not in the position for paying a tax of this type, either directly or indirectly. Its application should be tied to the strengthening of user charges, as indicated. It would also require better control of illegal dumping sites.

Ultimately, the study shows that there are some important economic instruments in use in the region and that their greater dissemination could be of interest for other countries and cities. However, there is still a lack of experience in some instruments that may have a large potential for increasing the efficiency of solid waste management.

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