



Quality of Life and Alliances in Solid Waste Management

Contributions to Urban Sustainable Development

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This paper examines the contributions that new alliances in urban solid waste management (SWM) systems can make to the quality of life by improving effective provision of this urban basic service, based on case studies of three multi-million cities in developing countries: Chennai, India; Manila, Philippines; and Lima, Peru. It starts with a systematic examination of the main types of alliances formed around SWM activities (including formal collection, transportation and disposal as well as informal collection, trade, re-use and recycling). These include public–private, public–community, community–private and private–private alliances. The main conclusion is that local authorities work together with large enterprises and non-governmental organisations (NGOs), but refuse to deal directly with the informal trade and recycling enterprises which recover large fractions of waste – linking to them only through NGO or community-based organisation (CBO) mediation. It goes on to examine the contributions different alliances can make to sustainable development in cities, utilising the multiple goals of sustainable development as developed by Satterthwaite in 1997 (*Urban Studies* 34 (1997) 1667). Using a nine-point indicator system, it shows that current contributions of alliances between local authorities and large enterprises lie mainly in the area of improved disposal, cleaner neighbourhoods and financial viability. In contrast, alliances between local authorities, NGOs or CBOs and through them informal trade and recycling enterprises contribute more heavily to financial viability, employment, and cleaner urban neighbourhoods, as well as greater re-use and recycling of waste fractions. © 2001 Elsevier Science Ltd. All rights reserved.

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Introduction

Research on urban solid waste management (SWM) in developing countries has developed from two main concerns: the concern for public sector reform (including privatisation issues), and the concern for sustainable development in the urban context.¹ The

latter is associated particularly with a focus on quality of life (QOL) aspects.

The first category of studies is closely connected to the neo-liberal doctrine proclaiming a resurgence of the market and a reduction of state control. The structural adjustment programmes of the 1980s included as crucial items curtailing of government bureaucracies and cutting of public expenditure. The strong push for privatisation initiated then still has strong effects on policy discussions about delivery of urban services.

Private sector involvement in service provision raises issues of public interest and acceptability. Governments must still ensure appropriate standards, achieve co-ordinated provision, provide a competitive environment, avoid monopoly control of essential services by non-accountable private providers, and mini-

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¹While admitting that any dualistic divide has something artificial and fails to do full justice to the wide variety of positions, these two basic orientations nevertheless seem to be real. However, individual authors will not always explicitly admit to one of these orientations. Being categorised within one of the two literatures does not automatically mean compliance with the main tenets.

mise corruption and inequity (Rondinelli and Iacono, 1996; Burgess *et al*, 1997). Therefore, privatisation in service provision usually implies a public-private arrangement. In such situations the government retains some degree of power, while saving on costs, reducing political interference and red-tape, and lowering levels of coercion. SWM studies in this category include those by Bartone *et al*, (1991), Ali (1993), Fernandez (1993), Cointreau-Levine (1994), Lee (1997), and Post (1999).

Sustainable development is the second major source of inspiration for many analyses of SWM systems in the developing world. The 1992 Earth Summit brought environmental problems to the forefront of international policy debates. However, developing countries have made it abundantly clear that environmental policies should reflect their own priorities and not curtail their legitimate desire for economic growth. They have shifted the environmental focus from issues of natural resource depletion and resource management² to pollution issues (the so-called "brown agenda"), with a predominantly urban focus (UNCHS, 1996). The brown agenda is defined as

. . . the immediate and most critical environmental problems which incur the heaviest costs on current generations, particularly the urban poor in terms of poor health, low productivity and reduced income and quality of life: lack of safe drinking water, sanitation and drainage, inadequate solid and hazardous waste management, uncontrolled emissions from factories, cars and low grade domestic fuels, accidents linked to congestion and crowding, and the occupation of environmentally hazard-prone lands, as well as the interrelationships between these problems (Bartone *et al*, 1994: 10-11).

This focus on pollution problems carries implicitly a conception of sustainable development, which combines "meeting the needs of the present generation . . . without compromising the ability of future generations to meet their own needs" (cf. Mitlin and Satterthwaite, 1996; Satterthwaite, 1997: 1681). Improvements to the natural environment are considered in conjunction with improvements in the quality of life in the urban habitat. SWM studies carried out within this framework usually deal with the contributions various actors can make to improve environmental performance as well as contribute to urban livelihood strategies. These include contributions by Furedy (1992, 1997), Pacheco (1992), Bose and Blore (1993), and Baud and Schenk (1994).

Both sets of literature share a preoccupation with relationships between actors. In the literature on privatisation of SWM, the analysis of public-private partnerships is given primary importance, and usually covers collection, transportation and disposal activi-

ties. Studies enlarge on failures in public servicing, and suggest different methods of privatisation for greater efficiency and effectiveness. The major concern is to evaluate the organisational and financial aspects of privatisation initiatives, and to assess the capacity of government departments and private contractors to perform their new roles.

Little attention is given to the potential of small-scale, private operators and community-based organisations (CBOs) removing solid waste informally from residential areas. Local authorities prefer to link up with formal enterprises. There is an emphasis on strong contractual arrangements, for which informal businesses and communities do not qualify. Although their potential is increasingly acknowledged, few governments have started to include them in their policies.

In the literature on SWM from the perspective of sustainable development, a larger range of investigated relationships is covered, including public-private, community-public and private-private arrangements. Although some studies relate to public sector activities, the majority focus on other activities within the SWM system – notably, separation of waste, and the productive use of waste. Focus is often on examples of informal economic activities and community initiatives. Studies deal not only with linkages laid down in (semi-)contractual arrangements, but also with small-scale business transactions³ and the impact of official rules and regulations on private or communal undertakings. Finally, more effective provision of services to poor households and the safety and health aspects of activities within the SWM sector are given more importance (Huysman, 1994).

A major gap in the current literature on SWM in developing countries is that the system is rarely investigated in its entirety, and assessments combining ecological, environmental health and socio-economic considerations are still largely absent.⁴ This paper attempts to contribute to a framework for integrated assessment by (1) identifying existing types of partnerships in SWM systems, and (2) carrying out a qualitative exploration of their contributions to a QOL perspective by looking at such socio-economic and ecological aspects.

Actors and alliances in urban solid waste management

To identify the actors and potential alliances the following model, based on earlier work at the University of Amsterdam, is used (Baud and Schenk, 1994). In

²Namely, the prime environmental worries in the North.

³Forward and backward linkages among firms.

⁴Currently, an attempt is being made in a comparative study of Nairobi and Hyderabad by researchers from the Moi University, the Centre for Economic and Social Studies in Hyderabad, and the International Institute for Environment and Development in London, coordinated by the University of Amsterdam.

urban SWM practices, the range of actors can be clustered into the following main groups:

- the public sector (national authorities, local authorities and local public departments) constituting a central set of players;
- the private sector (large and small registered enterprises carrying out collection, transport, disposal and recycling);
- the small-scale, non-recognised private sector (waste pickers, itinerant buyers, traders in waste materials and non-registered small-scale enterprises);
- local community and its representatives (NGOs and CBOs).

In this paper the term alliances is used to describe established relationships between actors in the SWM sector. Similar to a partnership, the distinguishing features of an alliance are:

1. It involves two or more actors.
2. It refers to a more or less enduring relationship between the actors (based on a written or verbal agreement).
3. The relationship is mutually beneficial (without assuming equality between actors).
4. It finds expression in concrete (physical) activities.

Fig. 1 shows possible alliances between the various actors in the SWM system. It must be considered a heuristic analytical framework, ready to be tested against the empirical situation found in any city.

Contributions to sustainable development

The contributions to sustainable development, as delineated by Satterthwaite (1997), have been adapted more specifically to a nine-point indicator system for urban SWM.

In order not to compromise the situation for future generations, SWM needs to work towards the following goals promoting sustainability:

1. production of waste should be minimised;
2. material re-use and recycling should be maximised (as well as energy recovery);
3. remaining waste should be disposed of in a controlled fashion, in order not to exceed the absorption capacity of local sinks.

For meeting human needs, several economic, social and public health goals need to be included. These should encompass recognition that SWM creates employment, which needs to provide a living wage, be safe and healthy, be carried out with dignity and respect, and should promote equality among the people working in the sector (Baud and Schenk, 1994; Hunt, 1996). The system should also be accessible, affordable and well co-ordinated to remain viable. A socio-economic and public health assessment of SWM systems includes the following additional goals:

4. better co-ordination within the SWM sector;
5. a financially viable system for both consumers and local authorities (and private enterprises where relevant);

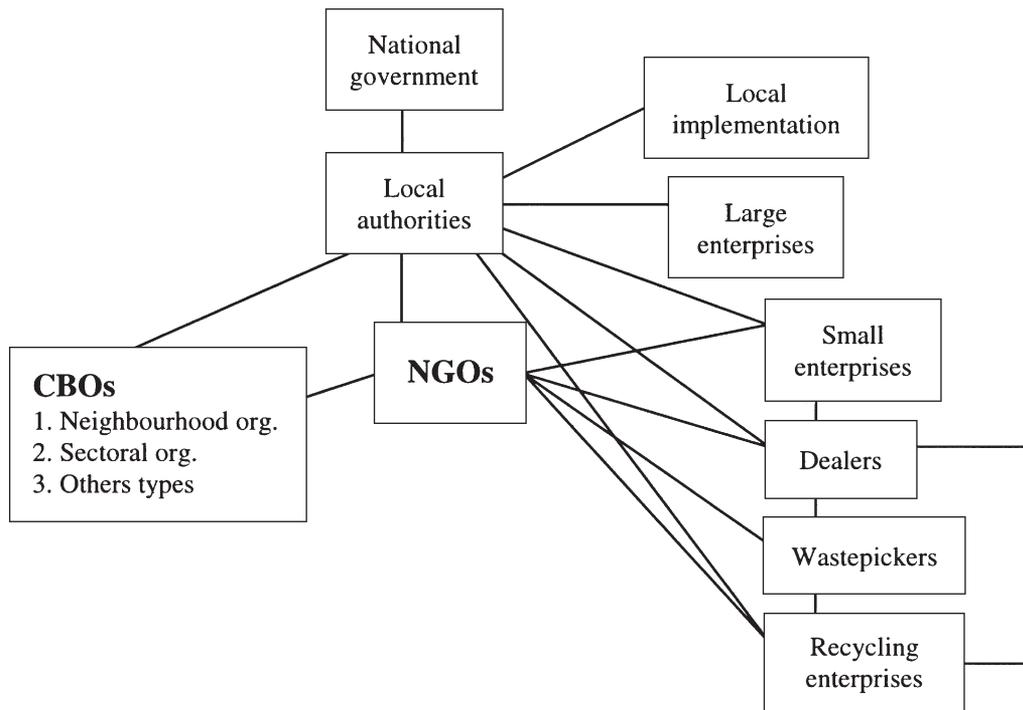


Figure 1 Possible alliances in urban solid waste management

6. employment with a living wage (and minimum job security) should be provided;
7. health and safety aspects should be given attention;
8. greater effectiveness in terms of clean and healthy urban environment;
9. legitimacy in the eyes of the actors and consumers.

Methodology and urban context

The questions addressed here are provided answers using three city case studies: Chennai⁵ (India), Lima (Peru) and Manila (Philippines). These cities were selected because they are all very large and growing cities (5–10 million people at the agglomeration level), and illustrate the problems of growing waste flows. The second, more practical, reason is that in all three cities, extensive fieldwork has been carried out among actors in SWM systems, allowing us to look at how alliances function in some detail. In Chennai, fieldwork was carried out during 1994 as part of a Netherlands government-funded research project, and regularly updated by the Indian researchers involved in the years afterwards (Dhanalakshmi and Iyer, 1999). In Lima, Peru, research was carried out by the Peruvian research organisation DESCO (Riofrio et al, 1994), and by Dutch MA students from various universities guided by staff from the University of Amsterdam. In Manila, research was carried out by a Philippine NGO CAPS⁶ in the context of the UWEP Programme coordinated by WASTE (Gouda, Netherlands).

Results

Identifying the main alliances

The question in this section concerns the existence and strength of the possible different alliances as

found in the cities under study. Basic information on each city is provided below, followed by the main types of alliances found there (see Table 1).

Manila, the Philippines

Local authorities – large-scale enterprises Recently, many public–private alliances have been formed through foreign large-scale enterprises. They have been active in the Philippines, promoting Build Operate and Transfer (BOT) schemes to local authorities.⁷ Municipalities often accept such schemes to avoid large capital investments. However, the main aim of the private companies is not only efficient collection, transport and disposal of garbage but also profit. Metro Manila contracted such a private firm, which was planning to construct an incinerator plant with state-of-the-art emission control devices, provided that the Manila Metropolitan Development Authority would guarantee a daily delivery of at least 3000 tonnes of garbage. This contract made no allowances for the role of micro- and small-scale enterprises (Lapid, 1999).

Large-scale enterprises – local authorities – small-scale enterprises A different form of public–private alliance involves a tripartite arrangement. In this case, the local authority drew on the professional services of private companies in designing, constructing, operating and managing their sanitary landfills while phasing out old open dumpsites.⁸ One of the priorities of this project is micro-enterprise development (dealers and itinerant buyers). They are encouraged to organise co-operatives for collection, street sweeping, and recycling in densely populated areas. This for-

⁷This scheme is a public–private partnership whereby the private firm is authorised to finance, build and operate the service for an agreed period and on agreed terms before being transferred back to the local government.

⁸The context was a programme called SWEEP, Solid Waste Ecological Enhancement Project.

Table 1 Comparing the case study cities

Characteristics	Chennai, India	Lima Metropolitana, Peru	Manila, Philippines
Population size (millions)	Corporation, 3.8 (1991); Metropolitan area, 5.3	6.4 (Census 1993); 7 (estimate 1997)	9.45 (1995)
Population density (p/ha)	Corporation, 319; Metropolitan area, 218	Average 40; range 14–290	148
Area (km sq)	Corporation, 172; Metropolitan area, 1170	2817	
Economic characteristics	Economic sectors in transport, engineering, leather products, chemical-based industries, electronics, cinema	54% of GDP generated in Lima (1995)	City's contribution 30% of GDP. Average growth rate in Metro Manila 5.5% (1993–95)
Quantity waste generated (tonnes/day)	2500–2800 (estimate 1993/1994)	3535	5500
Waste collected (tonnes/day)	2300	2121	3800
Disposal sites	Three dumping grounds	Two official sites; >40 illegal sites	Two official dump sites

⁵Previously called Madras.

⁶Centre for Advanced Philippine Studies.

malisation of informal sector activities in municipal SWM is new in the Philippines (Lapid, 1999).

The local government manages the project through a loan from the World Bank. It retains much of the decision- and policy-making powers on how to conduct SWM through regulation of waste minimisation and recovery.

NGOs – waste buyers – traders in waste materials

This alliance between community and small-scale private actors was a community-based initiative in Manila because of the increased quantities of waste and inadequate servicing. The Metro Manila Council of Women Balikatan Movement (MMWBM), an NGO, implemented a recycling programme by forming co-operatives of itinerant waste buyers and junk shops, providing loans, and searching for suppliers and markets. The NGO has provided the co-operatives with more bargaining power in relation to large recycling industries.

MMWBM has started a source separation project in Metro Manila. Households are encouraged to separate their SW into wet and dry components. Protective equipment is provided to waste pickers and itinerant buyers, who are recruited and supervised by dealers. Collection carts are funded jointly by dealers and small grants from the project. Buyers pay households for recyclables, using money received from waste dealers. MMWBM organises the routes and schedules for buyers to collect garbage and promotes source separation through campaigns. The local government is not involved in the NGO project.

Chennai (Madras), India

In Chennai, different types of public–NGO and community alliances are found. In the period 1994–95, the Corporation had stopped initial experiments in privatisation of collection and transport, and was experimenting with NGO alliances (Dhanalakshmi and Iyer, 1999).

Local authorities – NGOs – waste pickers The Corporation in Chennai decided to introduce a new public–community–informal private alliance as a scheme under the Clean and Green Madras City project, whose main aim was to help to rehabilitate street children by paying them through NGOs to take care of *cleaning and maintaining* the streets. Four NGOs⁹ were given funds for this purpose and allocated areas of the city. The Corporation provided necessary clothes and equipment. About 250 boys with three supervisors were recruited. The boys were hired for a period of six months, and provided training to find another job afterwards. Teenage boys were selected and paid monthly wages by the NGOs to cover their basic needs and accumulate savings. Their basic income was increased by selling recyclable materials.

CBO – waste pickers Exnora International, a community-based voluntary organisation,¹⁰ created this community–private alliance. When the Corporation introduced neighbourhood waste containers for residents, Exnora took the responsibility of making sure the system would work. They incorporated local rag pickers for sweeping and collecting and named them Street Beautifiers. Exnora obtained a bank loan, bought a tricycle cart for their activities, and provided protective clothing and equipment. The collected garbage is segregated and all the materials are sold to dealers for recycling. The households pay the minimal amounts per month required for the service, and a street unit collects funds for the Street Beautifiers' salaries, repayment of the bank loan, and to build up a reserve fund against defaults.

Traders in waste materials: (a) waste pickers, itinerant buyers – dealers; (b) dealers – wholesalers Traders in recyclable waste materials form private–private partnerships, with potential benefits to both parties. The main incentive is the financial profit for each partner and not environmental awareness. In Chennai, a series of relations exists between waste pickers, itinerant buyers, dealers, wholesalers and recycling enterprises. Waste pickers collect materials, which they sell to dealers. The pickers also receive other benefits (free medical treatment), gunny bags, and gifts in kind or cash. Dealers advance itinerant buyers their initial investment capital, which is either paid back by easy instalments or not at all. The dealers sell the materials to specialised wholesalers, who in turn sell the materials to recycling factories.

The above linkages can be defined as alliances, because the financial assistance provided is important in providing a basic form of security for poor urban waste pickers and itinerant buyers. Alternative means of access to credit, liquidity and working capital are rarely available. For dealers, such assistance means an assured supply of raw materials.

Lima Metropolitana, Peru

The Lima Metropolitana government has the responsibility for cleaning, sweeping, collecting and transporting waste in downtown Lima, the two municipal transfer points and two sanitary landfills for waste from the whole city. The 43 district municipalities within Lima Metropolitana are responsible for cleaning, sweeping, and collecting within their own areas, and for transport to the transfer points or final disposal sites. Each municipality seeks its own balance between public and private actors to accomplish this task.

Local authorities – large-scale enterprises The poor quality SWM service provided by the Municipal Cleansing Enterprise of Lima (ESMLL) in past years

⁹Don Bosco Anbu Illam, Asha Nivas, Asian Youth Centre and Nesakaram.

¹⁰The philosophy of this CBO is that collective participation can help to tackle and solve common problems.

and the encouragement for a neo-liberal approach has led to a public-private alliance, in which privatisation of SWM is carried out at Metropolitana level. A Peruvian-Brazilian consortium (RELIMA) contracted with the metropolitan government to carry out all SWM activities for 10 years. A board called SUMSEL monitors the operation of the private company and co-ordinates with other municipalities. The 43 district municipalities each have their own set of alliances between their own public cleansing department and medium- to large-scale private enterprises. In some districts micro-enterprises carry out collection within the formal system.

Local authorities – NGOs – small-scale enterprises

A massive expansion of public-NGO-small-scale enterprise (SSE) alliances started in 1989, when pilot projects showed they were technically feasible means of collecting and recycling waste. They operate in areas where the municipality provided inadequate service, and in inaccessible areas. IPES, an NGO, initiated a large SWM programme for promoting employment, health and environment in Lima. IPES provided technical and financial assistance to start 140 micro-enterprises in 14 districts, advising the municipalities as well. The majority of the SSEs (70%) were managed by women from low-income settlements. They provided services to local communities, with residents supervising the process and paying the local authorities, who would contract and pay the SSE. This model did not work because payments between the various actors remained irregular, and the micro-enterprises collapsed because of lack of income.

The second more successful model involves a closer relation between a local community and micro-enterprises. The community receiving the service not only supervises and contracts out to the micro-enterprises, but also pays them directly as the waste is collected. The direct relations with their clients have enabled micro-enterprises to survive.

Alliances' contributions to sustainability

In this section, the alliances discussed in the previous section are analysed in terms of their contributions to goals of sustainable development, using the nine-point indicator system outlined earlier. Table 2 provides the overall results of contributions to sustainability for all alliances.

Manila, Philippines

Local authorities – large-scale enterprises

Ecological sustainability In this public-private alliance, the large private contractors have an incentive to maximise the amount of waste they dispose of as they are paid by the amount. Their demand for a guaranteed minimum amount of 3000 tonnes of garbage would mean that more than half the Metro Manila garbage would be taken care of by them.

Socio-economic and public health goals The costs of the contract between Metro Manila and the company were too high for a local authority (US\$59.00/tonnes). In addition, the private contractors would also recover recyclables to increase their revenues, marginalising itinerant waste buyers and junkshop operators (Lapid, 1999).

An assessment of employment opportunities was impossible as no information was available on the comparison between loss of employment in the informal sector and gains in employee recruitment by the large contractor.

The contribution to the goal of a clean urban environment is questionable because the operation of the incineration plant could lead to harmful emissions, and create difficulties in handling and disposing of toxic residues.

The strength of the alliance was that it could achieve some ecological goals and solve the problem of disposal and the performance of the landfills. Its weaknesses were the high costs for the municipality and the social costs such as expected increase of unemployment and emissions, which made this partnership unacceptable to the host community.

Large-scale enterprises – local authorities – small-scale enterprises

Ecological sustainability This tripartite public-private alliance is in a very early stage and can be examined through looking at its preparations and main objectives. The aim of the project is strongly oriented towards ecological goals, including source separation, recycling, and composting. The use of sanitary landfills as final disposal of the waste is a secondary aim. *Socio-economic and public health goals* Partnerships involving the SSE sector in functional co-operation with the local authorities make significant improvements in the co-ordination of the service.

There are no specific data on the costs of the project but the introduction of waste minimisation and resource recovery means the municipality is trying to prolong the life span of the existing disposal site to avoid the high cost of a new one.

The safeguarding of the activities of itinerant waste buyers, dealers and small recyclers by the municipality, and their encouragement to organise co-operatives, creates more secure and long-term employment. The municipality also includes social security benefits to families affected by the project.

This alliance has many strong points on ecological and socio-economic grounds. However, it remains to be proven on the ground.

NGOs – waste buyers – traders in waste materials

Ecological sustainability In this NGO-private alliance, source separation of waste by large numbers of households leads to essential contributions to the goals of waste minimisation and increased recycling. The recovery of solid waste in San Juan municipality increased from 10% in 1983 to 35% in 1994.

Table 2 Overall comparison between alliances in different cities

Ecological sustainability												
	Minimisation of waste			Re-use/recycle			Disposal without emissions or leachates					
	CH	M	L	CH	M	L	CH	M	L			
LAs – LSEs	–	–	–	–	×	×	–	+	+			
LAs – SSEs	–	–	–	–	+	–	–	+	–			
LAs – waste traders	–	–	–	–	–	–	–	–	–			
LAs – waste pickers	–	–	–	–	–	–	–	–	–			
LAs – recycling enterprises	–	–	–	–	–	–	–	–	–			
LAs – NGOs/CBOs	–	–	–	–	–	–	–	–	–			
LAs – NGOs – waste pickers/traders/SSEs	×	–	–	+	–	+	na	–	+			
NGOs/CBOs – waste pickers/traders	×	–	–	+	+	+	na	×	–			
Waste traders – recycling enterprises	–	–	–	+	–	–	na	–	–			
Public health												
	Clean and healthy urban environment			Safety and health aspects			Safe disposal					
	CH	M	L	CH	M	L	CH	M	L			
LAs – LSEs	–	+	+	–	?	?	–	+	+			
LAs – SSEs	–	?	+	–	+	–	–	+	–			
LAs – waste traders	–	–	–	–	–	–	–	–	–			
LAs – waste pickers	–	–	–	–	–	–	–	–	–			
LAs – recycling enterprises	–	–	–	–	–	–	–	–	–			
LAs – NGOs/CBOs	–	–	+	–	–	–	–	–	–			
LAs – NGOs – waste pickers/traders/SSEs	?	–	+	+	–	+	na	–	+			
NGOs/CBOs – waste pickers/traders	?	+	+	+	?	+	na	×	–			
Waste traders – recycling enterprises	?	–	–	?	–	+	na	–	+			
Socio-economic goals and legitimacy												
	Co-ordination			Financial viability (costs)			Employment			Legitimacy		
	CH	M	L	CH	M	L	CH	M	L	CH	M	L
LAs – LSEs	–	?	?	–	×	?	–	?	?	–	×	+
LAs – SSEs	–	?	–	–	+	–	–	+	–	–	+	–
LAs – waste traders	–	–	–	–	–	–	–	–	–	–	–	–
LAs – waste pickers	–	–	–	–	–	–	–	–	–	–	–	–
LAs – recycling enterprises	–	–	–	–	–	–	–	–	–	–	–	–
LAs – NGOs/CBOs	–	–	+	–	–	–	–	–	–	–	–	+
LAs – NGOs – waste pickers/traders/SSE	+	–	+	+	–	+	+	–	+	+	–	+
NGOs/CBOs – waste pickers/traders	?	+	+	+	+	–	?	+	–	?	+	–
Waste traders – recycling enterprises	+	–	+	+	–	+	+	–	+	×	–	+

Symbols: CH, Chennai (Madras); M, Manila; L, Lima.

LAs, local authorities; LSEs, large-scale enterprises; SSEs, small-scale enterprises; NGOs, non-governmental organisations; CBOs, community-based organisations.

+, contribution to the goal; ×, no contribution to the goal; –, no existing alliance; ?, insufficient information; na, not applicable.

Socio-economic and public health goals This alliance has improved the co-ordination of the service among the actors involved. But the local authorities are not involved so that these activities are not integrated into SWM as a whole system.

The data are insufficient to assess the financial viability of the alliance. The buyers receive fixed prices for recovered materials regardless of market price fluctuations. The NGO has provided the buyers with access to credit from government sources for working capital, and for seed capital for other income-generating programmes.

Almost 500 dealers with more than 2000 itinerant buyers and employees have so far joined the project. Better working conditions and greater public acceptance of their work lead to more and higher quality employment.

The large-scale participation by households and the large amounts of materials recycled contribute to a cleaner urban environment.

The strength of this alliance was to combine ecological and social objectives for greater effectiveness. Separation at source and increased recycling contribute to better environmental performance as well as higher quality employment. Even if the local authorities are not directly linked to the alliance, it is accepted by much of society.

Chennai, India

Local authorities – NGOs – waste pickers

Ecological sustainability This public–community–informal private alliance connecting local authorities, NGOs and waste pickers was the first of its kind in Chennai and its ecological contribution, although small in an absolute sense, is still very interesting. From the ecological point of view, the young waste pickers do not directly reduce the amount of generated garbage, but their segregation and trading of waste materials for income constitute recycling and reduce the amount of waste going to the final disposal site.

Socio-economic and public health goals The alliance contributes to better co-ordination of SWM services at the neighbourhood level. The financial viability for the Corporation is increased as this arrangement lowers their costs. The financial security of the waste picking boys is also increased through a regular monthly wage, complemented by building up savings. The Corporation thus provides a more secure form of regular employment to street children as well as free medical treatment, non-formal education and vocational training. Through training, the boys can move out of waste picking, enhancing their social acceptance and sense of identity.

The protective clothes and gloves provided increase the quality of their employment, making it safer and healthier.

The fact that the young sweepers keep the streets clean and collect the garbage from the streets contributes to an effective cleansing of the neighbourhood.

No reliable data are available on the extent to which environmental costs are externalised to other neighbourhoods. Legitimacy is achieved through the municipal partnership and the wide social acceptance.

This alliance has made a significant contribution to socio-economic benefits but a lesser absolute contribution to the environmental performance of SWM as long as the areas covered remain limited.

CBO – waste pickers

Ecological sustainability In this community–private alliance, the Street Beautifiers supported by Exnora introduced waste segregation and trade in their activities. This increases the extent of material recovery, and reduces waste levels at the disposal site.

Socio-economic and public health goals The co-ordination of the SWM services is not optimal in this alliance because the Corporation is not involved. In practice this often leads to a breakdown because the Corporation does not pick up the wastes from the transfer points rapidly enough, leaving waste in the neighbourhood (Furedy, 1992).

The financial system is viable for the organisation, and provides a satisfactory income for the Street Beautifiers.

The result of the co-operation of the CBO, waste pickers and households is clean neighbourhoods. However, the city as a whole does not become cleaner, because the problem is externalised to the transfer point.

This alliance depends on other actors' activities such as those of the municipality (collection of waste from transfer points) and the households (payments). The weakest point of this alliance is the lack of co-ordination with the Corporation. CBOs should be more directly linked to the Corporation to make sure that waste pollution is not externalised to other neighbourhoods. The strongest points of this alliance are the effectiveness of source separation, financial viability and increase in quality employment for the Street Beautifiers.

Traders in waste materials: (a) waste pickers, itinerant buyers – dealers; (b) dealers – wholesalers; (c) wholesalers – recycling enterprises

Ecological sustainability Private–private alliances in trading and recycling exist throughout the city and involve many people. The total quantity of waste materials recycled is estimated at 320–430 tonnes per day. Itinerant buyers are estimated to contribute around 4% to total recovered materials, transfer station and dump pickers 29% and street pickers 67% (derived from Dhanalakshmi and Iyer, 1999). The whole process reduces waste significantly through the sorting of waste fractions by the various actors and their use as raw materials for recycling. Recycling itself contributes to ecological sustainability through resource recovery, less energy used in production processes and fewer emissions, and a longer life span of disposal sites for solid waste.

Socio-economic and public health goals These alliances contribute to better co-ordination of activities among the actors themselves. Relations are mainly financial, with possible exploitation of those with less bargaining power. A negative link is the total lack of co-ordination with the municipal system; both groups of actors regard each other with the greatest suspicion, and avoid contact.

The financial viability of the system is vulnerable to external factors. Prices of materials fluctuate widely, influencing levels of incomes of pickers and dealers. They are influenced by the availability of virgin materials and the import regulations concerning certain raw materials.

Waste pickers and itinerant buyers earn daily wages, enough to cover only their basic needs. Small dealers have a low profit margin and often run the risk of financial failure. Levels of investment vary from Rs. 2000 to more than 15,000. Wholesalers have higher average net profits (10–15%) (Dhanalakshmi and Iyer, 1999).

The trade and recycling alliances provide employment to many groups of people. It is not a secure employment, as it exists outside the legal framework. However, few better alternatives currently exist for these social groups (mainly low-caste rural immigrant groups).

These alliances contribute to a cleaner city, as they remove waste fractions from the municipal stream, and reduce the amount left for final disposal. Although these alliances are not based on environmental awareness, they make an important contribution to ecological sustainability.

Socio-economically, these alliances are beneficial in terms of creating extensive employment, but the weak point is their vulnerability to price fluctuations and regulations, and the lack of formal recognition from the municipality. This means that employment and incomes are not very secure.

Lima, Peru

Local authorities – large-scale enterprises

Ecological sustainability The public–private alliance in which the private firm provides services at the Metropolitana level did not include *recycling* or waste separation activities, so no contribution to *minimisation and recovery* of waste was achieved. Effective recovery is constrained by the law that limits authorisation for waste separation activities to the final disposal site. All separation activities between collection and disposal are illegal, and the actors are harassed by the authorities. However, the firm improved the *disposal site*, so that more waste is dumped there instead of in other public areas. The firm, however, has no mandate to force other district municipalities to dump their waste properly, and many are still evading this because of the small charges levied on the trucks. Based on the available information, the strength of this alliance in ecological terms is better management of disposal.

Socio-economic and public health goals There are no data to assess possible improvements in co-ordination, in financial viability, or quality and quantity of employment. The service does contribute to a clean urban environment as the firm now collects 80–95% of the garbage generated in Lima Downtown.

Socio-economically, the strong point is a more effective cleanliness of the urban environment. The alliance has legitimacy within its own municipality, but lacks the mandate to force co-operation with the district municipalities in Lima.

Local authorities – NGOs – small-scale enterprises (SSEs)

Ecological sustainability The main activity carried out in this public–community–small-scale private alliance is sweeping the area and collection of waste. Within pilot projects, contributions have been made to increased re-use and recycling of waste by support to small-scale actors in the waste and recycling sector.

Socio-economic and public health goals This alliance makes significant contributions to socio-economic goals. It improves co-ordination of SWM services even though linkages are complicated. The system was financially viable because of the low cost compared to conventional systems (50% less). Residents pay additional fees for the service, which means that cost recovery is viable for both provider and consumers.

This alliance has a significant impact on secure employment, with higher than minimum level wages and social security benefits. Although the training in health, hygiene and safety aspects was provided, workers ignored this, reducing health and safety of employment.

The alliance proved effective in contributing to a clean and healthy urban environment locally, although it is more successful in middle-class areas than in poor ones.

Conclusions on alliances and their contributions to sustainable development

The existing alliances show a clear preference by local authorities to privatise services through large-scale enterprises. They are generally reluctant to create alliances with small-scale enterprises, waste traders and waste pickers because of their unofficial status and the number of units involved. The elusiveness of such informal activities is at odds with the enforcement of rules and regulations (including sanitary codes and health standards) and could make effective sanctions in cases of malpractice difficult to enforce. In addition, official attitudes towards such undertakings in many countries are still overwhelmingly hostile, especially when they relate to activities that are socially stigmatised as dirty, unhealthy, chaotic and illegal.

However, in those cases where “informal actors” are integrated into the official system through the mediation of NGOs or CBOs, there are positive spin-

offs in terms of socio-economic and ecological sustainability, and public health aspects. In particular, the waste trading and recycling actors contribute to cleaner urban neighbourhoods, financial viability, reduced volumes of disposed waste through recycling, re-use and composting, and employment creation for predominantly poor people.

If the privatisation of SW collection, transportation and disposal is restricted to large-scale enterprises only, the financial viability and disposal levels may improve, but the prospects for achieving ecological gains are gloomy. Large-scale enterprises in solid waste collection do not seem to be interested or able to capitalise on waste separation and resource recovery, unless they involve small-scale operators.

These results suggest that the concept of “partnerships” as used in the literature should be more inclusive of a wider range of actors than are generally acknowledged by proponents of public sector reform, in order to obtain the added benefits to greater ecological sustainability and socio-economic and public health goals. The results also indicate that a wider range of alliances is feasible in practice, as those discussed above have only partially occurred in a project setting. Finally, there are clear remaining roles for local authorities as “enablers” by developing legal and regulatory frameworks that permit other actors to develop a wider range of activities in the direction of more integrated sustainable solid waste management systems.

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