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### Solid waste collection in Accra: The impact of decentralisation and privatisation on the practice and performance of service delivery

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Solid waste or refuse is generated through human activities (Cotton and Fraceys, 1991; Furedy, 2002, 1997). The management of this waste often seems impossible in most of the cities of the South (Gilbert *et al.*, 1996: 3). Throughout history, cities and towns have struggled with how to collect and dispose of the refuse generated by their populations (Doan, 1998). The increasing complexity and costs of waste management are making it difficult for local authorities in many developing countries to handle the process efficiently and effectively. Often, solid waste receives scant attention at the municipal planning stage, yet may account for between 20% and 40% of municipal revenues (Cointreau-Levine, 1994, 1982; Cotton and Franceys, 1991; UNCHS, 1996; World Bank, 1993). Connected to this problem is the issue of inadequate funding and poor cost recovery for solid waste management. Virtually all urban authorities in developing countries have failed to devise effective response mechanisms to mitigate the problem of low cost recovery. In addition, several factors negatively affect contributions to sustainable development, such as the non-enforcement of physical planning and planning regulations, erratic land use policies, administrative bureaucracy, corruption, attitudes of residents towards solid waste management and ineffective supervision and monitoring measures by the local authority as well as residents (Batley, 1996; Baud, 2000; Baud *et al.*, 2000; Hasan, 1998; Obirih-Opareh and Post, 2001; Server, 1996; Wekwete, 1995).

Attention for such solid waste management problems has increased in the international circle, academic literature and policy practice since the 1990s. Three main reasons account for this. The primary reason is the issue of public health. Improper waste collection can lead to filth, stench and the possible spread of diseases from vectors, perhaps even leading to epidemics. The World Health Organisation's (WHO) policy on primary health care for all by the year 2000, formulated in the Alma Ata Declaration, called for an emphasis on basic preventive measures, such as safe drinking water, proper sanitation and adequate waste management, rather than on curative methods, such as medication and building hospitals, polyclinics and clinics. Preventive methods often cost less than curative measures. This shift in orientation has influenced the debate and thinking in international and national development circles, academic literature and policies. The general adage now is that a healthy nation means a healthy economy. The second reason for increased attention for solid waste management stems from an environmental point of view: improper handling of solid waste could degrade the environment, create nuisance and make the

place unsuitable for human habitation. Thirdly, from an investment and tourism point of view, people normally try to avoid filthy environments. A country's waste management system is a critical indicator of its level of development and an important benchmark for its transition to sustainable development. Solid waste management is one of the six pressing issues of the "brown" agenda.

As we have seen in the previous chapter, many local governments in developing countries are addressing the "brown" agenda. The focus of the "brown" agenda is on safe drinking water, proper sanitation and adequate waste management, that is, issues which combine a concern for meeting primary human needs and a concern for a better environment. In other words, urban management is often linked to the goal of improving the quality of the urban environment (usually alongside more conventional goals such as enhancing urban employment or improving access to housing). Waste management is one of the most important and yet often neglected issues facing mankind. Solid waste management continues to be a major challenge in urban areas throughout the world, particularly in the rapidly growing cities and towns of the developing world (Lee, 1997).

In this chapter, we put solid waste management and solid waste collection in a theoretical perspective. First, we will elaborate on the concept and definitions of solid waste management and the various perspectives that have been used to study the problem of solid waste management in developing countries. Next, we will discuss the solid waste management system, clarifying how solid waste collection relates to overall solid waste management and showing that it can be considered as an economic good. The second part of this chapter will focus exclusively on solid waste collection. We will discuss the public good nature of solid waste collection and its implications. We will also deal with the implications of the debate on decentralisation, privatisation and public-private partnerships, which we addressed in the previous chapters for solid waste collection. One of these implications is the emergence of new institutional arrangements in solid waste collection.

## **4.1 Solid waste management in theoretical perspective**

### **4.1.1 *Concept and definitions***

Furedy (1997) defines waste as residual materials that are considered to be of no use and must eventually be disposed of (typically by dumping or incineration). In her deliberations, Furedy uses words like "would-be-waste" to conceptually qualify waste as a resource with economic value, *i.e.* to show its potential as a resource for reuse, recycling or composting. Otherwise, waste is something to be discarded or thrown away. According to Skinner (1995: 11), solid waste management in its

broadest sense means integrated systems for waste generation, gathering, storage, collection, transportation, recycling, energy recovery, treatment and disposal. Solid waste management practices include all domestic refuse, commercial and institutional waste, street sweepings and construction debris (UNEP, 1994, 1992; Coin-treau-Levine, 1994). Solid waste management is concerned with how actors get organised for the collection, disposal, (re)use, recycling and composting of solid waste. Solid waste management goes even beyond this, in as far as it is concerned with the link between its processes and the substantial goal of transition to sustainable development.

Municipal solid waste management includes the cleaning and sweeping of public areas and streets, as well as the primary and secondary collection, transfer and final disposal of solid waste. Primary collection is the collection of solid waste at the source (from households, businesses, institutions, etc.) or from street containers and its transportation to points of transfer. Secondary collection is the collection of the waste from transfer points for transport to the final disposal site. A further distinction can be made between house-to-house collection, where materials are collected from the doorstep, and drop-off collection, where citizens have to bring their materials to indicated points, for example street containers or central communal containers. Solid waste management also involves waste recovery (at the source, during transportation, in the street and through final disposal) and public education to encourage the population to develop attitudes and practices, which are sensitive to waste issues such as source separation or waste minimisation. Waste recovery represents the removal or rescue of waste for some type of reuse, recycling or composting. This often implies its separation, sorting and eventual processing for use.

At this point, it is important to distinguish between the reuse and recycling of waste materials. Reuse is a process by which material in its end-use is reclaimed and again used in the same form. This entails no significant transformation of the residual, e.g. returnable bottles or the use of newspapers for packaging, card box, etc. Reuse implies that the waste is used in its original capacity, whilst recycling is the productive transformation of a material. In common usage, the term "recycling" has evolved into a concept encompassing any productive use of what would otherwise be a residual requiring disposal (Baud and Schenk, 1994: 106). Recycling can be defined as a method to reprocess waste in order to recover an original raw material. Composting is a means of both treating and reducing the amount of waste requiring final disposal. In simple terms, composting means turning organic waste into manure for agricultural purposes. These processes make a fairly important contribution to reducing the amount of waste finally disposed of by the municipal-

ity, even though the exact quantity usually cannot be determined with any degree of accuracy in most developing countries (Baud, 1993: 356 and 2002).

Historically, solid waste management has always been regarded as a public good and managed as such by local government authorities (see Section 4.4). In recent years, however, there has been a considerable shift and major differences in opinion as to how solid waste should be managed. One of the thorny issues is whether solid waste management should be decentralised, privatised, come under community participation, or managed in accordance with a combination of these. The mainstream neo-liberals argue that solid waste management is a service, aspects of which could best be handled by the private sector (Batley, 1996; Cointreau-Levine, 1994; Rondinelli, 1997). This view is connected to their belief in a slim minimal state and the efficiency of the market in resource allocation (see Section 2.1). Some critics oppose this view and contend that because of the 'public good nature' of solid waste management, it cannot be left entirely to the market and should be under public control (references!). A third school of thought argues for partnership between the public, private and other non-public organisations (NGOs, CBOs, and particularly the informal sector) (Baud and Post, 2001; Evans, 1997; Hordijk, 2001; Post and Obirih-Opareh, 2002; Ostrom, 1996). This school of thought recognises the increasing role of the informal sector, waste pickers, itinerant buyers, retailers and wholesalers in solid waste management.

#### *4.1.2 Types of solid waste management studies*

Research on urban solid waste management in developing countries has developed from two main concerns: from a public health perspective (normally referred to as public management approach), and from a contribution to sustainable development approach (including reuse, recycling and composting). Historically, the primary objective of solid waste management is that of public health. Solid waste accumulating in densely populated urban areas posed epidemiological health hazards, which local authorities sought to control by providing effective collection, transport and safe disposal services (Baud *et al.*, 2000: 2).

In modern times, efficient collection and disposal of municipal solid waste is recognised not just as critical for maintaining a healthy environment – a key factor in ensuring the health and safety of the population – but also as an important indicator of the level of development of the nation. Accordingly, cities in the developed world have devised complex procedures for handling waste and have established a variety of institutional mechanisms to ensure that these procedures are adhered to. Doan (1997) points out that in the USA, for example, many cities have adopted stringent regulations to govern their waste management. These include the kinds of material

that can be thrown away by a household or business, the type of storage containers and the kind of equipment to use to pick up waste. It also indicates the exact procedure for disposing waste in a sanitary landfill, the specifications for liners, covers and aeration procedures for those landfills and the proportion of the cost of this "service" to be paid by the consumer. This is hardly the case in many developing countries. Whilst the rate of waste generation increases very rapidly, resources to manage it grow very slowly, at times negatively. Though solid waste collection is a traditional area of concern for municipalities because of the public health dangers of poor collection practices, it is a public service which is often provided for by one of four main forms of service provision. This may include complete municipal involvement (public provision), a management contract, franchises and full private sector operations (Doan 1997; Roth, 1987; Savas, 1977).

Many solid waste management studies focus on public health challenges through community participation (see Van Naerssen, 2001). They acknowledge the close inter-relationship between urban health and the urban environment. An example is the WHO "Healthy Cities Project" for the period 1995-1999, which aimed to improve the urban environment and health conditions by raising awareness and mobilising community participation through partnerships with local (municipal) agencies and institutions, thereby helping them to deliver effective environmental and health services (Van Naerssen, 2001). Other studies focus on how public health can be improved or how to do more with the same amount of money (Potney, 1997; Lee, 1997). The privatisation exercise in solid waste collection is based on this idea.

Another area is that of livelihood and poverty-based studies which seek to improve employment opportunities and reduce poverty for the people working with waste (see Baud, 2002). The focus on livelihood was not based on public health/private management perspectives. It was inspired more by alternative development views that started from people's own initiatives (bottom-up). These studies recognised the economic potentials of waste, while simultaneously streaming the positive impacts on the environment. They therefore have a link to sustainable development (see Baud and Post, 2001). The combination of improving the employment and livelihood needs of the people is addressed under the umbrella of sustainable development studies (see Baud and Post, 2001).

Savage and Diaz (1995) note that solid waste management in developed and developing countries has undergone substantial changes over the last two decades as a result of (a) increased attention to solid waste management by donors and academics alike (since the problem has become more visible with the decline of services due to the structural adjustment programmes (SAPs)); and (b) growing importance of sus-

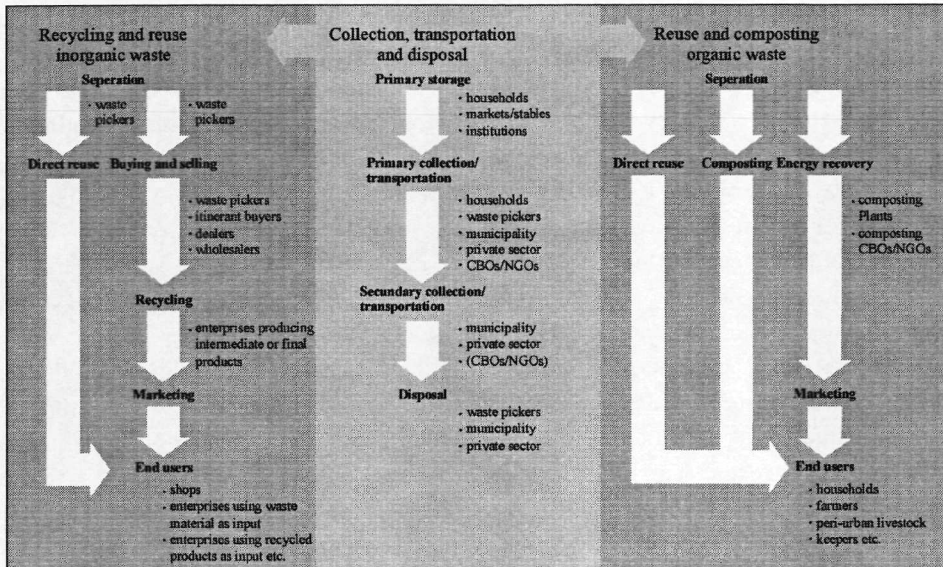
tainable development thinking and its impact on policy designs in the national and international arena. In addition, economic conditions improved in the North, permitting regulatory requirements, public demand for specific types of services, concern for public and occupational health and safety and goals and demands set forth by a variety of environmental groups. The costs of service, environmental policies and regulations and public participation continue to be key influences that will shape the development of solid waste management in the future. The origin and potential consequences of waste also affect the way in which policy develops.

Studies on privatisation in solid waste management – which are receiving more attention here because it is the topic of this thesis – are mostly undertaken from the public health perspective. They focus mostly on opportunities for improving efficiency and getting the cityscape clean, without due regard for environmental considerations or the labour conditions of the workers engaged in the service's provision. Current analysis of privatisation is largely limited to the socio-economic aspects of service delivery, *i.e.* those elements that usually figure prominently in evaluations of privatised servicing (Baud and Post, 2001). Although some privatisation studies give attention to environmental impacts, this is largely from a public health (rather than an ecological sustainability) perspective. Privatisation of solid waste collection appears to be assessed primarily in terms of service efficiency and effectiveness. The former is largely concerned with economic motives (can costs be saved by generating higher output from a given input of resources), while the latter is concerned with quality and accessibility (indicated by such aspects as reliability, frequency, type of collection and spatial coverage), stemming from the desire to improve the overall public health situation (Post 2002, forthcoming). Batley (1996: 743) further distinguishes between productive efficiency, which refers to the operational performance of the service provider (measured by such things as labour productivity and costs per tonne) and allocative efficiency, the extent to which charges cover the cost of the service. Studies on privatised collection often arrive at the conclusion that services are delivered more efficiently than by municipal departments, but tend to ignore the additional costs incurred by the authorities for contract management and performance monitoring (transaction costs). Very often privatisation is also associated with gains in effectiveness. Although such progress should certainly be attributed partially to the private sector as such, much depends on the ability of local authorities to create a competitive environment with sufficient incentives to extend services to poorer neighbourhoods (Batley, 1996). It is remarkable to notice that the impacts of privatisation on the labour conditions of people working in the sector have received little attention and that ecological considerations have been virtually absent in the evaluations (Baud *et al.*, 2001).

## 4.2 The solid waste management system

In the study on waste, van der Klundert and Lardinois (1995) were perhaps the first to use the term integrated solid waste management by which they mean waste management hierarchy.

Figure 4.1. Actors and relationships in solid waste management



Source: Baud et al, 2001, p. 133

The chain of activities in solid waste management system includes waste generation, (primary and secondary) storage, solid waste collection (collection, transportation and disposal mostly through land filling and burning), recycling (including material recovery and reuse) and composting.<sup>29</sup> Though integrated sustainable waste management as a concept is discussed at an international level, in practice there is very little integration, particularly in developing countries, of the socio-economic, environmental and public health aspects concerning reuse, recovery and recycling (Baud, 2002; van der Klundert and Lardinois, 1995).

<sup>29</sup> Blore (1999) speaks of solid waste management system as being waste hierarchy. Sakai et al. (1996: 341) note that the philosophy of "waste management hierarchy" has been adopted by most industrialised nations as the method for developing municipal solid waste management strategies.

In the sections below, we will discuss the various activities in the chain of solid waste management in more detail, paying attention to the different methods used, their strengths and weaknesses and possible ramifications.

#### *4.2.1 Household storage*

Of late, the commonest mode of storing waste in both developed and many developing countries is polythene bags. In the rich-income areas, households also use plastic containers with lids to keep the waste properly stored and away from flies. However, in some poor-income areas, all manner of containers such as old buckets, broken baskets, and wooden and metal boxes are used. Though cheaper, these latter types of storage facilities can lead to filth and flies. Roaming domestic animals, including livestock, which scatter the waste on the ground as they search for food, complicate this problem. Ideally, household waste should be stored in a sturdy container of sufficient capacity which is easy to empty and clean, and has a well-fitting lid. Galvanised steel and plastic bins can satisfy these criteria, but are not affordable in most low-income communities. Such containers would be used for more pressing needs such as water or food storage (Cotton and Franceys, 1991). Many houses use small containers for which no other use can be found, or accumulate a small pile of waste outside the house, which is eventually carried to a communal container in a basket. Better quality waste containers suitable for house-to-house, roadside, or street corner collection, may only be appropriate either when the household income level has risen, or when the level of collection service is highly efficient and households are willing to invest in order to benefit from the service.

The use of communal storage containers to which households carry their waste is widespread and seems likely to remain a common option for low-income communities. Communal storage containers can be positioned at a number of strategic locations. Households are required to carry the solid waste from the house to the communal storage container, which in some cases may entail walking considerable distances. A frequent problem is the provision of too few containers of insufficient capacity, which are inappropriately located. Containers are usually open, giving access to rats, flies and domestic animals and creating a situation which is undesirable for both hygienic and aesthetic reasons. It is unlikely that many households will want a communal container near their house. This is a particular problem on densely populated sites; in some cases households are prepared to walk longer distances to a larger communal storage point. The use of 'skip' containers which when full can be hoisted onto a standard vehicle and replaced by an identical empty container is another option for communal storage.

#### 4.2.2 *Collection*

In high-income countries, all urban waste collected goes to safe sanitary landfill, composting or incineration facilities. These facilities are designed and operated to meet environmental protection standards. In middle-income countries, about 50% to 80% of the total urban waste is collected, and less than 10% is deposited in controlled and sanitary landfills. Low-income countries experience the lowest levels of collection service. Typically only 30% to 60% of their urban waste is collected, with nearly all of the waste collected being deposited in open dumps (World Bank, 1999: 3). The uncollected garbage is potentially a source of environmental degradation and a health hazard. Waste collection is by far the largest cost element in most municipal solid waste management systems, accounting for 60-70% of the costs in industrialised countries, and 70-90% of costs in developing and transition countries (World Bank, 1993; Cointreau-Levine, 1994). Collection and street sweeping together constitute the single largest category of expenditure in many municipal budgets. Failure or inadequacy of collection, especially in developing countries where there is often a lot of human faecal waste in the municipal solid waste, can compromise public health. Given its high visibility and importance, waste collection should receive a high degree of attention, scrutiny and supervision, monitoring and evaluation to ensure effective and efficient public or private operation. However, in developing countries, the opposite is the case.

A further problem is that waste collection is often in a jurisdictional no-man's land, where fiscal, operational and administrative responsibilities are fragmented between public health, public works and public cleansing departments, with budgetary and operational responsibility in conflict with each other. Waste collection functions have a low status, and managers and supervisors are not given training, support or recognition.

In general, there are two main forms of collection: primary and secondary (see above). Each of them has its strengths and weaknesses. Primary collection enables the members of the household to tidy up their surroundings and store the waste till it is made available for secondary collection. The problem with primary collection is, however, that the decaying organic matter in the waste may cause a stench if its removal is delayed, particularly if the waste is not collected on a daily basis. An important feature of storage and collection systems for solid waste is the varying degree of participation required from the households. There are three basic options in this respect:

- Collection from communal storage containers (otherwise referred to in this study as central communal containers (see communal storage containers above)).

- Street corner collection, in which a collection vehicle halts at predetermined places and households carry their solid waste to vehicles.
- Roadside collection, in which the household leaves its storage container by the side of the road at an appointed time for waste collection workers to empty.

The problem associated with these options is that there could be littering at the collection points. A very important aspect of collection is collection frequency. Up to 70% of solid waste in low-income areas consists of material which decomposes. There is a high proportion of vegetable matter (Holmes, 1984). Waste decomposes more rapidly in hot and humid climates than in temperate regions. After two days, an offensive odour is produced and infestation by flies and rats may occur. Regular collection is essential. Flintoff (1984) recommends three times a week from communal storage containers, twice a week from individual dwellings with storage containers outside the house, and daily collection from houses with storage containers inside the house.

#### *4.2.3 Transportation*

A very important aspect of solid waste collection is how it is transported from the storage points to the dumpsite. Various means of transport are used. Each of these has its strengths and weaknesses. The first group, which includes handcarts, push-carts and wheelbarrows, is commonly used to carry waste over short distances. The second set of means of transport comprises animal-drawn carts. Carts drawn by bullocks, horses or donkeys can pull much larger loads than the first group referred to, although they do move very slowly. In many cities this does not present too much of a problem as traffic congestion prevents rapid transit by any sort of vehicle (Cotton and Franceys, 1991). Animal carts are quiet and do not consume fossil fuels. However, many city dwellers object to the use of animal-drawn carts in the city centre, referring to it as primitive rural technology (Obirih-Opareh and Post, 2001). The third option for transporting waste is collection vehicles. Since waste management involves the transfer of waste from one location to another, careful consideration must be given to the vehicles that are employed. Access widths and the type of waste storage in use are relevant to the vehicles design. Tractor units are much quicker than animal carts but have a small carrying capacity compared to large vehicles. There is a wide range of vehicles for the longer-range transfer of waste to the final disposal sites. Recent studies on the design of vehicles appropriate for restricted access situations show many pitfalls as regards choosing inappropriate western-designed vehicles for use in less developed countries. The careful choice of small container handling vehicles can result in a tremendous reduction in the operating costs of about four times those for a conventional western compactor vehicle (Cotton and Franceys, 1991). Whilst this is a problem that has to

be tackled by the urban local authority, it is important to ensure that the design of communal containers and transfer stations enables the local authority to adopt the most efficient solution (Cotton and Franceys, 1991). Various types of equipment are used for the transportation of waste. These include low technology such as donkey carts, pushcarts, power-tillers, open trucks, trucks, or high technology such as skip-loaders and compaction trucks. The advantage of the low-techs such as donkey carts and pushcarts is that the acquiring and maintenance costs are not so high compared to the high-techs. In addition, donkey carts could be deployed in areas with poor road accessibility for conventional vehicles such as trucks. In practice, however, the low-tech means of transport might not be environmentally friendly due to serious degradation.

#### **4.2.4 Reuse**

The reuse of organic waste material to feed domestic livestock and the reuse of inorganic waste materials is a widely practised phenomenon in many developing countries. Moreover, the reuse of non-organic materials e.g. old refrigerators, old shirts, furniture, etc. is a common practice in both developed and poor countries, (see Baud, 2002; Furedy, 2002). In many developing countries people usually recognise the value of the used item and remove them from the waste at the source.

#### **4.2.5 Recycling**

Waste recycling forms a key component of sustainable waste management in developing countries (Tucker, Murney and Lamount, 1998: 445). Many people make a living from recycling (Baud *et al*, 2002; Hasan, 1998; Post *et al*, 2002). Recycling is influenced by factors such as (i) the direct value of raw material, (ii) technology, (iii) costs, and (iii) market structure. In most developing countries, there is a strong inclination to economise on resource use and to make optimal use of resources, since labour costs are usually low enough to facilitate recycling. If the product is completely useless, recycling is considered an option. Highfill and McAsey (2001: 37) argued that though municipal recycling is becoming an increasingly important method of household waste disposal technology, in net terms municipal recycling costs more money than it generates – and it is often more expensive than land filling.

The provision of new recycled products needs careful targeting and a high level of consumer participation in order to increase return on investment and minimise any shortfall in meeting targets (Tucker *et al.*, 1998). In many countries, recycling remains a voluntary activity. However, a lot of individuals participate in recycling for altruistic reasons. In most developed countries, and even in many developing countries, waste recycling is carried out by the private sector. The possible ramifications

of this include increased privatisation of recycling with regard to solid waste management. However, in some developing countries, the promotion of recycling activities of solid waste has centred on co-operation between governments and civil society organisations and has largely ignored the existing private sector in this area. If new initiatives lead to reduced access to waste by existing recyclers, the economic viability of private sector activities may be endangered (Blore, 2000). In contrast, CBO activities are often dependent on the volunteer work of community groups, and are not economically viable (Baud *et al*, 2002). It is only in China that recycling is still regarded as a public good.

#### *4.2.6 Composting*

In cities in developing countries, there are a wide range of factors that promote composting. Urban organic solid waste not only includes organic material in municipal solid waste, but also waste generated by gardening, urban agriculture, park and road maintenance, livestock keeping, food processing and tanning. What concerns most municipal solid waste managers, however, is the organics that are put out for collection and therefore are mixed in with solid waste. The managing of the organic component of municipal solid waste (which typically comprises from 40%-70% of all solid waste in large cities of developing countries) has been the focus of attention for quite some time. Composting and reusing techniques going back several hundred years have been documented in Africa and Asia (Furedy, 2002). The interest in urban organic solid waste has become more general, however, in the context of environmental thinking about waste reduction, treatment and strategic planning for urban solid waste management (Hart and Pluijmers, 1996, Nunan, 2000; Rosenberg and Furedy, 1996, van der Klundert *et al*, 2001) and greenhouse gases. In addition, those interested in helping small farmers and livestock keepers view urban organics as recoverable resources. Composting is very prevalent in the Indian sub-region. In sub-Saharan Africa it occurs mainly on a low scale. Thapa (1998: 112) points out that farmers around a metropolitan city (*e.g.* Bangkok) may not like urban refuse-based compost because it may contain hazardous waste particles, including glass.

The experience with the composting of urban organics, however, has been fraught with multiple problems relating to feedstock, plant operation, the quality and price of the product, marketing, consumer understanding and institutional support (Furedy, 2002). Most households have no incentive for keeping organics apart from other waste (Furedy, 2002). Pilot projects in composting often try to integrate general environmental, health and specific social concerns (Lardinois and Furedy, 1999). A major issue for solid waste managers is what will motivate household and institutional waste generators to undertake and keep up the difficult task of carefully separating wet wastes for the success of urban organic solid waste composting

in the long run (Furedy, 2002). Both large-scale compost plants normally owned by the state and small-scale compost plants owned by non-public agencies, but which are often dependent on external financing, are not really viable (sources). The main problem is that there is a low demand for compost on the market either because of relatively high costs, or low quality, or both.

#### *4.2.7 Disposal*

Various modes of waste disposal can be identified. These include open burning, dumping into craters and old quarries, land filling and incineration. The first two forms of waste disposal are the most common in developing countries. Though these are often cheap in financial terms, they are not environmentally friendly and it might cost a lot more money to clean up and rectify the consequences. Smoke from open burning pollutes the atmosphere and causes health problems and degrades the environment. Dumping into open craters and old quarries could contaminate the underground water bodies. Land filling, using state-of-the-art technology, prevents or reduces leaching to the barest minimum thereby reducing contamination over a long period of time. Incineration is also the other type of waste disposal. Using high temperatures, the waste is burnt in a chimney. Land filling and incineration are two forms of waste disposal that are hardly used in poor developing countries. This is due to three major limiting factors: cost, technology, and, in the case of incineration, the large organic content of the waste in developing countries.

The upgrading of equipment used in the collection, transportation and disposal of waste requires extensive attention. Developing environmentally safer methods of waste disposal, for example, requires capital-intensive sophisticated high-tech investments (e.g. in sanitary landfills or incinerator combustion), which many developing countries cannot afford on a sustainable basis. In addition, large-scale/high-tech solutions may not be feasible in a context in which a sufficiently sound infrastructure is lacking, or where there is little quality control over a combustion plant or composting process. Nonetheless, efficient waste collection must not be sacrificed on the altar of cost expediency through the use of primitive modes, which have proved unsuitable and incapable as regards dealing effectively deal with the problem in the long run, while their contribution to environmental sustainability is questionable. There is no need for poor developing countries to re-invent the wheel as far as effective and efficient waste collection methods are involved. Simple but effective inexpensive equipment can be used.

### **4.3 Solid waste management: an economic good**

In addition to being a public good, solid waste collection also produces economic benefits that help employment creation and income generation (Baud, 2002; Baud and Schenk, 1994; Furedy, 1992; Halla and Majani, 1999; Hunt, 1997; Huysman, 1994). It is a source of employment and income for a large number of people involved in this sector, including those formally employed by contracting firms and those working in the informal sector (Obirih-Opareh and Post, 2001) for whom the waste sector provides raw material for the recycling industry, as well as for the composting of organic waste for agriculture and gardening. UNCHS (1996: 272) notes that the "waste economy" provides a livelihood for tens of thousands of people living in the cities. Many Asian cities have extensive "waste economies" structured through itinerant waste buyers, waste pickers, small-waste shops, second markets, dealers, transporters and a range of recycling industries. In Calcutta, for instance, more than 40,000 people make a living from waste picking and many thousands more from farming or fishing based on the solid (composted) or liquid waste from the city (Furedy, 1992, 1997, and 2002). A similar figure applies to Bangladesh and some other cities in Southeast Asian countries (see Hasan, 1998: 194; Thapa, 1998). Though Accra and other Ghanaian cities have comparatively less developed waste economies, this sector provides livelihoods for a considerable number of people (Post *et al.*, 2002).

This demonstrates the value of the solid waste industry; it constitutes a source of income for those in the waste business. Waste pickers help to pick up inorganic waste, such as textiles and metal scraps, thereby improving the quality of organic waste for composting. In doing so they are making a valuable contribution to society. However, employment conditions and the quality of employment in this sector are very poor. Though workers in the public sector have slightly better conditions of service, the quality of employment is not that different from that of the private sector. In addition, the status of waste workers is very low and they receive very poor remuneration (Post *et al.*, 2002). Furthermore, because of the lack of respect for the workers and the social stigma associated with solid waste management workers, the social groups which are least respected tend to end up in this type of job. Sometimes, specific ethnic groups are employed to carry out the solid waste collection work. In India, for instance, it is the "untouchable" community, while in Ghana, the workers are usually migrants from the poor northern parts of the country, as well as migrants from the "Kru" in Liberia. In Cairo (Egypt), it is the Zahsleens who carry out this work. It seems that in each country specific groups, particular ethnic groups, handle waste management. It is, however, not clear which category of people controls what aspect of solid waste management or type of waste, and to what

extent. One or many ethnic groups may control some or all aspects of disposal, the management of the landfill sites, composting of the organic waste, etc.

In some countries, the organisation of solid waste management is linked to gangsterism. The criminalisation of solid waste management in some countries involves situations in which, for example, gangsters dominate the dumpsites (Post *et al*, 2002). In Nairobi for example, there is a lack of security at the dumpsites. According to Ikiara *et al.* (2000) the lack of security is associated with gang type control of the dump by groups of waste dealers and pickers. Several gangs have formed and divided the dump into territories. Each gang polices its territory to enforce ownership of waste dumped there. Similarly, trucks that regularly transport waste into the dump are "owned" by specific gangs and are usually guided to the appropriate territory for dumping. Truck drivers, including drivers of the Nairobi City Council, must cooperate or the trucks are vandalised. They usually pay for a police escort to the dump. However, the police are often helpless in the face of the gangs, some of which are led by heavily armed hardcore criminals masquerading as waste dealers. Lima (Peru) also presents yet another example of how criminal gangs rule the dumpsites (see Hordijk, 2000). In most cases, the gangsters have territorial domination over a waste picking area. In some countries, the economic value of solid waste has created a problem as regards its ownership and control. In such areas, gangsters control aspects of solid waste management. Classical economics teaches that the demand for a commodity determines its price. In such situations, power relations stemming either from economic capital, criminals or corrupt politicians, will rule its appropriation.

#### **4.4 Solid waste collection: a public good**

Municipal solid waste collection is essentially a public service which benefits all urban residents. Public cleanliness and the safe disposal of waste are essential to public health and environmental protection (Contreau-Levine, 1994: vii). The public benefit of solid waste collection creates problems similar to the tragedy of the commons, which Hardin referred to in 1968. In many developing countries, urban residents are provided with solid waste collection and disposal services virtually free of charge. Local governments and their line agencies normally bear the cost. This is due to the fact that it is very difficult to totally exclude free riders from solid waste management service because of possible public health problems and environmental degradation. Hardin (1968), overwhelmed by the "tragedy of the commons", contended that the tendency of the individual to maximise personal benefit from the open access resources was the primary cause of the steady degradation and depletion of these resources, thereby impinging severely on the quality of life of both present and future generations. Remedying these problems requires either full cost recovery by levying charges for use of environmental and natural resources, the strict control

on the use of resources, or a combination of both. Hardin's proposition was that the government should take over because of the public good nature of solid waste collection (Endres, 1989; Pearce, 1989; Thapa, 1998; Tietenberg, 1988). In other words, solid waste collection is a public service for which local or metropolitan governments are mainly responsible. This does not mean, however, that local governments have to accomplish all the tasks of service delivery entirely with their own staff, equipment, and funds. The private sector, as well as the community, can take part in the challenge.

Private sector participation in solid waste collection may be influenced by factors, such as an enabling environment and cost recovery. The fundamental concern of the private sector is whether it will make profit from its participation. One of the motivations behind the privatisation of solid waste collection was the pressure from the business community for rent seeking – although the feeling that the private sector can provide a better solid waste management service also played a role. For the government, one of the many considerations is whether private sector participation will save money. The consumer, as the beneficiary party, is interested in a clean and safe environment at the lowest cost possible – if not free. This brings actors into a game in which each tries to maximise his benefit whilst minimising the costs. This, in fact, shows that each of the stakeholders has a fundamental interest, which can be harmonised only through partnership arrangements (see Section 4.4.1).

One of the reasons why partnerships in solid waste collection are needed is down to the problem of poor cost recovery. In fact, this constitutes one of the biggest dilemmas facing local authorities responsible for solid waste collection in developing countries. Many local authorities are not able to recoup the day-to-day operation costs through general rates and property taxes. In terms of affordability, compared to average household income levels, the user charges for refuse collection are low and affordable (Lee, 1997: 280). The weak financial base consequently means that urban authorities are able to collect only a fraction of the estimated refuse produced each day. Poor cost recovery is one of the major reasons for poor services. That raises the question of whether the majority of the residents in urban centres in developing countries are so poor that they cannot afford user fees for solid waste collection. Or is it overexploitation of the public good nature of solid waste management which leads to “the tragedy of the commons”? Why have issues on user fees for solid waste collection often met stiff resistance, not only from residents and labour unions but also, and particularly, from the political leadership? These questions will be addressed in Chapter 6, 7 and 8.

Communities may also be able to play a role in this respect. Community involvement in solid waste management is even very crucial for its sustainability. There are various areas to which the community can make an immense contribution with regard to improving solid waste management. These include a change of attitude, the use of appropriate waste primary storage facilities, keeping area and collection points clean, avoiding indiscriminate dumping and littering and contributing to the cost recovery of solid waste collection.

The community is responsible for part or all of the activities inside and in the immediate vicinity of their houses and sometimes for transporting solid waste to a transfer station. Indeed if the local authority is grossly inefficient, community involvement may be the only practical solution for waste collection and street cleaning in low-income neighbourhoods, where solid waste management may create serious difficulties. Though the local authority is deemed responsible, it is often unable to carry out its duties effectively, whereas at the same time the community does not see itself as being responsible.

A role like this for the community in solids waste collection requires a change in popular attitude however. Generally, the public attitude towards waste is indifference at best and appalling at worst. Even though almost everybody knows that waste could pose serious health hazards if not properly removed, the majority of the people care little about where the money for solid waste collection should come from. For most people, solid waste collection is a public problem as soon as the waste leaves their doorsteps. Such negative attitudes are reinforced in how waste is disposed of, including littering and indiscriminate dumping into open spaces, drains, gutters, streams and river bodies (Obirih-Opareh and Post, 2001; Post *et al.*, 2002).

Whilst a more active role of the community is theoretically workable, undertaking the day-to-day operation of solid waste management is by no means simple and requires a high degree of motivation and cohesion. For many poor communities (with poor road accessibility), the most appropriate waste collection system is likely to be the use of communal storage containers of the "enclosure" type. The collection system can be labour intensive, using unskilled labourers with handcarts to transport the waste to a transfer station. In general, communal containers should be emptied at least three times per week in residential areas and daily in market areas.

#### *4.4.1 Linkage of solid waste collection to decentralisation and privatisation*

The present modes of solid waste collection are closely linked to the decentralisation and privatisation policies, which put qualitatively new demands on key actors and stakeholders, such as consumers, private service providers and local govern-

ments in particular. Decentralisation is supposed to enable and empower actors and stakeholders so that they are capable of meeting the new responsibilities and demands. Decentralisation of solid waste collection entails devolution of functions and responsibilities for solid waste collection from the centre to the lower levels of government and to the private sector. The changing views and shift in interpretations of waste and the need to bring all stakeholders on board for solid waste collection have created new opportunities and challenges for all of them. It brought about various options and new institutional arrangements for solid waste collection. Decentralisation and privatisation have strengthened the role of the private sector in solid waste collection through various arrangements such as sub-contracting of jobs on behalf of the local authority, setting up micro enterprises and creating employment opportunities. Each of these arrangements requires the local government to fulfil a specific role, such as supervising the operations of private contractors, management of land-filled sites, acquisition of land for waste disposal and the control of disposal methods (Cointreau-Levine, 1994). Two main forms of privatisation in solid waste collection can be distinguished: (i) spontaneous (informal) such as waste picking and recycling, which develops by itself, and (ii) organised forms which result from institutional arrangements put in place by local government authorities. Likewise, the role of the communities depends on the type of arrangement prevailing in a community, such as the involvement of communities in cleaning up campaigns and private-community actions.

One of the most frequently cited advantages of the private sector is its management flexibility. There is more scope in private sector management for firing personnel for non-performance and for providing upward mobility for workers who perform well. This also applies to solid waste collection. In developing countries, cities are hard pressed to obtain enough capital to finance their solid waste collection systems and are burdened with political constraints limiting their ability to generate revenue (Obirih-Oporeh and Post, 2001). Private sector participation is viewed as one way to secure investment finance for solid waste, because solid waste collection – in contrast to water supply, electricity and telecommunications that have such significant economies of scale that they are often regarded as natural monopolies – does not fit into the conventional wisdom of economies of scale of natural monopolies (Sinclair, 1991). It should be kept in mind, however, that privatising some aspects of municipal solid waste service delivery does not in any way take away the need for a local or metropolitan government which is to be fully responsible for it (Batley, 1996; Obirih-Oporeh and Post, 2001).

Many authors argue that the private sector also has a huge potential for dealing with the “brown” agenda (Batley, 1996; Cointreau-Levine, 1994; Devas, 1993, 1999;

Rondinelli and Kasarda, 1993). Waste collection, for instance, renders itself perfectly for privatisation because tasks can be precisely defined and performance by private entrepreneurs easily measured (Amos, 1993: 146). However, the private sector in many countries is relatively weak, certainly when it comes to "brown" issues (Cointreau-Levine, 1994; Devas, 1993; Rondinelli and Kasarda, 1993). The problem is how to solve this riddle: the public sector's failure to provide efficient service delivery and the private sector's weakness to take over the responsibility of the retreating state. Public-private partnership arrangements may be part of the solution. Thirdly, privatisation brings in additional investment and private sector managerial thinking into waste management. Private sector participation may lessen the financial burden on the municipality. It also provides income to the municipality through the payment of charges such as registration, licensing, renewals, dumping fees at landfill sites and fees relating to the provision and maintenance of a cleaner environment, the provision of customised services and the provision of regular, more reliable and at times more efficient services. Privatising solid waste collection without residents paying for the service costs does not, however, solve the financial burden on local authorities. It might help to provide efficient and effective services for a while, but its sustainability is questionable if cost recovery is not achieved.

Mansoor Ali, Olley and Cotton (1999: 495) warn that despite the growing interest in, and attention to, the participation of private and community organisations in urban service provision, public sector institutions in developing countries remain the main stakeholder in solid waste management and hold the greatest proportion of funds and responsibilities. Decentralisation and privatisation of solid waste collection, nor partnerships, do take away the responsibility of the local authority. There are many aspects of solid waste management other than collection and transportation, which still remain essential tasks of the local authority or the public sector. Such management aspects include policy planning, regulation, supervision, monitoring and evaluation. In fact, privatisation requires the government to intensify its regulatory functions (see Section 2.1). The type of institutional arrangements also determines to what extent local authorities remain involved in the collection of waste. For instance, if privatised waste collection takes place on a contract-basis, it is the local authority which is charged with the responsibility of paying the private service providers. In a franchised system, however, the private service provider has to collect user fees directly from the service consumers to pay for his/her services without further interference by the public sector.

#### *4.4.2 Linkage of solid waste collection to sustainable development*

The way solid waste is collected impacts positively or negatively on sustainable development. The concern for sustainable development has led to heated debates in

both academic and policy circles. In this study, our position on sustainable development is one that seeks to combine goals of ecological sustainability with the concern for meeting current human needs (Hardoy, Mitlin, and Satterwaite, 2001; Satterthwaite, 1997). Ecological sustainability implies that the use of non-renewable resources should be minimised, use of renewable resources should not jeopardise their regeneration, and the capacity of local and global sinks should not be exceeded. However, what constitute acceptable levels of trade-offs have become subjects of tremendous controversy between the advocates of green and the brown agenda in urban environmental improvements (see Chapter 3 Section 3.3.1).

Although several attempts have been made to link solid waste management to the concept of sustainable development (see for example van der Klundert and Lardinois (1995) with their 'integrated sustainable waste management approach'), empirical work from such a perspective is still scarce. The current study does not claim to fill this gap but does try to test the institutional arrangements in solid waste collection against a set of criteria that reflect the multifaceted nature of sustainable development. It recognizes the necessity of looking at performance from three interrelated dimensions, namely ecological sustainability, socio-economic goals, and environmental health. The following argument is derived from Baud and Post (2001, pp 134-137) and has also been used in my earlier work with Post (Obirih-Opareh and Post, 2001, see also Chapter 8).

Ecological sustainability requires that solid waste management systems work towards achieving three main goals. These are: (i) to minimise the amount of waste generated, (ii) to maximise reuse and recycling, and (iii) to dispose of remaining waste in a controlled fashion in order not to exceed the capacities of local sinks. According to Baud and Post (2001), the goal of minimising the amount of waste generation could be achieved primarily through national policies which induce production and consumption practices that reduce the input of materials, make more efficient use of these inputs, and increase closed-loop recycling. Households, firms and institutions can help to maximise waste reuse and recycling if they sort the waste in such a way that the 'valuables' can be taken out. The extent to which waste separation occurs and is officially endorsed and promoted is a very important aspect of sustainable development (Lardinois and Furedy, 1999). The aim of waste minimisation and maximisation of reuse and recycling is to reduce the volume of waste for final disposal. Controlled disposal ensures that a high percentage of the waste reaches the official dumpsites. This is an important indicator of the quality of a solid waste management system because it enables the authorities, in principle at least, to reduce hazards resulting from contamination of surface and groundwater or soils by leakage. However, the prevailing method of final disposal in many developing countries is

still crude dumping, which impairs ecological sustainability and environmental health.

The assessment of socio-economic dimensions of solid waste management systems include both the consequences at the level of actors and the impacts on the efficiency of the entire system at the city level. Four criteria are distinguished:

1. Financial viability and affordability for the local authorities, consumers, and/or entrepreneurs involved in solid waste management.
2. Employment providing a living wage and a certain level of job security.
3. Legitimacy from the perspective of the authorities (legal) and the public social).
4. Effective monitoring and enforcement of standards.

Financial viability - in essence the assurance that the revenues will cover the costs incurred - depends on the willingness and ability of various stakeholders to contribute. The public good nature of solid waste management requires that authorities often have to accept a considerable degree of subsidisation. However, the financial sustainability of the system depends on the authorities' solvability (through own revenues or grants) and the political willingness to pay the price of adequate servicing. Contributions from residents can help to increase the financial viability of waste collection. The extent to which charges cover the costs of the service determines its allocative efficiency (Batley, 1996). However, if the charges are beyond what the residents can afford, it will incite them to opt out of the service or to engage in free-rider practices. Closely related to the concept of allocative efficiency is the concept of productive efficiency, which measures the operational performance of the service provider in terms of such things as labour productivity and cost per ton.

In many developing countries solid waste management provides gainful employment to numerous people. This serves as a key aspect of the assessment scheme that will be used later on. It is important to ascertain whether jobs within the sector provide a living wage and offer people a certain degree of job security. In addition, it is essential to look at the labour conditions of various groups within the solid waste system, especially the fringe benefits (or lack of these). The legitimacy criterion distinguishes between the legal situation and public attitudes. According to Baud and Post legal recognition of an activity or partnership relation may provide both advantages (access to credit and facilities; absence of harassment) and disadvantages (costs of formalisation), and the same applies to non-recognition. Social legitimacy refers to acceptance in the eyes of the public. Finally, it is important to find out whether mechanism are put in place to monitor performance - output criteria, health standards,

labour codes, environmental rules – and to see if sanctions are imposed in case of infractions.

The third dimension assesses contribution to environmental health. The goals are:

1. To bring about greater effectiveness in achieving a clean urban environment.
2. To minimise occupational health hazards.
3. To minimise environmental health hazards to man and animals related to the use of waste in agriculture.

A cleaner environment at the neighbourhood level depends on the quality of waste collection (service effectiveness), notably the frequency and reliability of the service. However, pollution produced by local industries dealing with waste materials (air, water, soil) or by collection vehicles (air) also has to be taken into account. At the city level it is especially important to look to the spatial coverage of collection services. Occupational health hazards can be reduced when waste workers are not directly exposed to waste, especially to dangerous fractions of waste, and can be mitigated by the use of appropriate safety equipment. Finally, when organic waste is applied – either directly or after treatment – in (urban) agriculture or horticulture it may have negative impacts on animal's health, soil conditions, and quality of food crops as a result of contamination.

All these aspects are important in assessing the contributions of solid waste activities to sustainable development. In Chapter 8 this challenge will be taken up.

#### **4.5 Conclusions**

A country's waste management system is a critical indicator of its level of development. Whilst developed countries have devised very complex but effective systems to manage their waste, developing countries have still not come to grips with how to do this effectively. The way waste is handled affects people's lives and the surrounding environment. Physical planning of estate development has a tremendous impact on waste management and environmental health. Reuse, recycling and composting not only reduce the volume of waste for final disposal, but also promote the judicious use of resources.

Problems of waste disposal are most severe in poor cities in developing countries. House-to-house waste collection is too expensive for many households or municipalities, while the streets of many poor neighbourhoods are too narrow for vehicles. Collection points can easily become small garbage dumps, especially when collection is intermittent. In many poor countries, public budgets have been under great pressure in recent years and waste collection is often one of the services to suffer most

(Bernstein, 1993; Young and Sachs, 1994). Solid waste collection often creates one of the most visible environmental problems in low-income communities. Two groups most directly exposed to solid waste are children and waste pickers in low-income neighbourhoods in cities in developing countries. Accumulated garbage also contributes to neighbourhood environmental health problems by providing food or breeding sites for flies and other pests (WRI, 1997: 5). The local authority, which is the main stakeholder in solid waste collection, should always take a special interest in the effectiveness and costs of collection methods, the effectiveness and costs of sorting systems and novel recovery methods, and how these methods contribute to sustainable development.

The public good nature of solid waste management means that even where the services are privatised, the public sector remains fully engaged, at least in regulating, supervising, monitoring and evaluating the activities of private contractors. In addition, where the privatised services are organised on a contract basis, the local government authority provides the money to pay the private contractors. In fact, privatisation does not take away the responsibility of the local authority in solid waste collection. Moreover, it is prudent to formalise the activities of informal actors into an integrated solid waste management system. It would take the collective responsibility of all the stakeholders in partnership to ensure sustainable development. How this is being shaped at local level in the city of Accra is dealt with in more detail in Chapters 6 and 7.

