

Municipal solid waste management

Involving micro- and small enterprises

Guidelines for municipal managers



For demonstration purposes only

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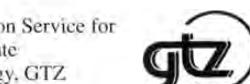
INVOLVING MICRO- AND SMALL ENTERPRISES

GUIDELINES FOR MUNICIPAL MANAGERS

by Hans Christiaan Haan, Adrian Coad and Inge Lardinois



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Summary – the key issues

Many cities in low-income countries are facing mounting problems in their solid waste management services because of their explosive population growth. Often the result is that parts of the municipal areas are not being served, and garbage generated in congested urban districts is not collected. In many cases the new low-income, high-density, unplanned housing areas are the most neglected, resulting in serious public health risks and environmental degradation. Frequent causes of these problems are:

- a lack of adequate budgetary funds (often with major cuts in recent years),
- low productivity from the workforce, management problems and unhelpful bureaucratic procedures, and
- inappropriate equipment for the physical conditions of unplanned areas, where access roads are not suitable for conventional refuse collection trucks.

For some years the private sector has been proposed as a solution to these problems. Involvement of private enterprise can bring clear advantages - in terms of lower costs (savings of up to 30%) and higher quality of service. In a number of cities the private sector has already stepped in to help fill the gap left by the public sector - either in a free market setting or encouraged by community-based organisations, non-governmental organisations and the municipalities themselves. It appears that a minor revolution has taken place in that the private sector is becoming more and more involved in providing services that historically were regarded as the domain of the public sector. In Guatemala City, Harare and Dakar, and in many other cities, private contractors are already responsible for collecting virtually all household waste.

This book considers one part of the private sector – the smallest enterprises and operations, known as “microenterprises” and “small enterprises” (abbreviated as “MSEs”). It is concerned with how these enterprises can work in partnership with municipalities to improve the coverage and standards of waste collection and disposal.

Compared to conventional contractors, MSEs bring the additional advantage that their appropriate technologies allow them provide low-cost services to those residential areas where larger scale operations either are too expensive or make use of inappropriate equipment. A further significant benefit is that MSEs can contribute to the creation of jobs and incomes.

The decision to involve MSEs should not be based on ideology or dogma, but on the basis of the merits of the case – that is, after substantial data collection and careful analysis. If there are good reasons for considering this option, the next stage is to run an experimental pilot phase. Small beginnings yield valuable experiences and indicate further helpful changes.

A number of qualifications are given concerning the extent to which MSEs should be involved

- MSEs cannot take on all the solid waste services, but should work in combination with the municipal workforce or conventional contractors;
- MSEs are not suitable for activities which offer substantial economies of scale;
- involvement of MSEs will not mean the end of the responsibilities of the municipality. On the contrary, municipalities continue to be responsible for maintaining standards to protect public health and the environment.

Examples of existing waste services delivered by MSEs include primary collection (especially in unplanned residential areas), street sweeping, park cleaning, and recycling. (There are very large numbers of microenterprises and small enterprises involved in recycling and resource recovery, but because most recycling operations in low- and middle-income countries operate independently of municipalities, comments about these enterprises have been included as an annex.)

The current trend is towards a mixed system – or team – of small and larger enterprises working together with municipalities. One such arrangement is the use of microenterprises for primary collection from the more difficult parts of the city, and a larger contractor collecting from the other parts and transporting the waste to the disposal site, which might be run by the municipality. The municipality would also act as the client and overall supervisor. This is just one of a wide range of possible combinations.

Achieving this integrated arrangement, in which the strengths of each team member are acknowledged, may not be an easy process. In many municipalities it might involve *a major change of attitude and expectation* among some local government officials. These changes could involve a review of administrative arrangements to allow MSEs to be contracted, and training for certain municipality staff.

There are four basic approaches to setting up and running MSEs, and often two or more of these approaches are combined. Some are more commercial in nature - looking for business opportunities - and others more closely linked with a particular community, and seeking to clean up their locality.

There are policy decisions that should be made at a high level, and more detailed operational plans which follow once policy has been determined. Among the policy issues to be considered are:

- Cost-recovery How will the income be generated to pay for the service? Options include a direct service charge collected either by the municipality or by the MSE, combined collection with a utility, or some form of taxation. Timely payment is vital for successful MSE involvement.

- Contracting arrangements There are three basic patterns, with varying degrees of municipality involvement and competition. This may be a good time to evaluate the form of contract that is used for general contracting and consider what changes should be made for service contracts with MSEs.
- Community involvement An understanding of the perceptions, wishes and priorities of the local community is an important starting point for planning. Particular importance should be laid on the views of women, since they are most concerned for waste management and so they are the main beneficiaries of the service. There is much evidence to show the great importance of the role of the community (that is receiving the service) both in decision-making and supervision, and municipalities are urged to involve communities at an early stage. Programmes that develop awareness are important both to create demand and to encourage participation.

A toolkit, not a cookbook

This is not a cookbook. It does not provide a guaranteed recipe that can be used in exactly the same way for every occasion. The strengths, needs and opportunities of municipalities around the world vary greatly. The difficulties facing city governments differ from place to place. There is a wide range of mechanisms operating within microenterprises and small enterprises, and there are many different tasks that they could perform. Communities differ in terms of motivation, organisation and finance. There is no single, universal procedure for involving MSEs. This book provides the tools that can help municipalities to shape the MSE component of an integrated solid waste management system, but the reader will need to consider which tools to use and be prepared to practice a little before obtaining the desired results.

This book has been written from the viewpoint of municipal managers. It should also be of interest to others who are concerned with municipal issues.

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I About this book

A Who should read this book?

Key points

This book is written for municipal officials who are in some way concerned with improving solid waste management services.

It is principally concerned with situations in Africa, Asia and the Western Pacific, and Latin America and the Caribbean.

If you are a manager, administrator or engineer, working in a municipality or local government body and you have responsibility for solid waste management (the collection and disposal of garbage or refuse) – then this book is written for you. (It should also be of interest to officers in national governments who are concerned with municipal issues, and to development co-operation agencies.)

This book could be useful to you if you must answer “yes” to any of the following questions:

- Are there some parts of your town or city which do not have a regular collection of solid waste, so that in these parts refuse is found lying on the streets, in drains or on vacant land?
- Is there pressure to cut the cost of the existing solid waste collection and disposal systems?
- Are many of the residents not paying the required fees for solid waste collection, or are they paying them very late?
- Are residents calling for an improved solid waste collection service – more regular, more frequent, or more convenient?
- Is the efficiency or productivity of municipal waste collection labourers inadequate?
- Is there political pressure to contract some municipal services out to the private sector?

This book is concerned with finding solutions to issues like these.

The reader will find explanations and introductions for those who have had no previous contact with micro- and small enterprises. There are also case studies and lessons drawn from experience, so the reader who already has had some contact with microenterprises or small enterprises will find some useful new ideas within these pages.

In this manual, attention will be placed mainly on the potential of micro- and small enterprises in waste services that are the responsibility of municipal administrations, and particularly in waste collection services. However, in Annex 7 some observations are made on small-scale waste recycling activities.

This book is principally oriented towards low- and middle-income countries, because experience shows that good solid waste management practice differs significantly according to geographical and socio-economic factors. Industrialised countries generally have high wage rates and proportionately low capital costs for machinery, and so the methods that are appropriate are very different from those that have been found to be successful where labour is relatively cheap and the costs of purchasing and operating machinery are high. Warmer climates call for more frequent collection of wastes and allow a higher consumption of fresh fruit. Literacy rates and packaging requirements also have an effect on the composition of the waste, and therefore, how it should be managed. High rates of rural-urban migration have had a major impact on the layout and infrastructure services of many urban areas, restricting, in some cases, the use of large solid waste collection vehicles. For these reasons this book is more relevant to low- and middle-income countries than to industrialised and high-income states.

B Tips for using this book



Key points

This book is designed in such a way that busy people can dip into the relevant section, rather than reading the book through from beginning to end.

Annexes provide important further information.

The authors have tried to keep this book brief and concise, because we know that municipal leaders have little time for reading.

As you may have noticed in the list of contents, we have organised the first part as answers to questions. This format was chosen in the hope that busy readers can concentrate on questions that are particularly important to them rather than feeling that they must read every word from beginning to end. The order of the questions suggests a sequence or process that many municipalities could follow, but a different sequence may be more suitable in certain situations.

Alternatively, there is a short subject index at the back that will enable you to find the main sections that deal with particular topics.

We have also included summaries in boxes at the start of each section to help the reader who must skim quickly through the book. These summaries give a quick review of the main points in each section.

In the interests of simplicity the pronouns “he”, “him” and “his” have been used to represent both male and female managers, administrators and workers.

A few cartoons have been included in this book because they each make a simple point in an effective way. We hope that you will enjoy them and not find them offensive in any way – they are not intended to be critical.

The annexes are a storehouse of useful and practical information for readers who want to go a little deeper into related issues. We hope that you will have time to visit them too. Abbreviations and specialist terms are defined in Annex 2.

Where information has come from a particular book or paper, the source is indicated by the family name of the first author and the date of publication. When there is a direct quotation the page number where the quotation can be found is also shown. More information about the sources can be found in Annex 12, the bibliography.

II Making the decision

C Why change the existing arrangements for waste management?

Key points

The environmental conditions in many larger cities are rapidly getting worse.

In many places traditional solid waste management arrangements have not been able to keep up with the problems posed by rapidly growing populations. In such places it may be helpful to consider alternatives.

Most people do not like change, and try to avoid it. We often wait until the pressure to change becomes intolerable - so great that we cannot continue without modifying our actions or attitudes. When law or administrative practice dictates the current approach, it often appears impossible to do things in a different way. However, the changes that this book is proposing are not impossible, because they have happened already in many cities.

If change is to take place, it may need to be driven by the mayor or most senior executive, in order that all concerned departments make the necessary changes. It may be useful to take the mayor to see some of the most unsanitary places in the city – the “hot spots”. Such a tour may have a powerful effect on a mayor who was previously unaware that such conditions existed in his city.

If you answered “yes” to any of the questions in section A, you are not alone. Cities all over the world are facing serious problems as they seek to keep ever-expanding areas clean and healthy. Some of the problems that are currently found are:

- Insufficient funds to provide a service for all the urban population;
- Low labour productivity, perhaps because of trade union restrictions, inadequate supervision, or unsatisfactory equipment;
- Inappropriate machinery which is unsuitable for the particular type of solid waste, the road conditions, or the maintenance possibilities, and which is much more expensive to operate than less sophisticated equipment;

- A lack of co-operation and participation from the public. Most residents may see the municipal administration as remote and inaccessible. They may regard solid waste collection as the responsibility of local government, with no need of co-operation from their side. Therefore they are not motivated to pay waste management fees or to handle their waste responsibly.

Cities which are expanding 'spontaneously' as the result of continued rural-urban migration are facing an enormous challenge as they seek to provide adequate waste collection services to their entire geographical area. Quite often they are not able to extend solid waste collection services to the new, low-income high-density housing areas. Such new housing often sprouts up on hilly terrain and is served by narrow, even unpaved roads which are inaccessible for the regular municipal waste collection vehicles. In many cities such settlements do not have a formal status and so have no legal right to a waste collection service. In such situations uncollected refuse (often mixed with human and animal excreta) is dumped in streets, on vacant ground, in drainage systems, or into or beside rivers. Often it is burned, posing serious public health risks and causing grave environmental degradation. The economic costs of this neglect may be higher than one may think, because of the costs of treating the resulting disease (which can spread far beyond the confines of the particular housing area), and lost economic activity because of illness.

Such difficulties are compounded by cost recovery problems. Waste services are generally financed from municipal taxes or special charges, which some citizens and businesses refuse to pay. Many households may face extra difficulties in paying these taxes and fees because they earn only meagre incomes and already have problems in meeting basic needs - food, clothing and housing.

It can be concluded that many of the larger and rapidly growing cities in low-income countries are facing a serious solid waste crisis. Efficiency is low and an increasing geographical area is not adequately covered. Dwindling resources aggravate the situation. Economic and urban development will undoubtedly lead to a further and increasing demand for waste services.

Private sector initiatives have emerged to improve this situation.

Change is often seen in a negative way, as something to be avoided. However, change has a sweeter side. When a new approach is tried, and new minds are involved, it is often possible to innovate, and improve on methods and approaches that have been in use for decades. Old assumptions are questioned. Long-accepted methods are examined. Change can bring a refreshing breeze.

Change may be painful, but the pressure is increasing for something to be done.

D Why involve the private sector?

Key points

The public sector is one option for filling the gaps in solid waste management services.

The private sector can offer advantages in terms of cost, control and reliability.

There is a range of types of private sector organisation, to suit different needs in different situations.

Whenever the private sector is involved, municipalities should retain responsibility for enforcing environmental standards and supervising the operations of contractors.

Lets us consider cases where the municipal sweeping and collection service has not been able to meet the needs of an expanding city. In such situations, municipal managers who are concerned to provide *all* the citizens with a waste collection service are asking themselves...

...What are the options?

Three options come quickly to mind.

- 1) To increase the size of the municipal workforce in proportion to the extra population that requires the service. In some cities this is not a feasible option because of restrictions on recruitment, often because of budget problems. In other cities this is not acceptable because of dissatisfaction with the output or productivity of the workforce – the feeling that the labourers could do much more work than they actually do. So the next option is
- 2) To improve the working practices or productivity of the workforce. In many large cities this has proved to be very difficult because of customary practices or agreements with labour unions, or difficulties of supervision and motivation. A third alternative is
- 3) To contract the services, either to a private company or to an autonomous organisation. Why?

What advantages can the private sector offer?

Cost Although private sector companies must earn enough to make a profit, in addition to covering their costs, experience has shown that they can often deliver the required service at a cost lower than the public sector. This is

not only the case in high-income countries, where waste collection research shows that private sector firms operate waste collection services 10-30% cheaper than municipalities (Cointreau 1994), but also in low income countries (Arroyo, 1998). Private sector companies are motivated to keep their costs down by their desire to maximise their profits and by competition. They are able to keep their costs down because of their management flexibility and freedom of action (in comparison with municipal bodies that are often unable to dismiss unsatisfactory employees or improve inefficient practices).

Control Public bodies often have more control over their contractors than over their own employees, because penalty clauses in well-written contracts provide sanctions to penalise poor performance. The threat of non-renewal or termination of a contract encourages contractors to strive to please their clients. (Some examples of contracts are given in Annex 10.)

Reliability is an important requirement for waste collection. Private sector collection services in many places have shown themselves to be reliable because of the penalties that result if they fail to provide a service. For example, if a vehicle operated by a transportation contractor has a mechanical failure, the contractor is obliged to hire a replacement immediately in order to avoid being penalised under the terms of the contract.

The issue is not the handing over of any *responsibilities* from municipalities to the private sector, but handing over the *execution* of some of the tasks. It is essential that the municipal authorities retain ultimate responsibility for the standards and performance of the tasks undertaken by contractors, to ensure satisfactory services and to prevent any form of environmental degradation that might be caused by the action of contractors.

In recent years there has been increasing interest in the potential of such public-private partnerships in the field of solid waste management (Cointreau 1994 and UMP/SDC 1996a). The growing role of the private sector in what historically was the domain of municipal services has become accepted, and many local governments are now actively seeking partnerships with private enterprises. Such partnerships tend to refer to an increased role for medium and large enterprises. But there are also examples of smaller enterprises which have tried to fill the gap left by the public sector in the field of solid waste management. Self-employed waste collectors, small transport companies, community organisations and development programmes have initiated a variety of waste services in different cities, and especially in Latin America. Later sections of this book will discuss such options in more detail.

E What are MSEs?

Key points

MSEs (micro- and small enterprises) are enterprises with fewer than 20 employees and only a small amount of capital. They often rely on low-cost technologies.

Survival activities are not included.

MSEs take various forms and start in many different ways.

In general, MSEs form a very important part of the economies of developing countries.

In this book abbreviations are avoided as much as possible, but this one cannot be avoided. The term "MSEs" stands for "microenterprises and small enterprises". (It should not be confused with the term "SMEs" which refers to larger operations - "small and medium enterprises", - which will hardly be mentioned in these pages.)

Microenterprises, small enterprises and medium enterprises are usually distinguished from each other and from larger private sector organisations by the number of employees in each and the capital involved. In some countries other characteristics may be associated with these terms, so when discussing these issues it is important to clarify what is understood by the terms being used. The box below suggests a simple definition for MSEs.

DEFINITION OF MSEs

An MSE can be defined as a group of people working together for financial gain, subject to the following limits on numbers of workers and capital.

Size: microenterprises from 1 to 10 workers, and small enterprises from 11 to 20

Capital: capital investments - mostly from own savings and informal loans (coming mainly from family and friends) - ranging from US\$ 100 to US\$ 10,000 (microenterprises) and from US\$5,000 to US\$ 50,000 for small enterprises. The actual amounts must be varied according to local economic conditions, and so these ranges should be taken as examples rather than as an absolute definition.

In certain countries the definitions are more complex, because other features may be associated with either microenterprises or small enterprises, or both. Such features of MSEs include:

- **Technology:** MSEs often use low-cost and labour-intensive equipment and machinery, such as handcarts or donkey carts. Such methods may be regarded by some as outdated, but in fact they may be

well suited to certain types of conditions and can be more effective than technologies which are considered modern, so they should not be rejected without clear and objective reasons. However there are also many examples of MSEs that use tractors and trucks.

- **Employees:** MSEs characteristically employ few regular workers. Often labourers are hired on a casual or short-term basis. Many MSEs rely on family workers who are often not paid for their work.
- **Organisation:** In MSEs there is often limited division of labour - most of the workers doing most of the tasks - with little specialisation.
- **Management style:** In some MSEs there may be a conventional approach to management and labour relations, but in others the owner may do similar work to other employees, or the operation may be built on family relationships.
- **Legal status:** This varies considerably from one country to another. In some countries MSEs may work without written contracts. MSEs in some areas are mostly in the informal sector - that is, they are not legally registered and operate without a licence, without paying tax, and without conforming to labour legislation (such as minimum pay laws, provision for pension and insurance, and safety requirements). In some places the legal status may be seen as the essential difference between a microenterprise and a small enterprise. In other places MSEs are registered and conform with all legal requirements.
- **Financial aspects:** The wages of employees are often low, irregular and insecure. Owners of MSEs generally earn well above the minimum income level.

Are survival activities considered to be MSEs?

Sometimes microenterprises are confused with *survival* activities. Survival activities, such as street trading, shoe shining and other personal services, yield a pitiful income and generally offer few prospects for development. People who cannot find a proper job elsewhere engage in these activities in order to try to earn some money for the household budget. Since it is easy for anyone – with little technical skill or capital – to become involved in such activities, competition keeps profits down and limits the opportunity for capital accumulation. Consequently these survival activities do not offer much scope for growth.

In this manual the term ‘MSEs’ will not include survival activities. In other words, it is assumed that the owners of the firms are seeking to expand and develop their operations, and have the skills to achieve this, and that their businesses have a definite potential for growth and development.

Many variations possible

There are many types of small organisation that could provide services such as solid waste collection. Some are set up by external agencies for social purposes – usually to provide employment. Others are set up by community groups to provide a service that they require for themselves, and may depend quite heavily on voluntary inputs for functions such as supervision and financial management. Experience has shown that both types can be affected by fatigue (in other words, a loss of interest when the initial motivation dies off) and so they may not be sustainable. The first type may depend too much on the external agency for financial support, management skills or political connections, and so not be able to maintain its service if the external agency withdraws. Community-based services have failed when volunteer supporters have lost interest or left without being replaced.

Some types of MSE are set up by local entrepreneurs (or small businessmen) who perceive the delivery of waste services as a business opportunity. In other words, they are entirely 'demand-led', seeking to fill a gap and generate income. They bring some capital (or funds borrowed from friends and relatives) and, probably, relevant technical and management skills. All these are critical factors when it comes to promoting sustainable waste services. The operators are profit-driven and motivated to continue the delivery of the service, and, if possible, steadily improve the efficiency and size of the operations and the quality of the service.

In most developing countries, the MSE sector provides work for 30-80% of the urban labour force. (Since definitions vary, this could also include survival activities in some situations.) This means that MSEs are by far more important as a source of jobs than the modern industrial sector and the government services combined. Newcomers to the labour market (including "drop-outs" from the education system, and graduates), recently arrived rural migrants, and 'retrenched' public sector workers, turn to the MSE sector to earn themselves an income when they are unable to find work in the modern industrial sector or government service. The flexibility of the working arrangements (e.g. part-time work, home-based activities, low educational and capital entry requirements), makes it also possible for large numbers of women to work in MSEs.

F Why involve MSEs?

Small is beautiful
(Schumacher)

Key points

MSEs must work together with the private sector and local government. MSEs can normally provide only parts of the waste management service.

Experience shows that MSEs can deliver a good quality service at a low cost.

MSEs often benefit from links to the communities in which they work.

MSEs may develop innovative approaches to particular tasks.

This question is really two questions:

- Why should I involve MSEs instead of increasing the public sector (municipal) involvement? And
- Why should I involve MSEs instead of larger contractors?

The first question has already been partially answered in section D, but some of the comments in this section add to what was written there. Much of this section concerns the benefits of involving small organisations as compared with larger conventional contractors.

Before going any further an important point must be made. MSEs should not be expected to provide *all* the solid waste management services of a city. There are some functions that they can perform well, and others that should be done by a different type of organisation. This is discussed more in section G. MSEs can provide *some* services in an effective way.

In the last two decades MSEs have come into focus as an important economic sector, providing employment and incomes to a large section of the population of low-income countries as well as numerous repair and other services to the rest of the economy.

The involvement of MSEs in waste services is not new. The oldest garbage collection MSEs have been found in Guatemala and Costa Rica, and date back to the early 1950s. Unlike MSEs that have started more recently to provide waste management services, they were set up without any specific stimulus from public or private agencies, but as a business opportunity and to meet a need.

The concept of the ‘‘level playing field’’ is often mentioned, describing a situation in which the success of the players is based on their own ability, rather than external factors (such as the slope of the football pitch). Do MSEs compete with municipal workforces and large contractors on a level playing field? Not according to the Latin American commentator who wrote this:

“...the greatest obstacle has [been] the reluctance to hire the sanitary services offered [by MSEs]; the municipalities’ lack of confidence in establishing contacts has been marked; in most cases officials in charge prefer companies with large capital investments and advanced technology, even though this technology is not adequate for Colombia’s cities and cannot be afforded by them.” (Querubín, 1996: 6).

There are signs that the attitudes are changing. After having been shunned and even actively discouraged by national policy makers and local law enforcers for years, the micro- and small enterprise sector is now being regarded more positively. Governments in developing countries have discovered that they are largely dependent on this sector for the creation of work for their rapidly expanding labour forces. This is because the average investment per job in the modern sector (US\$10,000 or more) is too high for large-scale employment creation. The international trend to curtail government expenditures (stimulated by the IMF and the World Bank) also prohibits the expansion of public sector employment. This has made some governments more sympathetic towards MSEs, leading to the formulation of specific economic policies for the MSE sector, overdue changes in the legal framework, and the initiation of micro-credit, technical training and other MSE support programmes. (In later sections of this book these helpful changes will be discussed in more detail, and MSE support is covered in Annex 8.)

Assuming that the playing field is approximately level, what are the arguments in favour of MSEs?

Case studies show that MSEs can deliver good quality waste collection services at a low cost.

Cost

A key reason for considering MSEs for waste management is the financial saving that can result. This is obviously particularly important for municipalities suffering from high expenditures and inadequate revenues. The lower costs follow from the use of more appropriate technologies, such as handcarts and donkey carts, which require less investment capital and can have lower operational costs than motor vehicles.

In some countries another saving comes from the lower wages of MSE workers in comparison with their municipal counterparts. This is particularly the case in cities with strong labour unions where the wages and benefits of municipal employees have risen far above the wages of people undertaking

similar work in the private sector. In Latin America this is not the case. It is important to build in safeguards to prevent exploitation. There are cases when the costs of MSEs are less partly because the workers of MSEs receive wages lower than the statutory minimum wage (Coad, 1997). Sometimes family members do work for which they are not paid. Both these situations should be avoided.

Quality of service

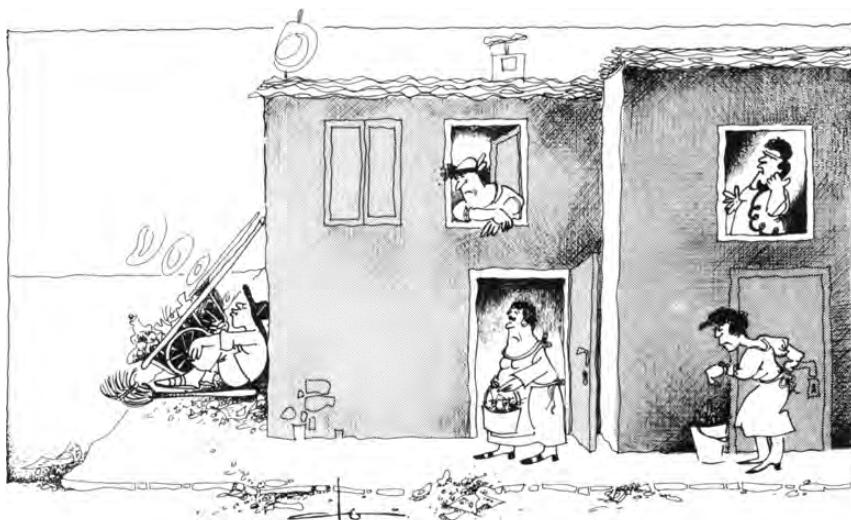
The small size of MSEs makes them flexible and able to provide more tailor-made services. Different types of housing and access roads require different waste collection systems, and a small MSE may be able to modify its method of working to fit requirements. The smaller size leads to a stronger team spirit and the consciousness that the success of the enterprise depends on the attitude and effort of each of the team members. Each worker knows that his job depends on how well he does his work, and this provides more motivation than a municipal position. (In many towns and cities, municipal employees are virtually guaranteed a job for life, and may be regarded as just numbers on a payroll sheet, being paid the same wages whether they work hard or half-heartedly.) The supervision of the MSE owner is closer and more urgent, and so more likely to lead to a higher standard of work. MSEs that have links with the particular community that they serve are motivated by closer and more personal contacts with the beneficiaries of their work. All these factors can result in a better performance, a higher quality of service.

Links with community

Since MSEs operate at a small scale, and are often based in the neighbourhood they serve, they favour community participation and control. All solid waste collection systems require some participation by the residents who receive the service – often this involves putting the waste into specific types of containers and leaving it at a specified place, perhaps at a specified time. Close links between the collection workers and the residents help to develop such co-operation. The community can also be involved in supervising the service, reporting if collection is delayed or missed. (Figure 1) If a community is aware of the refuse collection service, and know the workers responsible, they are more likely to be ready to pay for the service, than if the service is impersonal and unseen.

Figure 1

Supervision by the community can be very effective in noting the failure or delay of the collection service



By working more closely with the communities, MSEs can play a role in public environmental education. Close links with the residents can provide opportunities for introducing source separation of certain wastes for recycling, which can benefit the worker who collects and sells the recyclable materials, and benefits the municipality by reducing the quantity of the waste. (By taking out certain components of the waste, recycling also increases the homogeneity of the remaining material, which is an advantage if composting is taking place).

Safety in numbers

For the municipality it may be an advantage that waste MSEs have inherently a limited capacity, so that coverage of substantial areas will require the involvement of a number of such MSEs. This will create conditions of competition among them, which will contribute to transparency and accountability of the contracting arrangements that are worked out with the local government. Competition can also keep the fees down, if it is the practice to accept the lowest satisfactory bid in a tendering procedure. Figure 2 illustrates this point.

Figure 2
An advantage of many MSEs over one large contractor



- a) If there is only one contractor interested to do the work, the client has little control over the price and the quality of the service



- b) If there are many MSEs interested in taking parts of the work, the resulting competition keeps the prices down and enables the client to control the quality of the service since unsatisfactory contractors can be replaced.

Though waste management MSEs have shown great resilience, with remarkable stability in the face of major economic and political fluctuations, there is always the chance that some inexperienced entrepreneurs will fail in the early stages. If there are many other MSEs already in the field, or waiting for an opportunity, a replacement can be quickly found. On the other hand, if there is only one large contractor, there is no competition, and no opportunity for competitors to develop. This can lead to high charges, poor service, and pressures on municipality staff.

Employment generation

It is understood that the job descriptions of municipal managers and decision-makers who are responsible for solid waste management do not include taking care of the unemployed. Nevertheless, from the humanitarian perspective, all should be concerned for the poor. MSEs using labour-intensive techniques can create more employment than large enterprises that tend to utilise more labour-saving machinery. In this respect, the introduction of MSEs can be an important element in local poverty alleviation strategies, especially when they rely on entrepreneurs and workers from the low-income neighbourhoods.

Focus of attention

In large organisations, the tasks of manual collection and sweeping may be seen as unimportant in comparison with other components of the service. An organisation charged with collection may give considerable attention to the specification of the trucks it purchases, or the design of a transfer station, but very little attention to the design and maintenance of its handcarts. If disposal is included in its responsibilities, much thought may be given to the development of treatment plants or site selection, so that problems faced by sweepers are left unsolved. On the other hand, a small organisation, whose work is based completely around low-cost equipment, such as brooms and handcarts, gives these items careful consideration and seeks to find ways to improve designs and maintenance to ensure an efficient and economical service. (To illustrate this point, think of looking at a painting at an art exhibition. If we concentrate our attention on one corner of the painting, we see details that are missed when we look at the whole. What we see depends on our field of view or area of focus.)

If attention and thought are given to the small details of manual operations, services that involve many workers can be improved. (More information on designs of handcarts is given in Annex 4.)

Conclusion

In view of

- the current problems in municipal solid waste management,
- the increased attention being given to public-private partnerships,
- the benefits of employment creation in the MSE-sector, and
- the benefits of MSEs mentioned above,

it would appear to be worthwhile to investigate the potential of expanding the role of small waste MSEs in municipal solid waste services.

G What tasks can MSEs do well?

Key points

MSEs are well suited to tasks that present small or insignificant economies of scale, and that require only small capital inputs.

Other factors such as motivation and supervision can also have a major influence on the benefits of using MSEs.

Good contractual relationships need objective quantitative descriptions of the work that is to be carried out by the contractor.

MSEs are well suited to undertake primary collection and street sweeping, and may be able to effectively carry out many other tasks related to waste management. There are many recycling MSEs, but few have links with municipalities.

Municipal staff always retain the responsibility for maintaining environmental and financial standards in work undertaken by MSEs and other contractors.

Solid waste management includes many different tasks, some are technical, others administrative, and others are concerned with social aspects. Tasks related to the waste collection service must often be performed differently in different parts of large cities. As mentioned in the previous section, MSEs are not suited to all aspects of solid waste management work. Which tasks are suitable for MSEs? Table 1 shows examples of MSE activity in solid waste management in Latin America. These results show that all technical tasks are handled by MSEs, but the majority of small contractors are involved in cleaning of public areas, collection, and waste recovery or recycling, including composting.

Table 1
Examples of MSEs in Latin America

This table does not give a complete list of the waste management MSEs in the countries listed, but cites examples that were studied. It is taken from Arroyo (1998).

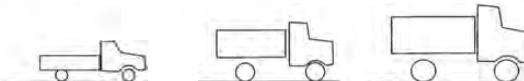
Country	Principal activity	Number	Starting year
Guatemala	• Street cleaning and sweeping	2	1984
	• Collection	6	1950
	• Final disposal	1	1982
	• Recovery and sorting	5	1990
El Salvador	• Collection	5	1983
	• Recovery and sorting	4	1970-1985
	• Composting	1	1994
Costa Rica	• Collection	7	1952-1995
	• Recovery	8	1981-1993
	• Final disposal	1	1995
	• Beach cleaning	1	1987
Colombia	• Collection	5	1990-1994
	• Recovery*	3	1985-1990
Brazil	• Recovery	1	1989
	• Separate collection	2	1985-1987
Bolivia	• Street sweeping and collection	9	1991
	• Collection	9	1987-1994
Peru	• Street cleaning and sweeping	1	1993
	• Collection	15	1989-1994
	• Final disposal	1	1994
	• Recovery	2	1989,1992

* (Colombia) excluding the National Association of Recyclers.

A principal criterion for deciding whether a task is suitable for MSEs is the question of *economies of scale*. This term refers to decreasing unit cost (i.e. the average cost per ton or per cubic metre) of an economic activity when the scale of operation increases. To a large extent this is due to the use of capital equipment – for example the unit cost of transporting waste with a small truck is higher than when using a larger truck (see the explanation in figure 3 below). Simple theory indicates that, in general, it is more economical to operate on a larger scale. Other factors which may work against economies of scale will be discussed later in this section.

Figure 3
Example of economies of scale
long-distance transportation of waste

If a small pick-up truck is used to transport half a ton of solid waste over a distance of 30 km, the cost per ton will be higher than if 5 tons are transported the same distance in a bigger truck. The unit cost of transporting 10 tons in a still larger vehicle will be still less. It is more economical to operate on a larger scale.



Load of waste (tons)	0.5	5	10
(imaginary figures for example only)			
Labour	4	4	4
Vehicle	7	23	29
Total	11	27	33
Cost per ton (\$/ton)	$11/0.5 = 22$	$27/5 = 5.4$	$33/10 = 3.3$

To summarise: micro- and small enterprises are suitable for activities where there are small or negligible economies of scale.

Some economic activities have more pronounced economies of scale than others, depending on the possibilities for mechanising operations. The production of wheat, for instance, offers far larger economies of scale than growing vegetables or flowers, as evidenced by the huge wheatfields in the USA where the farming is completely mechanised. There are activities for which no labour-saving equipment has (yet) been developed. Park maintenance, for instance, has only limited possibilities for the introduction of cost-saving equipment. Another situation concerns economic activities for which sophisticated mechanised equipment is available but cannot be used because of local circumstances. This is the case when large waste collection vehicles cannot be used in unplanned residential areas which have unpaved, narrow and winding roads.

Manual street sweeping, on the other hand, does not present large economies of scale. If it is assumed that each sweeper works at exactly the same productivity level, and there is no supervision, then there are no economies of scale. If each sweeper must be supervised, and the cost of the supervisor is divided between the sweepers, then the unit cost of the operation (either in terms of area swept or weight collected) is less for ten sweepers working under one supervisor, than for one sweeper being supervised full-time by one supervisor. In the first case only one-tenth of the supervisor's salary must be added to the labourer's wages as a supervision overhead, in the second case the overhead is ten times more. So if the cost of supervision is included in this way, there is an economy of scale and it is more economical to contract one company

with ten sweepers and one supervisor than ten companies, each with a sweeper and a supervisor. (The question of the use of large sweeping machines is a separate issue that is discussed more in Annex 4).

However, putting aside the concept of *economies of scale*, there are other factors that must be considered in deciding whether MSEs are suitable for particular tasks. Imagine, for example that we wish to determine whether it is more economical to engage one company with many 10 ton trucks to transport waste, or a number of MSEs each having one 10 ton truck, driven by its owner. A truck driver who owns his truck and is paid according to the weight of solid waste that he actually transports, may be able to deliver waste to the disposal site at a lower unit cost than a municipal operation or large contractor with many trucks of the same size. The owner-driver in the first case may be motivated to do more trips in a day and load more waste into his vehicle each time. Drivers in large fleets, if they are paid at a flat rate or restricted by union agreements, may work shorter hours and take less trouble to load their vehicles. The question of motivation and its effect on productivity or efficiency is never far away from any consideration of cost-effectiveness.

Because they are small, MSEs are generally suited to tasks where there are no economies of scale, or where the effect of the economy of scale is easily compensated by increased efficiency.

A further factor to consider is the lack of capital of most MSEs. This suggests that they are best suited to tasks that do not require any expensive equipment. Some MSEs have succeeded in undertaking work that depends on large vehicles by either using very old vehicles, or by leasing modern vehicles on the basis of monthly payments or deductions from fees paid by the municipality.

One further test may be used – a factor that is of concern for all contracting, whether to large or small enterprises. Contracts should be written in terms of objective measurement of the work that is to be paid for. If the work cannot be objectively measured, there can be endless disputes about whether the work has been performed satisfactorily, or not. Contracts must be carefully written with precise and quantitative descriptions of what is to be done, and the conditions under which penalties will be payable.

Tasks that pass these three tests are probably suitable for MSEs. Annex 5 reviews the tasks that MSEs may become involved in, and discusses specific factors which additionally affect the suitability of MSEs. In most of the main part of this book the task of primary collection of domestic waste will be considered, since this is the most common duty to be entrusted to MSEs by local government. Many MSEs are involved in recycling, but usually not in direct relationship with the municipal authorities. The involvement of MSEs in recycling is discussed in more detail in Annex 7.

It is important to stress that the municipal authorities must retain ultimate responsibility for the services provided by MSEs, in terms of maintaining

environmental standards and ensuring good management of resources. Municipal officials must develop their scientific and practical knowledge in waste management, so that they can monitor and advise contractors that are providing services for them.

In a wide variety of situations, there is ample scope for increasing the involvement of MSEs in solid waste services. In some towns and cities there may be no MSEs providing collection (or other) services, and in such places municipal officials are encouraged to investigate the possibilities of opening the door to MSEs. In other situations it may be possible to improve waste management services by increasing the opportunities for MSEs. This is true even in a country like Costa Rica where MSEs already play a key role in solid waste management in some towns - serving residential areas not covered by municipalities. The residents value their efforts but the MSEs are not officially recognised and only have a marginal role within the national solid waste system (Rivas, 1996). The opportunities for MSEs may be constrained more by the attitudes of municipal officials than by their ability to provide valuable services.

H Which type of MSE is most suitable?

"The MSE model that is most successful is the one set up on basic commercial principles and good business practice"

Dr Carl Bartone, World Bank

Key points

There are four basic types of MSE, and some MSEs are mixtures of these types. The four types are:

- The private MSE, working to make a profit;
- Co-operatives, providing mutual support for their workers;
- Community-based enterprises, established to meet a local need, and
- Labour contracted by an individual or social organisation, again to meet a local need.

Relationships with private MSEs may be similar to relationships with conventional contractors, but decisions concerning community-based enterprises should involve the community

Experience shows that motivation is a key factor, and suggests that the economic motivation is the most durable.

Examples and case studies show that among small-scale waste activities, there are four main types of MSEs:

- 1) private MSEs,
- 2) co-operatives,
- 3) community-based enterprises, and
- 4) labour contracted by a local organisation.

Not all MSEs can be easily put into one of these categories, because many have characteristics of two or three of these types. These categories reflect main characteristics, but the reality is often more complex. (For example, some co-operatives – type 2 - in Colombia have a strong business approach, like the private MSEs of the first type.)

The box below shows how various types of MSEs have been integrated into waste management in Latin America. (The term “pre-cooperatives” is found only in Latin America and refers to the first stage of the creation of a co-operative. In some Latin American countries [e.g. Colombia], pre-cooperatives are easier to establish than co-operatives, whilst still bringing some of the advantages, such as special tax treatment).

I) Private MSEs

A private MSE is basically a small private company, in which an owner or entrepreneur organises employees and resources so that he can generate a profit from this activity. The owner chooses to work in the field of waste management because he sees an opportunity in this form of work or because he has particular resources, skills, experience or contacts in the field. He might decide to change to another unrelated type of activity if he thought he could make more money by doing so. From the case studies it becomes clear that this type is common among the most experienced waste-collection MSEs, for instance in Guatemala, and especially in waste recovery and recycling.

A private MSE is concerned about profit, not about the needs of the community and protection of the environment. In some countries, such as Guatemala, private MSEs have operated with little relationship to local government, and so have been free to choose where they would work. As a result they tend to work in the areas where their profits will be greatest – that is, the middle- and high-income areas. Even if several MSEs are in competition with each other and are providing overlapping services, they prefer to stay in the more prosperous zones and avoid the low-income areas. This problem does not arise if the municipality is able to pay the MSEs directly, since their income can be the same whether they work in high-income or low-income areas.

2) Co-operatives

Many forms of MSE contain an element of 'collective' action. One model in this category is the co-operative, in which self-employed waste workers, previously working independently, decide to work together. In Brazil and Colombia, for instance, waste pickers were stimulated to band together and form co-operatives. In Colombia they then started to collaborate together in local and regional associations, and have now formed a National Association of Recyclers (Querubín 1996). Workers are often motivated to join together because of outside threats – such as from government or "middlemen" dealers.

ENTREPRENEURIAL ORGANISATION OF SOLID WASTE SERVICES

Street sweeping and cleaning / maintaining public parks

- a micro-enterprise specialising in this service, contracted by the municipality (Peru)
- neighbourhood committees contracting a group of people (Guatemala)
- undertaken by a garbage collection micro-enterprise as a secondary activity (Bolivia)

Solid waste collection and transportation

- individually owned micro-enterprises, whose owner initiated the service (Costa Rica, El Salvador and Guatemala)
- community businesses (Costa Rica, El Salvador)
- associations (Peru and Bolivia)
- NGO (El Salvador)
- pre-co-operatives (Colombia)

Recovery and recycling

- small formal enterprises (most of the recycling firms found in Latin America)
- pre-co-operatives (Colombia and Brazil)

Source: Arroyo, 1998

Unfortunately, the co-operative movement, which is based on the principle of working together, has in the past encountered a large number of practical problems. Experiences in Africa have been disappointing. Often, after an initial period of well-intentioned co-operation, small frictions creep in, and problems arise in connection with leadership, accountability and distribution. Such problems affected a co-operative waste collection enterprise in Ouagadougou (Burkina Faso), which split up after a few years following a "misunderstanding" between its president and treasurer (see Annex 9). Moreover, the lack of a business motivation is often reflected in a failure to adjust to market forces. As a result the operation starts to depend on artificially cheap inputs or subsidised revenues, which in the end increases the risk of commercial failure. The Payatas environmental programme in Metro Manila (the Philippines) reached a similar conclusion:

"...supporting family-based micro-enterprises has proven to work favourably rather than forming group or co-operative enterprises..... Essential elements of

co-operativism may be adopted and have already been proven effective, such as peer-support-systems, but establishing co-operatives per se among the urban poor is a tall order which requires a longer process than is commonly presumed." (Carcellar, 1996: 11).

3) Community-based enterprises

In waste management, collective ventures often follow from initiatives taken by the community or social organisations. Since they originate in community interest and efforts, they can be labelled 'community-based enterprises'. Their primary objective is not to operate as a profitable business, but to deliver some kind of social service.

Community-based enterprises, co-operatives and other forms of collective enterprises, bring a number of distinct advantages, and appeal to the popular concepts of working together and community development. A particular advantage of a collective waste enterprise is that it operates much closer to the community, which brings various advantages in terms of community participation in having the waste ready for collection and in payment of fees. Social pressure encourages prompt payment and good practice. A sense of ownership may turn every householder into an amateur supervisor.

The EXNORA programme has been very successful in motivating community action in India, according to the pattern outlined in the box.

COMMUNITY PARTICIPATION - THE CASE OF EXNORA

EXNORA is an international NGO which is active in Chennai (Madras) and many other cities in India. It seeks to act as a catalyst to create local 'Civic EXNORAs' which are street-level community-based associations of some 75 to 100 local households that organise waste-services.

They contract local waste pickers (who are renamed 'street beautifiers') for waste collection and street cleaning. They are provided with a small loan (about US\$ 165) for the purchase of a waste cart (often a specially designed tricycle) and working capital, and collect waste management fees (approximately US\$ 0.30 per family per month).

The Civic EXNORAs in a city collaborate in a Forum, and receive assistance from an 'innovators club'. They encourage refuse sorting at household level, assist in setting up vermi-composting pits or backyard containers, and engage in public education campaigns.

Source: Ramkumar 1996.

A significant number of the existing waste management MSEs perform economic activities in which the community is directly involved. For example, in areas excluded from regular solid waste collection, residents may decide to organise such services themselves in order to ensure waste collection and a

cleaner urban environment. In some cases they form a community-based organisation (CBO) for this purpose.

There are different ways in which a CBO can organise waste services in a neighbourhood. It can:

- petition the municipality, on behalf of the residents in the area, to improve or extend the solid waste services into or within the neighbourhood;
- organise volunteers to provide the services by means of a rota system or something similar. (Such services will then be confined to primary collection and street and drain cleaning, as transport and disposal are beyond the scope and capacity of most community-based groups.)
- carry out the services itself (usually by engaging labourers), for which it must usually collect payments from the residents;
- engage, on behalf of the residents, a private enterprise to carry out the service;
- stimulate local entrepreneurs to take on this task, (with active support from the CBO if necessary).

Direct involvement of the CBO brings certain advantages. There may be a high degree of dedication to the task, and collection of payments is facilitated by the direct links with the population. There is more chance that the wishes of the community will be taken into account. There are also disadvantages: - dependence on qualified leaders, lack of experience and skills, and the limitation to activities with little requirement for capital, such as primary collection and street sweeping. Experience has shown that such CBO waste services can be very effective - especially when the community groups are small and cohesive. Some MSEs of this kind are very dependent on the leadership of one person, so consideration should be given to the continuation of the work after this person has gone.

4) Labour contracting by community leaders or social organisations

This refers to the provision of waste services by direct labour contracting by a group of residents, community leaders, CBOs, NGOs or another organisations. In Indonesia, for example, many local leaders, especially of low-income neighbourhoods, organise the community to deliver household refuse to a communal depot, or hire and manage workers from the neighbourhood for door-to-door waste collection using handcarts (Cointreau, 1994).

This arrangement offers considerable advantages because of the level of co-operation from the community. However, there are important disadvantages, the main one being related to management style. The managers are generally the community leaders, often working on a voluntary basis, so that such schemes are likely to collapse when the competent leader withdraws.

There is no direct incentive for the workers to increase the efficiency and quality of their work, as their remuneration, if any, is usually very low and not linked to the amount of waste management fees collected. Financial dealings are not necessarily transparent, which may lead to corruption and mismanagement of funds, or suspicion of these.

Selecting the best type

The choice of the type of MSE has a major impact on the relationship between the municipality and the MSE, and on the way the work is set up and managed.

In the cases of the private MSE and the co-operatives, it would be possible to manage the contractual relationship in much the same way as for a conventional contract. All the decisions could be made by the client (the municipality). This might be appropriate if the community showed little interest in the arrangements, or for work that involved the community to a very slight extent. If the payment for the contractor were to come from the municipality, with no noticeable change in charges, it would be possible to plan and prepare with little reference to the community that is to be served.

On the other hand, if community-based enterprises or contracted labour were to be used, it would be essential to involve the community at an early stage. Similarly, if significant efforts were to be demanded of the community, such as a greater input into the collection process (carrying their waste further, or source separation, or an increase in fees), the community should be involved in the planning from an early stage. The best results will be obtained if the community is involved in the decision-making; it is not enough simply to pass on to them the decisions made by the municipality. To many people, the term *community participation* means asking the community to undertake some physical work at the direction of the authorities. However, the real benefits of community participation come when the community is involved in decision-making and feels a responsibility for, or ownership of, the work that is to be done.

Many municipal officials may have difficulty with this approach, both in understanding the importance of community involvement, and in knowing how to involve the beneficiaries. There are development workers (social scientists) with experience of utilising community participation in decision-making. Such a specialist would be a useful member of an implementation committee, even if his or her experience had been in a more rural setting. It is hoped that the more technical and bureaucratic members of the committee would be ready to listen and learn from the extensive experience of community decision-making. Some new urban communities, formed of immigrants from diverse rural areas, may have a very fragmented social structure, and take more time to develop a community consensus.

The choice of type of MSE, therefore, affects the mechanisms that will be used to implement the scheme. In some cases of positive community involvement, the inputs required of the municipality may be much less than if there is a conventional contractual relationship with a private MSE. Whatever the arrangements, the municipality should retain its responsibility for maintaining environmental standards, and ensuring a satisfactory interface with other parts of the waste management service.

In two ways the title of this subsection – “Selecting the best type of MSE” – is misleading. Firstly, it might better have been written: “Selecting the best blend of MSE types” since most MSEs in solid waste management are some combination of the four types listed above. Secondly, it is often not possible for municipal managers to select the type they would prefer, but rather to make conditions favourable for MSEs to operate and then work together with the type of enterprise that emerges.

Conclusion

Each of the arrangements discussed above has particular advantages in certain situations. In general it can be concluded that some aspects of private MSEs are likely to be found in most efficient, reliable and durable waste management enterprises. MSEs that depend on donations (or subsidies) and volunteers generally do not survive for a long time.

“...the business management approach of the [private MSE] model is likely to be advantageous with regard to providing an efficient and reliable service. Community-level systems without a commercial approach and dependent on voluntary management or external assistance have failed or are bound to fail.” (Pfammatter, 1996: 25).

Community schemes should develop a more commercial approach, including loan financing of equipment instead of cheap donations. This could lead to a stronger concept of accountability and improved motivation. Experiences in the Payatas environmental programme led to a similar opinion: *“Micro-enterprise and community development are not antithetical, [but] rather a healthy integration can achieve common interests with least costs. This is especially true for micro-enterprises involved in solid waste management which is not simply a business issue but a pressing community concern as well.”* (Carcellar, 1996: 11).

Motivation is a key factor at all levels. The motivation of the private entrepreneur may not include a concern to improve the living standards of the poor. The concern of the community leader to benefit his neighbourhood may not be sufficient when he is under pressure from other responsibilities. The desire to work together can be destroyed by minor disputes. Probably the most durable motivation is the need to earn money, and the best arrangement is when this is complemented with a concern for public welfare and the environment.

I Is success guaranteed? What problems might arise?

Key points

The chances of success can be increased by starting in a small way with a pilot project.

Municipalities can help by modifying laws and administrative procedures.

Training in business skills is very helpful for MSE owners.

Public participation – especially the prompt payment of fees – is an important factor.

Political factors at all levels can be a major obstacle, but strong support from higher political levels can be very beneficial.

Even if some MSEs fail, the consequences for the municipality need not be serious.

Success cannot be guaranteed, as with almost any institutional experiment. However, much can be done to maximise the chances of success. This section looks at the problems or threats that face MSEs, and the sources of these challenges, and suggests ways of helping MSEs to overcome them. Annex 8 gives more information on strengthening and supporting MSEs.

We suggest that the first steps should be small ones. A city with no experiences of working with MSEs should not suddenly engage fifteen of them, all at once. Instead they should adopt the pilot scale approach, engaging a small number of MSEs and allocating time and resources to keeping closely informed about difficulties that are experienced, so that corrective action can be taken at an early stage. Some MSEs may fail or be disappointing, but if the municipal officials are ready to learn from such failures, successful arrangements are brought closer. More will be written about the implementation approach later in this book.

If an MSE fails, the consequences for the municipality and the citizens are not necessarily very serious. Since the MSE is small, it can be replaced by another MSE, or temporarily by a municipal team. Valuable lessons can be learned from such problems. Since the consequences of failure are not severe, the risk of this happening can be tolerated.

MSEs may experience problems from three sources

- From the relationship with the municipality or client
- From the internal management and administration arrangements of the MSE itself
- From the beneficiaries of the service.

The relationship with the municipality

- The first issue is the attitude of the municipal officials who will deal with the MSEs. They must be ready to invest some time and thought into making this new relationship successful. They must be prepared to listen to the representatives of the MSEs, even though these representatives may be from what is regarded as a lower social class.
- Secondly, there may be legal restrictions that need to be modified. Some laws concerning waste collection and disposal were made at a time when no alternative to public sector service provision was considered, and so laws or by-laws need to be modified to allow MSEs to operate on a legal basis.
- Since most MSEs have very limited access to capital, they cannot afford to provide services and pay the salaries of their employees for a long period without receiving payment from the client. If payments from the municipality are delayed, the MSE might incur large interest costs from borrowing or it might not be able to continue to pay its staff and so stop operating. These aspects will be discussed further in section K.
- Municipalities may need to develop new methods of monitoring contracts and performance.

Reluctance to make these changes may cause some municipal officials to prefer to contract one large enterprise to take care of all solid waste service requirements, rather than using a number of smaller enterprises. If officials are unwilling to deal with a large number of small contractors, it may be possible for an agent to act as an intermediary, or the MSEs may join to form an association which has only one contract with the municipality.

Finally, it is important to consider the importance of political support for the decision to involve MSEs in waste services. There have been examples of political changes that have resulted in a more difficult environment for MSEs. A shift in solid waste management policies could, for instance, jeopardise the initial results which have been achieved by MSEs.

Internal difficulties

- Most MSEs face difficulties in accessing capital. This affects the purchase and upkeep of equipment. In some cases the only available source of capital may be a moneylender charging very high rates of interest. Under these conditions (inadequate equipment and high interest charges) operating costs may be much higher than expected.

- Many MSE owners have little formal education, and only very basic business skills. This can result in poor financial management – inadequate bookkeeping, poor cash flow forecasts, unrealistic pricing – and problems in complying with legal requirements. Only few of them actively promote their services among potential clients. Options for improving the business skills of MSE managers are suggested in Annex 8.
- Turnover of personnel is often high as wages are mostly unattractive and jobs have a low status. This adds to the time that must be spent on training and familiarisation with the work, and undermines the benefits that come from personal relationships with the beneficiaries.

Difficulties caused by the beneficiaries

The main problem that may be caused by the beneficiaries (residents in a collection system) is the non-payment of fees - in cases where the MSE collects the fees directly from the residents. Before the start of the scheme, realistic arrangements must be developed to encourage reliable payment, including an awareness campaign and a strategy for penalising non-payers. In the early stages it would be helpful for the municipality to have some money available to compensate the MSE for non-payment by the residents.

The other difficulty is the failure of the residents to co-operate with MSEs. Most waste collection systems require the residents to make their waste available in a particular way and at a particular time. If this is a significant problem, a survey of the residents should be conducted to determine why they find it difficult to do as they have been requested.

There have been cases where highly organised communities have rejected collection systems that have been imposed on them, since they wanted the labourers to come from their own community.

Political impacts

Politics can affect the process of involving MSEs in number of ways.

Positive support from central or regional government for the involvement of the private sector and MSEs can be of great assistance in the development of a working environment that allows MSEs to participate. Such support involves providing the political leadership and modifying laws and procedures to facilitate the entry of MSEs into the field of municipal services.

Unfortunately there can be negative political impacts at various levels, from local to international. The skills needed to live with these pressures are beyond the scope of this manual, and often very specific to a particular political system or party. Some of these impacts are:

- Linkages to particular parties or personalities One party or politician may favour private sector involvement, another the universal involvement of the state. One politician may seek support from a sector that is well represented in certain quarters and that favours a particular group of MSEs, and the successor may draw support from another sector. Key figures in municipal administrations may be seen as political appointments and change with electoral changes. All these considerations lead to instability and uncertainty, resulting in very short planning horizons and scepticism concerning new proposals, because no planning is possible beyond the next election. (One possible solution to this difficulty was demonstrated in Latin America: before an election both major candidates for the position of mayor were persuaded to declare publicly their support for MSE involvement, so that the MSEs were sure of support, whoever won the election.)
- The politicising of community positions. Community-based actions to improve the local environment rarely happen without a prominent leader or facilitator who has the initiative and leadership skills to motivate and unite the local community. Such community facilitators must often spend many hours to communicate their ideas and promote involvement. The political linkage may arise in at least two ways:
 - The leader may be motivated to undertake all this work by his (or her) political ambitions, and when he has gained local popularity or the support of a political body, he may lose interest in the community development work that started his political career.
 - Alternatively, the community leader may have no political ambitions, but his success may be resented by a local political figure who senses a rival or a loss of personal prestige. In this case the envious politician may use his influence to oppose the community development activity in order to weaken his “rival”. There is no clear way to avoid either of these risks, but if the leadership of the activities is shared between a number of local people as soon as possible, the risks are reduced. These difficulties suggest why clear financial motivation can be preferable to more subtle motivations.
- The need for quick results Impatience – unwillingness to wait for results - may be seen at any level. Effective community participation that results in sustainable activities usually takes some time to start and develop. Officials and politicians who are accustomed to top-down decision-making and immediate results may refuse to allow the necessary time for harnessing the energy of the community or finding and training the best MSEs. International aid agencies and NGOs may be pressured to deliver results according to a tight schedule, and so not have the time or patience needed for the evolution of improvements that will endure.

- The impact of international aid. Assistance in solid waste management is seen by many donor countries in terms of machinery, for the following reasons:
 - Donor countries usually have high labour costs and relatively low machinery costs, and so are accustomed to using capital-intensive methods for collecting waste.
 - Governments are concerned to support their national industries, maintain employment levels among their voters, and “wave the flag” overseas by exporting their products.
 - Their experience indicates that the machines they offer are effective, because they were developed specifically for the conditions that apply in their country. (The machines, of course, may not be effective in the situations to which they will be sent.)
 - Users of the machines in the donor countries have few problems with maintenance because the manufacturers of the equipment are never far away, and purchases of spare parts can be made without any foreign exchange formalities.

All these reasons explain why donor agencies like to provide machinery, and suggest why the machinery may not be helpful to many receiving countries. The logic of the donor can be very simple – *1. They have a solid waste problem. 2. We have solved our solid waste problem with this machinery. 3. If we supply this machinery, their solid waste problem will also be solved.* Any specialist in solid waste management in low- and middle-income countries can probably quote several examples of how the provision of machinery has made the situation *worse*. It can affect MSEs also, since the provision of machinery can turn the attention of decision-makers away from affordable and reliable solutions that generate local employment, and towards expensive and unreliable technologies that provide employment in the donor’s country. Furthermore, MSEs are not in the position to provide overseas tours or commissions. The only solution seems to be in the education of the senior national decision-makers of the receiving countries, but do they have the time and interest to listen?

There are potential threats and difficulties surrounding the involvement of MSEs in solid waste management. Success is not guaranteed. It is likely that some MSEs will fail. But if senior administrators and managers within the municipality are willing to make some changes, and there is some form of help for new businessmen, the chances of success are high. There are many examples to prove it.

III Preparing the way

J What information should I collect before starting?

Key points

In planning for a pilot project there is no need to consider a long time period.

The first step is to identify and investigate the gaps or inadequacies in the service coverage.

Information on the perceptions of the residents, the social structures of the communities to be served, the costs of existing systems and the presence of relevant organisations should also be collected.

A lack of data is sometimes used as an excuse for doing nothing. Most decisions are made with inadequate data, but it is important to have as much information as possible before deciding how to proceed.

It is important to understand the precise purpose for which any data are being collected, because often the way in which the information will be used determines how it should be collected. It appears that data are often collected for their own sake, with no specific purpose in mind. The result is that the data are hardly used, resources are wasted in collecting the information, and the implementation is delayed.

At the early stage (pilot phase) the planning horizon is short- to medium-term (perhaps two years). This is because the involvement of MSEs is, to some extent, experimental.

What are the gaps?

It is necessary to collect information about the gaps or shortfalls in the service that might be filled by MSEs. In the case of the collection service, this would require a survey of the city to determine which areas are not served effectively. Particularly troublesome areas are likely to be new housing areas, unplanned or informal settlements, and areas served by narrow or unpaved lanes. Other areas to look at would be those which produce the most complaints about shortcomings in the collection system. The study of these areas should

include marking on a map the geographical extent of the area, estimating the population, and recording any access problems such as narrow or steep roads, poor road surfaces or congestion. If the areas have any existing municipal waste collection service, it would be useful to discuss the problems with supervisors and workers who are familiar with these neighbourhoods.

If sweeping is being considered, the areas that are most littered by paper and other wastes should be surveyed. Improved drain cleaning is needed where there is frequent flooding or where mosquitoes are breeding in stagnant water.

Knowledge, attitudes and practices survey – community involvement

If waste collection is being considered, it is important to learn about the opinions and practices of the local residents, to understand their priorities and how strongly they want an improved system. A house-to house survey of a sample of the households in the target areas is recommended, conducted in such a way that the opinions of the women, in particular, are accurately known. The box below mentions some reasons when the participation of women is so important. The survey can also determine the type of collection system that is preferred, and may give some indication about how much the residents would be willing to pay for the service. If improved waste collection is not seen as a priority need, it may be advisable to concentrate on other services or other areas.

Much experience over many years has shown that the success of schemes that require inputs from the community is much greater if the community is involved in decision-making, and feels a sense of ownership for the project or activity. If the community is not involved in decision-making, they may not be prepared to participate by co-operating with the service and paying the charges. Therefore the initial survey should be seen as only the first step, to gain a broad understanding of the views and priorities of the community that is to be served, and to provide an indication of the social organisation of the community as a preparation for their involvement in decision-making.

Why are the opinions of women so important?

- Women are often more conscious of environmental problems than men, and more aware of the need for change. Reasons for this greater awareness include that women are usually more involved in the home and with the health of their children.
- In many countries there are presently few women found at policy level, so their opinions are not always heard.
- Women are already actively involved in solid waste services. Women have shown themselves to be successful entrepreneurs, but usually they are engaged in the more menial activities, and are often paid less than men for their efforts.
- Women tend to contribute more voluntary work to environmental services, compared to men.
- Experience shows that women make waste projects more successful.

Increasingly, public awareness campaigns are being seen as an integral part of any programme to improve the management of domestic solid wastes. Information gathered in the knowledge, attitudes and practices survey mentioned above would be very helpful in determining what messages should be communicated to the public, in order to maximise the benefits of MSE involvement. The content of the messages determines the appropriate timing. If preparation for community decision-making is needed, the public awareness input should be early on in the process of involving MSEs. If the main need is to communicate to residents how to use a new collection system, there may be no purpose in trying to communicate this until the system is operating. Further comments on public awareness inputs can be found in Section R.

Financial information

Before any MSE starts working, two financial questions will have been asked:

- Is it cost-effective to use MSEs? and
- What is a reasonable price for an MSE to ask for the job?

In order to answer these questions, it is necessary to collect some cost information about the existing system. Often such information is not available, because, for example, all labour costs for the municipality are recorded as one item, so it is not possible to isolate costs that are only related to waste collection. So it is usually necessary to collect some data and calculate the costs of the existing system and estimate the costs of the proposed MSE operation. The following information would be required for the case of waste collection:

- the productivity of the existing workforce. An approximate value can be obtained by following a few teams or individual workers to measure their output in one shift (in terms of weight of waste collected, for example, or houses served in one shift)
- information on labour costs from financial records
- an indication of other operational expenditures, such as vehicle costs from municipal records or field observations. Some operating expenditures are very difficult to isolate in the financial records of many municipal administrations - for example vehicle maintenance costs and costs of small items of equipment.

With this information it should be possible to calculate what it costs under the existing system to collect waste from areas similar to the target areas. It might also be possible to estimate the level of fees that should be charged to the householders for the collection service.

The costs of the existing service can serve as a yardstick for assessing the prices that are quoted by MSEs when they bid for the work. If the methods to be used by the MSEs are to be similar to existing methods, it would be possible to estimate a reasonable bidding price, using wages a little more than the minimum wage or appropriate private sector labour rates.

Existing organisations

Information on existing organisations with related interests should be collected. These may be non-governmental organisations (NGOs) or business support associations that are supporting MSEs, probably in other fields. Community-based organisations (CBOs) that are concerned to improve the living conditions of their areas may also be useful allies. Any information about involvement of MSEs in waste management in neighbouring cities would, of course, also be of interest.

Further data needs

It is customary in solid waste management projects to begin with detailed studies to determine the weight of waste generated per person per day, and the composition of the waste. Before such action is taken the investigator should stop and consider how necessary this information is, and how it will be used. He should then consider the degree of accuracy required and how this accuracy can be achieved. Any investigation of composition should be very carefully considered first, so that the resulting data meets the intended needs. In many cases such data is of very questionable accuracy and is not really necessary.

As the selection of target areas proceeds, further information gaps may become apparent. More detailed planning also requires more detailed information. Further data needs are discussed in Section N.

K What administrative changes are needed?

Key points

This section is largely concerned with barriers that stop MSEs forming contractual relationships with municipalities.

Some regulations and procedures relating to contracting are suitable for large construction contracts, but not appropriate for small service contracts.

Barriers include requirements for tendering, delays in payments, reporting and legal aspects.

Each public organisation that has contracted out some of its work has requirements that contractors must fulfil if they are to be eligible to undertake the work. These requirements are set up to minimise the risks involved in

contracting, by ensuring that the contractor has the resources to do the work, and has operated satisfactorily in the past. Some laws and regulations concerning contracting are specifically concerned with construction contracts. Most are intended for use with large contracting enterprises.

In addition to requirements for contractors there are administrative procedures within each public organisation for making payments. These are set up for the convenience of the organisation and to facilitate control and prevent misuse of funds. Such procedures may have operated satisfactorily for many years for paying large contractors.

Some of these regulations and practices may act as high barriers to stop the participation of smaller enterprises. This section will describe some of these barriers and discuss the possibility of removing or reducing them so that MSEs can pass over them and successfully provide services for municipalities. Figure 4 illustrates this point. The role of the municipality should not be to train MSEs to jump over these high barriers, but to remove unnecessary barriers so that capable MSEs are able to clear the remaining barriers which are thought to be necessary. Whatever training is necessary should be done by NGOs and business development agencies, not municipalities.

Figure 4 - Barriers to new microenterprises



Administrative procedures developed for large construction contracts often act as barriers that prevent the development of new MSEs. Examples of these barriers shown in the cartoon are:- requirements for experience, payment of bonds, delays in making payments, banking arrangements, registration and requirement for capital reserves.

It should be remembered that many of these requirements may have been developed and imposed for large construction contracts in which delays can be very expensive, and the cost of the contractor defaulting can be very high, in terms of both time and money. Waste management contracts with MSEs are very different. If one MSE fails, it is not difficult to arrange an immediate alternative, perhaps finding another MSE to take over the work. There is some inconvenience, but the consequences could not be described as serious, because of the small size of the MSE and the ease with which alternative arrangements can be mobilised.

What are the barriers and why are they there?

Different municipalities in different countries have different regulations and different experiences of contracting, so the following obstacles to MSE involvement must be seen as examples only. Each city should identify the obstacles in its own procedures. They may include some of the following:-

- **Requirements for experience** Before a client awards a large construction contract, he wishes to know what experience the bidding contractor has had in the field. If a contractor has not worked for the public sector before, he may have undertaken work for the private sector, and have experience here that he can point to. This requirement is a barrier to a new MSE, since it may not have any previous experience to point to.
- **Registration** Contracting companies of any size are usually required to register so that they have the correct and formal legal status. This may involve the payment of a fee, the services of a solicitor and considerable paperwork, and result in requirements to pay taxes and present financial records in a certain way. Such requirements may seem difficult and unnecessary for the owner of a small, new business, and it may be possible to simplify some of the requirements, but generally it is advisable to uphold this requirement for MSEs interested in waste contracts. (If municipalities make contracts with businesses that are not registered, they may be breaking the law themselves and encouraging the owners of MSEs to break employment laws and operate in ways that are not financially transparent.)

Operating licences give an adequate basis for the municipality to contract MSEs and make payments. In some countries MSEs that want to work for the municipality are required to have a formal legal status. In Africa, for instance, waste MSEs take the form of *Groupes des Intérêts Économiques* (groups of youth who have come together to undertake small-scale economic activities). In South America, where most of the waste MSEs operate under contract with a municipality, they are registered as co-operatives or pre-co-operatives. In Central America most have operated without a formal contract until now, but

this is starting to change. Experience clearly shows that it is important to choose the form of registration that is the most appropriate for the context of each country.

- **Bank account** Some potential entrepreneurs who are planning to set up an MSE in waste management may not have a business bank account. If the municipality requires all contractors to have a bank account, this may be a barrier for the MSE, because of preconditions imposed by the banks. The municipality may decide that this requirement should stand, because of the importance of recording all transactions and not dealing with cash. It may be possible to formulate a compromise that reduces this difficulty, such as the opening of the bank account after the signing of the contract, and the support of the municipality when the appointed MSE applies to a bank for an account.
- **Tendering procedures** The procedures and formalities involved in submitting a tender bid for a contract are often complex, and the difficulties of providing all the documents required may be a barrier to MSEs wishing to submit a bid for waste management services. These procedures may date back to the distant past and be in need of review for all types of contracts, or it may be that they could be simplified for small waste management contracts.
- **Financial requirements.** Enterprises seeking contracts with municipal government may need access to capital for a number of reasons.
 - They may be required to show that they have a certain amount of capital before their tender can be considered. This requirement can be justified for large construction contracts, but is not essential for small service contracts.
 - They may be required to pay a tender fee. (The purpose of the tender fee may be to discourage weak bids.) This requirement could discourage good MSEs from tendering, and should be reviewed. Bids from MSEs for waste-related services could be invited without requiring the tender fee, and if large number of hopeless bids were received, the tender fee could be reinstated, but at a lower rate.
 - Earnest money is sometimes required. If an enterprise is awarded a contract and then decides not to undertake the work, the earnest money is forfeited. This is particularly important for contracts under a strict time limit and with an expensive or long tendering process, but may be considered unnecessary for small contracts in waste management.
 - Bonds or a security deposit are sometimes required to give the client some control over the contractor, particularly in long and

complex construction projects. They also provide some compensation to the client if the contractor fails to honour the contract. Arranging such bonds or deposits could be a huge barrier to a would-be entrepreneur with only just enough capital to provide the required service.

- **Paperwork – reporting and invoices.** Large contractors have accountants and administrative staff who can provide financial documentation and reports in the form that municipal clients are accustomed to. Untrained MSE proprietors might find the requirements both mystifying and impossible, especially since they cannot afford to hire administrative staff, so that they must prepare invoices and financial records themselves. A municipality that wishes to engage MSEs should review its requirements in this domain and look for ways of simplifying its procedures and language, so that the necessary results can be achieved with the minimum of unnecessary work. Staff from the administrative and financial sections should be involved in such reviews from the very beginning, and may oppose any changes to the systems that they know so well. (Some might feel that any simplification of language or procedures could undermine their position and importance, so their involvement and support could be crucial in any planning to simplify procedures.)
- **Delays in payment** It is not uncommon for municipalities and other public organisations to delay payments to their contractors. They may do this for a number of reasons. (For example, it may be because their debtors are late in making payments, or because of cash flow reasons, or because of lengthy and inefficient bureaucratic processes resulting in the accumulation of mountains of paperwork on the desks of key officials.) Large contractors may be accustomed to such delays, and have financial reserves of their own, good relationships with their banks, or “front-loaded” contracts which pay enough early on to enable them to cope with delays. None of these mechanisms are available to most MSEs. If payments are not made promptly the MSE may go out of business because it loses its workers if they are not paid, or it quickly runs up debts and high interest charges and so becomes no longer financially viable. Again, senior staff from the financial section of the municipality should be involved in discussions about changes to the administrative systems, since their sincere support is essential if payments to MSEs are to be speeded up. (If the MSE charges the beneficiaries directly, then this problem does not apply, but the MSE will need a strategy to cope with delayed payments and late joining from households.)

Other administrative changes

One of the reasons why municipalities (and other government entities) tend to be particularly hesitant to involve MSEs lies in the perceived existence of legal barriers. Even when there are no formal legal barriers to do so, there may be inadequate knowledge about how to engage private enterprises. Model contracts relevant for the local context may need to be formulated. (Examples of contracts are included in Annex 10.)

Involving MSEs in solid waste management services will require other administrative changes. The municipality will change its role (with respect to solid waste management) in the parts of the city or town where the MSEs are working, to one of supervision and assessment of performance. The role of supervision is discussed in more detail in Section N.

Developing a programme of involving and monitoring MSEs will require a considerable investment of time, in preparing the work allocations (including the data collection described in Section J), in publicising the opportunities for MSEs, in evaluating tenders, in monitoring performance and overcoming early difficulties. Both the municipal officials who supervise the MSEs, and the MSEs themselves, must have access to a senior municipality official in case of problems that need decisions. If this work is simply an unwelcome addition to the workload of an official who is already busy, this may result in poorer performance and wasted potential, if the official is too busy to solve problems and make small modifications to working arrangements. The official will also need to form links with NGOs and other organisations which can support the new MSEs. The demands on the time of the appointed official will reduce as experience develops and the various parties learn to work together.

Bureaucrats and clerks who see only a limited picture may resist some of the required changes to municipal procedures. For this reason the decision to involve MSEs must be taken at a high level within the municipality and followed with interest by senior officials.

The most effective action that senior municipal officials can take is to ask some searching questions about municipal administrative procedures, and to be ready to take down some of the administrative barriers that serve no useful purpose in relationships with MSEs.

Figure 5 - The barriers are down



If unnecessary obstructions are removed, MSEs will be able to participate much more successfully

L What policy decisions must be made before starting?

Key points

Before detailed and operational planning can start, a number of high-level policy decisions are needed. These decisions cover:

- The commitment and objectives of the municipality;
- The criteria for deciding the locations where MSEs should start working and the type of work they should do;
- Financial arrangements including cross-subsidies and the collection of fees;
- Contractual arrangements, including selection between the different types;
- Arrangements for supervision of the MSEs;
- The forms of support that MSEs can expect from the municipality.

Before starting to involve MSEs in solid waste management, some policy decisions need to be made at a high level within local government. These decisions are the answers to the following questions

- 1) Is the municipality committed to the idea of involving MSEs in solid waste management?
- 2) For what reasons will MSE involvement be encouraged?
- 3) In what type of activity and in what locations should the MSEs start?
- 4) How should the revenue for the MSE involvement be raised?
- 5) What form of contractual arrangement is most appropriate?
- 6) What should be the duration of the first contracts?
- 7) How should the MSEs be supervised?
- 8) What form of support should the municipality give to the new MSEs?

1. Is the municipality committed to the idea of involving MSEs in solid waste management?

Devolving municipal waste services to the private sector, and in particular to micro- and small enterprises, needs to be a conscious decision, taken in view of the (medium-term) advantages that it brings. The decision needs to be made at a high level, since the implications will affect a number of departments. In some cases it may be helpful to consider that the decision is binding for a fixed term (perhaps one or two years) after which a review will be conducted and the decision re-evaluated. If senior decision-makers are uncertain about even a finite experimental period, it might be necessary to arrange a meeting or visit with a municipality where MSEs have been operating, to give them more confidence in taking a step in this direction.

Once the decision is made, it should be upheld. There may be disappointments and difficulties, and some officials may resent the changes, but most innovations have their developmental problems, so some perseverance is required.

2. For what reasons will MSE involvement be encouraged?

There may be a number of reasons for supporting the introduction of MSEs, and it would be useful for senior decision-makers to state explicitly what objectives they wish to see achieved.

Some possible objectives are:

- To increase the coverage of solid waste management services, in terms of geographical area or number of households served, or in terms of quality – frequency, reliability, or type of service.
- To reduce the cost of solid waste management services.

- To develop an alternative to the existing system which is more flexible or has other advantages.
- To conform with national or international policy trends in favour of the private sector.
- To improve the supervision and control of waste management practices, so that environmental laws and standards can be enforced.
- To provide employment and associated economic benefits to a particular segment of society.
- To provide a focus for community action that will lead to wider upgrading activities.
- To enhance the political support of a specific group of citizens.

If the relative importance of objectives such as these is known, it will help to ensure that the development of the programme is in the desired direction, and the evaluation mechanisms are appropriate. These objectives define the indicators to be used in assessing the success of MSE involvement. The agenda of senior officials affects the following decisions.

3. *In what type of activity and in what locations should the MSEs start?*

a) How to start

Municipalities are urged to start with relatively small pilot activities. They should cover a limited geographical area and involve only a small number of MSEs. Such pilot activities will allow the local government to test different models for involving MSEs in solid waste management and gain experience in working with them. Pilot operations are like real-life experiments, in which feed-back can be obtained on the suitability of the technology, the potential of MSEs, the role of the municipality and the conditions that need to be fulfilled for MSEs to be successfully involved in solid waste management. They can also be seen as training opportunities for both municipal staff and MSEs.

Smaller demonstration projects can be initiated to test and develop new equipment (such as handcarts), to introduce innovative ways of involving the population, or to assess the co-ordination between MSEs involved in primary collection and others responsible for waste transport and disposal. In the case of waste collection, it has been suggested that such demonstration projects should be limited to an area of 20-30 hectares with a waste collection twice a week for a period of a number of weeks (GTZ).

b) Where to start – criteria for selecting location and type of work

At this stage it is not necessary to define the precise tasks and locations of the pilot stage, but it is useful to agree on the criteria which will be used in making these decisions. (Section N covers the more detailed operational planning.)

An early choice might be between prosperous areas and low-income areas of the town or city concerned. High-income residential areas and commercial districts are more attractive for reasons such as

- The waste itself is more valuable and so MSE workers can earn some extra money from the sale of recyclable items.
- The residents and businesses are more likely to pay the fees for the service, easing the financial pressures on the MSE(s).
- The beneficiaries in this area may have more political connections and influence and so be seen as a priority.

The preference for such areas can be illustrated with many examples. In Central America - Guatemala and Costa Rica (Arroyo, 1998) - where solid waste collection by MSEs has a long-standing tradition and waste collection MSEs were set up without support from municipalities or NGOs, the clients are mainly high-income residents and tourist businesses which depend on clean streets and beaches. In Yemen it was found rewarding to provide collection services to hotels, restaurants, industries, slaughterhouses, and markets (Sunbun 1996). Another example is the collection of commercial waste from offices, such as paper, which is done by a project in Bangkok (Hutapaed 1996).

In many cases the prosperous areas already have a service, so the choice between rich and poor may not arise.

An important criterion for the selection of a pilot area is the demand of the residents for the service on offer. A high level of interest from the beneficiaries almost guarantees co-operation with both the municipality and the responsible MSE.

For the pilot stage it may not be appropriate to select the area with the greatest need if there is not a strong popular demand for a service. It is often better to start in an area which poses fewest problems, because the development of a new procedure often generates enough problems of its own. When most of the problems relating to MSE involvement have been solved, it is time to start work in the most difficult areas.

The selection of the type of work for the pilot stage should take into account the factors mentioned in Section G, and also the degree of interest of the beneficiaries in these tasks. It is also helpful if the impact of the work can be clearly seen or appreciated, because positive reactions to the results encourage the extension of this approach to other schemes and locations. If the chosen task is primary collection and the secondary collection (that is, the removal of the collected waste) may not be reliable, it is advisable to avoid this choice, or to find some way of guaranteeing the secondary collection. MSEs which are responsible for taking waste to an official disposal site may be tempted to save time and money by unloading the waste at an unauthorised place that is nearer to the collection area. There should be a system of record keeping and supervision to ensure that all collected waste is recycled in an acceptable way or is taken to the official dumpsite. An environmental scandal associated with the MSE

system (such as waste being dumped in an unauthorised place) could do great damage to the future of MSE involvement.

4. How should the revenue for the MSE involvement be raised?

Not surprisingly, shortcomings regarding payments to MSEs are often the major threat to the continuation and growth of the MSE sector.

Often the privatisation of municipal waste services in low- and middle-income countries is prompted by a lack of funds. The extension of waste services into hitherto unserved neighbourhoods also requires additional financial resources. Where can this necessary finance come from?

The costs of solid waste services can be paid from local taxes, inter-governmental transfers, or directly through user charges, or a combination of these. User fees are preferred by some, because they constitute a direct link between the delivery of the service and the need to pay for it, serving as a prime method for the users to consider and control the quality of the services received.

In many cases such direct charges are too low to cover the costs, and increasing them rapidly to meet actual costs is politically problematic, except perhaps if there is a dramatic improvement of service at the same time. An important consideration is the methods that can be used to enforce the payment of fees. If "free riders" (people refusing to pay the fee) are denied the service, they may simply dump their waste in front of a neighbour's house, or in a drain, with no concern for the environmental consequences. Sometimes social pressure from their neighbours encourages them to pay. For this reason, the collection of waste management fees together with electricity charges is advantageous, since the failure to pay the combined fee can result in the electricity supply being cut. (The privatisation of electricity supply and problems of recovering the revenue from the power supplier are sometimes drawbacks in this arrangement. Linking solid waste fees with water charges may be less effective because of the essential nature of water and the public outcry often associated with disconnection of water supplies.) It has been found that the main requirement for the collection of waste service fees is to keep it simple and establish a stable collection system.

The collection of fees is itself an expensive undertaking. In poorer areas it may be necessary to collect fees at least once a month, but the result of such frequent collection is that the cost of each bill or visit is a significant proportion of the amount actually collected.

It is probably easier to collect fees from households that have a house-to-house collection service than when there is collection from shared containers, because residents are more aware of the former type of service.

There are two basic mechanisms by which MSEs can be paid – they may be paid a contract fee by the client (the municipality) or they may collect fees themselves from the beneficiaries (residents and proprietors of businesses). This decision on the method of payment has a major effect on the type of contractual arrangement that is chosen.

In deciding on which of these two systems should be selected, the following factors should be considered:

- Regular payment is especially important for waste MSEs, as they tend to have a low working capital buffer and easily get into cash flow problems when residents or clients do not meet their payment obligations on time.
- Direct charges could be collected by house-to-house waste collectors who become well known to residents or their servants. These collection labourers may not be literate and so may have problems dealing with paperwork relating to the payments.
- The costs of waste management are more than the costs of primary collection – there are also the costs of secondary collection, sweeping, disposal, supervision and administration. If an MSE providing a primary collection service collects the fees also, it should pass on a considerable proportion of that fee to the municipality as payment for the other components of the waste management service, unless they are paid for by income from other sources, such as local taxes. Residents might make a smaller informal payment directly to the collection labourer (to retain their collection service) even though they might be listed as defaulters.
- If the MSE is paid directly by the municipality, the control of the MSE's working is more direct. Any shortcoming can be penalised with a fine by withholding a part of the month's payment.
- If the existing system of revenue generation is working reasonably well, it would be better to retain it and seek to improve it rather than to abandon it and start again with a new fee system.
- A sustainable solution of the waste problems in the larger cities in low- and middle-income countries requires a self-financing system, in which all the real costs incurred are recovered through contributions from the beneficiaries. Efficient solid waste management cannot be based on 'social needs'. In Dhaka "... *it was only when the 'social need' overtly transformed itself as 'economic need' in the residents' willingness to pay, did solid waste collection become a reality*" (Rashid, 1996:5).

Cross-subsidies

The collection of household refuse is normally not a very profitable business. Especially in low-income areas, most households have other priorities (apart from solid waste collection) to finance from their meagre

incomes - such as food, clothing and education. This does not necessarily mean that the residents in these areas are not willing to pay at all. On the contrary, experience shows that communities are indeed willing to pay for reliable waste collection services. Research indicates that residents in low-income areas are ready to pay 1% of their household income, about US\$1.50 per month (Pfammatter, 1996). Even when such a low fee is complemented with contributions in kind by the residents, it is still hardly enough for even a low-cost waste collection system. *As a rule of thumb, garbage fees can be taken to cover the costs of primary collection, but usually not the transport and final disposal costs.*

In cases where the entrepreneur or a community organisation is responsible for the fee collection, some beneficiaries may not be able or willing to pay. A case study in Bangladesh, for instance, shows that while there were some 600 paying households, another 20 to 25% of the families whose waste was being collected, were 'free riders', not paying, but having their waste collected. (Rashid, 1996).

Since solid waste fees in low-income residential areas can probably cover only a part of the solid waste management cost, municipalities are usually faced with the issue of 'cross-subsidies' - using revenues from high income areas or better financed waste services to support waste collection activities in low-income areas. To the extent that municipal services, commonly financed from urban taxes, cover both low and high income areas, cross-subsidisation is already taking place - assuming that residents from high income areas pay higher taxes.

If fees are to be collected by the MSE, there is a practical way to institutionalise cross-subsidies. A contract could be written such that an MSE is allowed to provide services to a high income residential area, under the condition that it provides a similar service (of the same quality) to low income areas. It can be expected that, even without direct municipal interference, the fees in the high-income areas would be higher than in the low-income areas. A main restriction to such a scheme might be the difference in the technologies that would be expected or appropriate in the two areas - the MSE may not have trucks that are suitable for the streets in the high income area, whilst equipment such as donkey-carts may not be exactly to the liking of the wealthy residents. Through a careful tender and licensing policy, local governments may find ways to influence differentiated garbage fees that benefit low-income groups. However, there would be a limit to the extent that a small number of higher income residents would be willing to support a service to a large low-income population, especially since municipal taxation would probably already be weighted towards the higher-income groups.

There is another possibility for this theme of cross-subsidy, but involving recycling rather than significantly higher charges. As suggested above, an MSE collecting from a low-income area could also be given a more prosperous area to collect from, but with the incentive of the value of the recyclable items in the

waste, rather than significantly higher charges. House-to-house collection provides a good opportunity for the collectors to ask residents or their servants to keep certain items separate, and for more thorough examination of each portion of waste. If the waste collection MSE were also interested in recycling, the richer dividends from the more prosperous area could help fund a collection service in a low-income area.

In some situations it may be possible to provide a cheaper service in areas where the ability to pay is less. The cost of a collection service can be reduced by decreasing the frequency or using communal containers at larger intervals. However, it is often the denser and poorer areas that need a more frequent service because of the lack of hygiene awareness and shortage of space for storing waste.

5. *What form of contractual arrangement is most appropriate?*

When the general concepts for the financing have been determined and agreed, the type of contractual arrangement can be decided. There are basically four types of contracting:- direct contracting, franchise, open competition and concession. (Concessions are usually not relevant to MSEs because of the capital that they normally require, as will be discussed later.)

Direct contracting

Direct contracting of waste services from MSEs gives local governments the most direct control over the operation of such services. Essentially this arrangement is the 'purchase' of urban sanitary services by a municipality. The municipality awards a contract to a private firm to provide stipulated waste services for a certain payment. The cost incurred can be recovered by the municipality by charging user fees, through local taxation, or by other means.

Most experience in contracting waste services by MSEs is to be found in South America. In Colombia, Peru and Bolivia, for instance, the majority of the waste management MSEs are contracted by municipalities as an extension of the municipal solid waste systems. MSEs work in places where municipal waste collection trucks cannot go, or in peri-urban areas that have a low population density, where conventional municipal services are too expensive. In Peru, for instance, IPES has been instrumental in the creation of well over a hundred *Public Sanitation Micro-Enterprises* ('MEGAs' is their Spanish acronym), most of which have contracts with local government for waste collection, street cleaning or park maintenance services (IPES 1996). The municipalities pay the MSEs for these services, mostly from the garbage fees that they collect from the residents. Whilst it is the municipalities that are mainly responsible for the supervision of the services provided by the MSEs, there is also a major role for the communities in monitoring the operations.

Such contracting has advantages for both parties. Municipalities can achieve a better coverage at a lower cost, and the MSEs have a definite amount of work at an agreed price. There are also disadvantages for both parties. The municipalities are responsible for the collection of the fees (which usually requires substantial personnel inputs). MSEs suffer if the payments from the municipalities are delayed. There have been various examples in which MSEs got into serious trouble because of late payment by municipalities. Another disadvantage may be that the MSEs are dependent on the rates set by the municipality. In El Alto (Bolivia), for example, the waste management rates fixed by the local government were eroded by inflation, but the municipality refused to raise them; as a result the MSEs formed an association to fight for their cause.

Direct contracting of MSEs has also been tried in Africa, for instance in Dakar (Senegal) and Accra (Ghana), but with far less success (see Annoh 1996 and Doucoure 1996). The lack of success may have been due to the inability of some municipalities to pay the MSEs regularly and the fact that there are not enough organisations in Africa that can provide the support and training that MSEs need.

Franchise agreements

Franchising refers to the awarding of a monopoly, through competitive bidding, to a private firm to deliver particular services in a certain geographical area for a stipulated time. The contractor (MSE) pays the client (municipality), and recovers this payment, his costs and profit by charging the beneficiaries of the services directly. Formal franchising contracts are not common for primary collection, but one example is given in the box below. More common is a form of *de facto* franchising when municipalities authorise **one** MSE to provide waste services in a particular residential area. In such cases the MSE is not generally required to pay the municipality for its 'franchise'.

In parts of Cairo there are contracts between the municipality and private contractors to collect household waste from a specified area. The contractor makes a down-payment to get the contract under very formal conditions. He also pays about 5% to 10% of his income to the municipality. This gives him the right not to be interrupted by other contractors in the same area, and the right to collect monthly fees from the residents. Residents are required by law to pay fees and participate in this scheme. (Bushra, 1998)

Open competition

Under this arrangement the responsible government agency allows different competent private companies to make available their waste services to households and commercial and industrial establishments, in competition with other contractors. Each customer is charged directly by the particular contractor that provides the service to him. The revenues of the municipality consist of the license fees. Open competition is common for the collection of commercial and

industrial waste. The main difference between open competition and a franchise concerns competing for business after the contractor starts to work. In the open competition arrangement, a number of contractors compete with each other in the same area and for the same business, whereas when a franchise agreement is signed, the enterprise which is appointed works alone in the particular area or field, without competition from other enterprises.

There are many cases of open competition which are not officially authorised by local government, and for which no licence is granted and no fee paid. Waste collection operates in this way in parts of Central America and West Africa, and recycling MSEs compete with each other without any official permission. In Guatemala City, for instance, there are 300 to 400 MSEs that have been collecting household refuse without any kind of contract for past 40 years, competing ferociously with each other, even following the same routes (Arroyo, 1998).

This form of contract involves less work for the municipality, but it also means less control. Private operators that are concerned to do as much work as they can as cheaply as they can may decide that fulfilling official requirements regarding collection methods and disposal procedures is too expensive. MSEs operating unofficially may not be linked up with secondary waste collection and transport carried out by the municipality. It may be difficult for municipal officials to discover what the private operators are doing, and which operator is responsible for which environmental offence. Unless a way is found of ensuring that all MSEs unload their waste at the correct place, the lack of control may be a major problem. If licences are granted, and no waste may be collected by any operator not having a licence, the threat of revoking the licence may give the municipality some control.

Under this arrangement the MSEs are free to determine the price for their services. The fee must evidently be competitive with other providers of similar waste services. The MSEs also need to collect the garbage fees themselves. There is a risk that unscrupulous operators may put pressure on their customers and others, forcing them in some way to keep using that operator or to change to him. The system can be wasteful in that workers or vehicles from several operators may travel down the same road each day, each collecting from only some of the sources. It is difficult to ensure that all the parts of a metropolitan area are covered, because the operators may all wish to collect from only the prosperous parts.

This picture of chaos is not inevitable. In many Asian cities where informal waste pickers are working, or where municipal sweepers are involved in extra work, the urban areas are divided into informal franchises by the informal sector personnel. These "franchises" are bought and sold within the informal sector, the prices being set according to the perceived profitability of each area. These unofficial arrangements prevent duplication and conflicts. (Ali, 1995)

Open competition does not automatically mean that the MSEs have no relation with the local government at all. In the first place the MSEs that collect

and transport waste are nearly always dependent on the municipal authority to use the official disposal site (unless they dump the waste in an unauthorised place that is more convenient). Moreover, even without a contract or waste collection licence, the MSEs may be required to have a trading permit like any other business.

A variation of this arrangement is when community groups are encouraged to engage MSEs to undertake cleaning in their localities. Such a system has been developed in South Africa (Roberts, 1996). In this case the municipality, as the government body with responsibility for waste management and the environment, should maintain some control over practices and standards. The links with other components in the waste management system – secondary collection and disposal – are particularly important in such cases, because the community group may be concerned for only the immediate locality, and have no direct influence over the activities of the secondary collection service.

Concessions

Concessions are not common with MSEs because they involve the purchase or construction of facilities and so cannot be afforded by most MSEs. Municipalities award concessions to private firms for the construction and operation of certain facilities, such as large transfer stations or disposal sites. Some concessions are based on the notion that refuse, once it has been put into certain containers, becomes the property of the municipality and can be made available for exploitation. There are few examples of concessions involving MSEs in the waste sector. One example occurred in 1994 in Guatemala, when ARMSA, a local NGO, bought the Alameda Norte integrated waste treatment plant, so that it could derive income from the sale of recovered materials, such as plastics, clothes, glass and tin cans (Arroyo, 1998). Since concessions normally require large capital inputs they are not normally within the reach of MSEs, and so will not be considered further here.

Table 2
Comparison of contractual arrangements

Type of contract	Source of payment	Allocation of work	Source of client's finance	Competition in operations between contractors
Direct contract	Client	Competitive tendering	Fees, taxes	No
Franchise	Beneficiaries	Competitive tendering	Fees paid by contractor	No
Open competition	Beneficiaries	Purchase of licence	Licence fee	Yes

6. *What should be the duration of the first contracts?*

The duration of the first contract may be different from the subsequent contracts, if the municipality is unwilling to commit itself to more than a short trial of MSEs.

Some municipalities restrict the length of their contracts to one year for administrative reasons. This may be acceptable when the capital requirement is low, but is often considered much too short if the contractor is required to purchase vehicles or other plant, since the contractor needs a guaranteed income for several years to pay off the loan for his equipment. Durations of five to ten years are common in industrialised countries for waste collection contracts that require the purchase of vehicles and plant. Even if the capital investment is low in the eyes of the municipal administration, it may be high for the entrepreneur, and in any case, a degree of certainty that encourages planning is appreciated by all.

Contracts are sometimes limited to one year because of uncertainties about currency inflation. If there is an appropriate inflation index, the contract can be written to include automatic price increases in line with this inflation index.

The duration of contracts is sometimes limited because of possible political changes. In such cases expiry dates are set to coincide with forthcoming elections.

Contract durations may be kept short to provide incentives to the contractor to work well, in the expectation of winning the next contract. The contract should be well written so that there are penalty and termination clauses that can be used in the event of poor performance. If these clauses are available in the contract, it should not be necessary to use the threat of non-renewal, and therefore restrict the duration of contracts for this purpose.

Arranging tendering and introducing new contractors can be time-consuming, so increasing the intervals between such activities can release administrative time for other purposes.

The first year of MSE involvement will be a time when many lessons are learned. If no large capital expenditures are expected of the MSEs, a period of one year is recommended for the duration of the first contracts. This relatively short period will allow the inclusion of improvements in subsequent contracts. Later contracts should, if possible, be longer.

7. *How should the MSEs be supervised?*

In the first year of MSE involvement, monitoring and supervision inputs from the municipality will be expected to achieve four purposes

- Training of MSE workers. The MSE should be responsible for training its own staff (as discussed in Annex 8), but a better

performance will be achieved if municipal staff also provide guidance, based on their many years of experience in the field.

- Training of municipality supervisors. If additional staff are engaged by the municipality for supervising MSEs, they will require training, some of which will be formal instruction and some of which will be undertaken in the field, under existing supervisors.
- Ensuring satisfactory standards of MSE operation. This is the basic task of supervisors, and involves monitoring the working of labourers, inspecting the areas being served and responding to complaints.
- Monitoring of new arrangements. In the pilot phase, the administrative aspects of MSE involvement should be monitored in extra detail so that improvements can be introduced and future developments planned.

When MSEs are involved in providing services in urban areas, there can be up to four groups of supervisors:

- Municipality staff. Their task is primarily to ensure that MSE workers complete the work that is expected of them according to specified requirements, especially in terms of service coverage and environmental factors.
- Independent inspectors. An alternative modality is to appoint independent supervisors or foremen, as has been done in West Africa (Doucoure, 1996) and Durban, South Africa (Roberts, 1996).
- MSE supervisors. The owner, or someone he has delegated, needs to observe his workers to ensure that they are giving him value for money and doing the work in such a way that there will be no penalties payable to the client for poor performance.
- Beneficiaries. Residents and commercial customers collectively have many eyes, and can see what the official supervisor may not. Beneficiaries notice if their waste is not collected, or is collected late. (Figure 1) Residents notice if their street is swept or not. Either the beneficiaries in general can be invited to complain to the municipality concerning service failures, or certain individuals (such as shopkeepers with a telephone) could be retained as stationary supervisors, and asked to report any shortcomings or needs. Complaints stop coming if the public feels that no action is taken on them, so it is important that the municipality acts quickly in response to complaints and informs the complainant of the action that the municipality has taken. There are interesting examples from Latin America, in which the residents are closely involved in the monitoring of the services of waste management MSEs. In Bolivia, for instance, a new law makes it possible for neighbourhood committees to assess the quality of the waste collection by MSEs (Gaston, 1996).

8. *What form of support should the municipality give to the new MSEs?*

a) Information and training

The main thrust of this manual is that the role of the municipality is to lower the barriers for MSEs to be involved in solid waste management, rather than upgrading the skills and management of micro-entrepreneurs so that they can 'jump' over all the difficulties. Most municipalities should not become involved in helping and strengthening the MSEs interested in waste management. Municipalities in general do not have the skills, the resources and the mandate to become involved in business development. Therefore they should leave this work to the NGOs, business development organisations, training establishments and government enterprise agencies, as discussed in Annex 8. If a particular municipality has proven experience of successfully assisting new enterprises, it might decide differently. The limit of involvement in the internal affairs of MSEs should be determined as a policy decision.

A municipality may decide that it would be helpful to all parties concerned if some money were available for buying some business development support for the MSEs that are appointed to specific tasks – after the contracts are awarded. This support should be in the form of services rather than cash, because it is important that the financial arrangements for MSE involvement are sustainable, and not dependent on handouts of extra money.

It is probably appropriate for the municipality to be ready to provide technical guidance on

- the physical performance of the work,
- aspects concerned with occupational health and safety,
- relationships with the public, and
- the interface with other aspects of the waste management system.

It may be helpful at this stage to specify the officials who will be responsible for providing this support.

b) Economic incentives

Municipalities can also stimulate MSE involvement in waste services by providing economic incentives. Essentially economic incentives aim to increase the revenues (or lower the costs) of the provision of certain services. In this way, entrepreneurs are more easily persuaded to engage in certain activities. Especially when the MSEs are just beginning, economic incentives may be needed to overcome initial inefficiencies.

A frequently used economic incentive is the reduction of, or exemption from, taxes. Local and national governments often use this to attract industries to locate in a particular region or industrial zone. In a similar way local governments can also make solid waste services more attractive, relative to

other economic activities, by lowering the taxes which need to be paid. Most of the Economic Interest Groups in French-speaking West Africa enjoy tax exemptions, as do pre-cooperatives in Colombia. However, this type of incentive will have no impact on informal enterprises that operate outside the tax system, and on enterprises whose turnover is too low to attract taxation.

Economic incentives should be used with caution. In a way they create an artificial situation, because the services are not entirely exposed to market forces. MSEs that depend on economic incentives cannot be regarded as sustainable. Therefore such incentives should have a temporary character, to overcome initial doubts on the part of the entrepreneur interested to start up in the waste management sector, or to cover teething problems and initial low efficiency of a new MSE.

c) Use of municipal facilities, equipment and land

In cases where MSEs are taking over from municipal staff, it may be appropriate to consider possible mechanisms by which the new MSEs could employ the equipment that had been used by the municipality. The following factors may be relevant to any decision on this issue:

- The equipment may be needed by municipal teams elsewhere.
- It may be decided that the MSE should be able to stand on its own feet and not depend on the municipality for support.
- Equipment, facilities or land could be either sold to the MSEs or leased against a monthly or annual payment. However, the MSE is unlikely to have access to enough capital to buy any major item. If equipment is leased, there may be legitimate concerns that it will not be properly used and maintained, so that the particular assets rapidly lose their value. Within one year a truck can be rendered inoperative by accidents, poor driving techniques and lack of maintenance. Good leasing agreements include the requirement of documentary evidence of regular servicing, and annual checks and valuations.
- The equipment may be too sophisticated for use by the MSE.
- As was stated earlier, one of the advantages of MSEs is that they may try harder to improve their methods and equipment for doing relatively simple manual tasks, in comparison with large organisations that have many functions and a large range of equipment. If they are directed towards using existing municipal equipment that is not particularly well designed, they may adopt methods that are not superior to previous approaches. For example, if they use handcarts made to an old municipal design that have a small carrying capacity, their operations will be less efficient than if they develop larger carts that are more suitable.

An example in which leasing of equipment might be appropriate could be for secondary transportation of waste collected by the MSE to the disposal site. The purchase of a vehicle would be a substantial investment outlay for the

MSE. The municipal truck may be specially designed for this duty. As an extra incentive, the municipality may decide to adopt concessionary rates for such equipment leasing. Again, this should be viewed as a temporary measure aimed at overcoming initial weaknesses of the MSE, so that the rates are gradually increased to market level.

Land required for transfer of waste or storage of equipment might be provided by the municipality or the community at a low rent. Office accommodation, if required, might be provided on the same basis or left for the MSE to find for itself.

d) Credit facilities

Some people who are interested in the promotion of small-scale waste services feel that municipalities should stimulate the involvement of MSEs in waste management by making available credit at low interest rates. They argue that it is difficult for MSE managers to borrow money to finance investments and provide working capital. They suggest that municipalities should help them with special credit schemes.

Should municipalities operate credit schemes of this type? Are such low interest rates necessary? Experience has clearly shown that low-interest loans are associated with inefficient economic activities. The main problem faced by MSEs is the limited access to credit and not the level of the interest rate. If this is the case, a better solution might be provided by schemes in which the municipality provides a loan guarantee to the financial institution which makes available the actual credit. It would be particularly unwise for the municipality to set up its own credit scheme for the promotion of MSEs in waste services, unless it has prior experience and clear expertise in the credit field. Busy municipality staff should concentrate their efforts on what they alone can do – facilitating and supervising municipal services such as solid waste management.

e) Public awareness campaigns

A less direct form of support, but one that could have a major impact on the success of MSE involvement, would be directed towards developing the understanding and motivation of the community to be served. These public awareness campaigns should be carefully developed and executed, and it is likely that the municipality does not have specialists in this field. Even so, support for such programmes, either financially or with an official endorsement, can be a significant step towards enhancing the success of MSE involvement. There is more on this theme in Section R.

M How can policy be developed and implemented?

Key point

A cross-functional committee should be formed to prepare for MSE involvement.

In order to arrive at a well-founded decision that is supported by the various parties involved, a small cross-functional committee should be formed. Its members should be drawn from concerned municipal departments and at senior level. It is essential that the finance department is represented because of the importance of financial and contractual matters, and because there may be a need to modify payment procedures for MSEs, to avoid long delays. A senior official with responsibility for legal aspects should also be encouraged to participate. This committee could also review the consequences of the involvement of MSEs for local government. There may be significant changes in the role of the municipality with respect to solid waste management, and modifications to the regulations, structure and staffing may be required. In particular, it may be necessary to strengthen the municipality's capacity for the management and monitoring of the new MSWM system.

This policy committee could evolve into a steering committee to monitor and guide the steps towards implementation and to review the actual involvement of MSEs.

The order of the sections in this handbook suggests a sequence of implementation, and an alternative approach that has been developed in Latin America is shown in Annex 3.2.

IV Making it happen

N What operational planning is necessary?

Key points

The more practical issues around the involvement of MSEs include:

- the selection of the locations and sizes of the areas where the MSEs will work;
- operational arrangements at the interfaces between the MSEs and the municipal system, principally transfer for secondary transportation and access of MSE vehicles to municipal disposal sites;
- arrangements for supervision of MSE workers;
- requirements for methods and equipment.

Factors affecting decisions in these areas are discussed.

Section L was concerned with policy decisions that should be made by a committee including senior decision-makers. This section looks at more technical and specific questions, which should be considered as an early step in implementing the policy decisions.

Among the questions that should be asked are:

- 1) In which part of the urban area should the MSE service operate? How big should the area be?
- 2) What interfaces will there be with other parts of the solid waste management system, and what decisions and actions are needed to ensure that these interfaces work well?
- 3) What can be done to ensure that supervision is effective?
- 4) What requirements should be made regarding the method of working and the equipment that will be used by the MSEs?

There is a wide variety of types of MSE, and ways in which MSEs can get involved. For this reason it is not possible to define one unique process for involving all the different types of MSE. In some cases where there are strong community links, some of the decisions outlined in this section would be made *after* the MSE was selected, and the MSE itself would be involved in making these decisions.

1) Location and size of pilot area

Decisions should be based on the criteria outlined in Section L. More detailed investigations of possible areas should lead to the identification of the most suitable location for the pilot trials. It is important to remember that the human factors are important in selecting the area, not just physical features. (Human factors include the motivation to make the area cleaner, the presence of potential MSEs, and the willingness to pay for the service.)

The exact definition of the area to be served will need some serious planning (see Pfammatter, 1996; pages 4-7). This will use data collected as outlined in Section J. Economic, social and socio-cultural characteristics of the community, existing boundaries, and the presence of community organisations should all be taken into consideration. The infrastructure situation (roads and availability of space for locating storage units) and the present solid waste practices, including recycling, are also relevant.

The ideal sizing of the area to be offered for MSE operations is not easy to determine. The optimum size depends on the number of workers, and the number of households or businesses that each worker can serve in a working day. If the selection of MSE is to be made by open competition, it cannot be known in advance how many workers the winning MSE will have. If the method of working or the equipment is new, the productivity of each labourer with this new system cannot be known. It is likely that the MSE that is awarded the work will need to hire new workers, so the number is not critical. It has been suggested that a residential area with up to 50,000 inhabitants and a population density of 300 inhabitants per hectare or less is suitable (GTZ). From the point of view of the municipality itself, the zoning should take into consideration the interest of the municipality to create conditions of competition and to facilitate monitoring efforts.

2) Interface with the rest of the solid waste system

Most MSE operations will have at least one interface with other parts of the solid waste management system. In many cases MSEs collect waste from households and take it to one or more designated transfer points, from where it is removed by another agency (private or public). In this case the interface is at the transfer stage. Operational issues that need to be resolved include

- where the waste will be transferred,
- how the waste is to be transferred, and
- the timing of the transfer operations.

The siting of a transfer location is sometimes a difficult issue. The location must be accessible to the secondary collection vehicles (considering road width and surface, traffic congestion and car parking), must be convenient

for the primary collection operation, and acceptable to nearby residents. If the waste to be delivered to this transfer area is coming from a part of the city that had no previous collection, it may be necessary to reorganise the adjacent secondary collection routes to provide capacity for this extra waste.

Transferring of waste from the primary to the secondary system must be done in such a way that the workers involved are not subject to any unusual health or safety risk, and that the environmental nuisance (noise, dust, odour, drain blockage) is minimised. The transfer operation should also be efficient. One satisfactory way of achieving this transfer is to collect the waste at the primary stage in containers that are small enough that they can be lifted to tip their contents into the secondary collection container. If carts are required to be pushed up a ramp at a split level transfer station, this will have a major effect on the design of the carts and the way they are used, and the steepness and length of the ramp are critical factors. The use of trucks instead of demountable containers at transfer points has proven unsatisfactory because the trucks frequently arrive late and are the cause of various other problems (Pfammatter, 1996). (Types of trucks and containers are discussed briefly in Annex 4.) It is recommended that the method of transfer is considered in advance and that requirements are included in the contract details.

The timing of transfer is important. If the container of the secondary collection agency is removed before the primary collection system has loaded its waste into it, the result can be wasted effort, or waste being left in an urban area for days at a time, attracting animals and causing complaints about the smell. Co-ordination of the timing of the operations on each side of this interface is important. Allowance should be made for reasonable delays in the primary service, particularly in the early stages when the system is being developed.

Some MSEs take the waste they collect to the disposal site. In spite of their lack of capital, either they are able to afford a very old vehicle, as in India, or they rent or lease the trucks they need. In this case the interface is represented by the entrance to the site, and some of the issues to be considered are:

- What charges should be paid by the MSE for the disposal of the collected waste? If the MSE pays no charges, but other users – such as industries – are required to pay, the MSE may take on the work of delivering the waste for these other users, to save on paying the fee. If the MSE is required to pay a fee, the drivers may take some or all of the waste to an unauthorised dumping site to avoid paying the tipping fee, unless there is a strict system of control. If payment is made, it is recommended that it be based on weight, or numbers and types of vehicles, since it is very difficult to estimate the volume of waste in a truck.
- What information should be recorded about each load brought by the MSE? It is recommended that an official should keep reliable records of all vehicles bringing waste to transfer areas and disposal sites. This information is useful for managing the disposal site, but also

important for monitoring the collection operation. (Of course there is always the risk that gatehouse officials may be pressured by a contractor to write down deliveries of waste that are never made.)

- What restrictions are to be imposed on the type of waste that may be deposited on the site, and how will they be enforced? Certain types of hazardous wastes (such as organic solvents and certain healthcare wastes) may not be allowed on disposal sites. Any such restrictions should be communicated clearly to operators, and ways of enforcing them developed.
- What restrictions are to be imposed on the type of vehicle that may come onto the site? Operators of landfills may not allow certain types of vehicle onto their sites if they cause congestion (by frequently getting stuck) or take a long time to unload. A potential contractor should be informed of such restrictions at the tendering stage.

3) *Supervision*

Supervision of MSEs will be a new task for the municipal supervisors, so some thought should be given to recruitment and training for this work. It may be useful to visit other cities where MSE systems are in operation, to learn from their experience. In deciding what supervision is necessary, it may be helpful to consider the perspective of the MSE owner, who may regard his profit as the governing consideration, and have little concept of environmental protection.

Close monitoring and good communication with the contractor are necessary for taking early corrective measures in case problems occur. Taking action at an early stage may prevent a complete breakdown of waste collection services. For instance, if the collection vehicle of an MSE is not usable and the repairs are not carried out quickly for lack of working capital, the residents may start to withhold their collection fees because their refuse not collected. This non-payment in turn causes a further cash flow problem for the MSE which can lead to additional problems, such as payment of salaries. Minor problems should not be allowed to develop into major failures.

Supervisors need transport. It is possible for a supervisor to ride in a collection vehicle, but this limits the supervisor's observation to only one team, and the supervisor may be intimidated by the MSE crew if he is obliged to travel with them. Supervision must be cost effective; large numbers of supervisors would significantly increase the cost of the MSE option. If one supervisor is to cover a wide area he must have a convenient method of transport for moving around it.

4) Requirements for methods and equipment

Methods and standards must be set. The tender documentation and contract should stipulate the form of collection service to be provided (kerbside, block, front gate etc.) and the frequency of this service. (Annex 4 gives background information about these issues.) The requirement for work on the rest day (Sunday or Friday) should be mentioned. The hours of working may also be defined.

Certain minimum standards for equipment may also be specified. These may refer to the noise or pollution made by the equipment, its capacity or appearance. Some forms of transport (such as carts drawn by animals) may be regarded as unacceptable – but if there are many such restrictions the advantages of MSE involvement may be greatly reduced. There could be requirements about the maintenance and appearance of the equipment. For example there could be a requirement that handcarts should be repainted annually and washed weekly, and that the name of the MSE should always be readable on them.

Standards could also be applied to clothing and safety equipment. MSE workers might be required to wear a specified article of brightly coloured clothing for purposes of identification and safety, and to wear gloves.

O How should the contract be written?

Key points

Contracts should be simplified as much as possible, but include clear descriptions of how the work is to be measured, and all necessary clauses to allow the municipality to retain control.

Please look at Section K (on administrative changes that are needed), and at Section L (on policy decisions), because points relating to contracts in those sections will not be repeated here.

It is common practice to use standard forms of contract, but for the purposes of contracts with MSEs there are several reasons why it might be helpful to simplify the form of contract. One reason is that the MSE entrepreneur may not be able to read well and so not read the contract if it is long and written in difficult language. Another reason is that there is less need for the contract to be long and complex (in comparison with the contract for a large

construction project). The officials who are asked to review and simplify the standard form of contract may not be pleased to do this work because it might seem to be a large amount of work for a small contract sum. Once a contract has been successfully adapted for MSE work it could be used many times, and would be of interest to other cities contemplating MSE involvement.

Examples of contracts are included as Annex 10. The contracts are taken from Latin America and India, and show a wide range in detail and requirements. Contracts for MSEs show large variations, and need to be tailored to the local situation.

Formal agreements between local government and MSEs should specify:

- (i) the type of waste activity (for example: primary household waste collection). The description of the work should be as precise as possible to minimise misunderstandings and disagreements about what is required
- (ii) the geographical area in which the MSE will operate
- (iii) the duration of the agreement
- (iv) arrangements for payments for the MSE
- (v) penalties for failure to provide the service
- (vi) conditions for termination of the contract
- (vii) procedures for reporting to the client
- (viii) responsibilities and liabilities of the contractor
- (ix) responsibilities of, and undertakings by, the client (local government)
- (x) requirements regarding the supply, use and maintenance of equipment and safety clothing.

Some contracts indicate the number of lots to be served, and specify the services in terms of tons of waste to be collected, the distance that the waste must be transported, the frequency of collection, and the hours of work. (Waste, 1996).

Measurement of work

The method of measurement of the work is of great importance. If the measurement is carefully specified, the client is more likely to obtain satisfactory performance from the contractor. If the method of measurement of the work is unclear or impractical, there can be many disputes and claims.

The simplest method of measuring waste collection contracts would seem to be to weigh the loads collected, and pay on the basis of weight. Unfortunately this system was found to be unsuccessful in Rajkot and elsewhere in India because contractors mixed heavy materials (such as construction debris) with the waste they were collecting to increase the weight (Coad, 1997). (This would be acceptable if the rate for collecting construction debris were the same as rate for domestic waste.) So now the work is specified in terms of collecting the waste from a designated area, and there is a fixed

payment for each area, irrespective of the number of truck trips that are required. This method of measurement is less objective and requires more supervision, but it has been found to be satisfactory.

The measurement of street sweeping has traditionally been done in terms of input – a certain area must be swept a certain number of times each week. However, on a windy day a street may become littered very soon after it has been swept, and street traders can quickly spoil the cleanliness of a pedestrian area, and then the sweeper may be blamed for not doing his work. Alternatively, if the street has not been swept, the contractor may blame the wind or the street traders. So the other way is to specify the output or result – that the street must be kept clean, and any reported litter must be removed within a set time interval. This second way is easier for the client's supervisors to monitor, but it is more difficult for the contractor to determine the price of his contract bid.

Similarly with the emptying of litter bins: the contractor may be instructed to empty the bins at a particular frequency, or be required to ensure that they are never allowed to become full.

In terms of waste collection and street cleaning, no two areas are the same. Differences in housing density, distances, traffic conditions and socio-economic factors mean that it is difficult to say that two areas or two collection or sweeping assignments are the same. In preparing contracts there can be two approaches. One is to attempt to divide the work into equivalent allocations and ask contractors to bid a standard price for each allocation. The other approach would be to ask for bids for each allocation individually. The latter approach is recommended so that there are no complaints of unfairness after the MSEs start work, since no two allocations will be exactly the same.

Time spent in preparing precise and clear formulations for contract clauses is time well spent. A carelessly written contract is very difficult to enforce, and can open the door for endless disputes.

P How to make contact with MSEs

 **Key point**

Municipal officials should attempt to make contact with as many potentially suitable MSEs as possible, using all available channels.

As has been mentioned earlier, there are many ways in which relationships between municipalities and MSEs develop. In some cases the

MSE for a particular task may have been clearly identified as one of the earliest steps, especially if it has close links with the community to be served. This section is written for cases in which there is no obvious choice of MSE, and is more relevant to private MSEs than community-based enterprises.

Having made the preparations, it is now time to make contact with MSEs. It is likely that the preparations have attracted the interest of some potential MSEs, but there are reasons for trying to make contact with more:

- Although it is important to start on a small pilot scale, it would be useful to start with two or three MSEs if possible, so that experience is not based simply on one relationship, and so that one failure does not spoil the whole experiment.
- Ideally the selection process for MSEs should follow the conventional two stages – a prequalification stage in which unsuitable contenders are rejected, and the bidding process in which the bids of eligible contractors are evaluated in terms of price and content. If such a procedure is to be followed, there should be more candidates than places.
- The selection of MSEs should be seen to be transparent and fair. If there is no open invitation for expressions of interest, but only MSEs already known to the municipality are invited, there will be accusations of unfair practice and perhaps corruption.

For these reasons it is important to attempt to contact as many potential or actual MSEs as possible.

The opportunities for MSEs can be advertised in a number of ways.

- Many MSEs involved in waste collection have links with the community in which they operate, so influential people in the area to be served should be asked to look out for potential MSEs.
- NGOs and business development organisations may know of suitable entrepreneurs and MSEs.
- It is possible that MSEs operating in related sectors may be interested in working in the field of waste management, so small transport businesses and recycling organisations might be approached. The advantages of using established MSEs may be very significant. The manager of an existing enterprise may have had time to learn from his mistakes and perhaps to benefit from training, and to demonstrate his entrepreneurial skills, so that there is less chance of his business failing.
- Advertisements in local papers and announcements on central notice boards should also be placed.

When contact has been made, communication should start. It is important that the municipal official who will be responsible for this work has time to explain the requirements of the municipality, pass on information about the proposed assignments, and develop an element of trust with potential MSE

managers. Information about the areas should be made freely available to the MSEs so that they can prepare their bids.

Q How to select the best MSEs

Key points

In some communities there may be strong support for a particular locally-based MSE:

Experience suggests that the best MSEs are those that operate according to business principles (able to generate a profit) and have been operating for some time.

Training in business skills should be done by experts.

Community-based enterprises may be of particular interest in cases where there are no local waste management private MSEs in existence. If a community-based approach is to be used, the community may already have decided who is to be involved, and how the service is to be operated. In this case the involvement of the municipality may be limited to ensuring satisfactory environmental standards (disposal arrangements) and any links or interfaces with other parts of the solid waste management system, such as transfer to the secondary collection system.

If the community does not have a strong interest in one particular enterprise being given the work, and there are several MSEs eligible for the work, and interested to do it, the issue is how to decide which would be most suitable. Which criteria should be used?

The main message with regard to efforts to involve MSEs in solid waste services is that it is crucial that these ventures are based on solid business considerations. Only with an appropriate business perspective can the services be efficient and sustainable.

The involvement of MSEs in waste management has some significant advantages, but much depends on the owner of the business. He/she should have distinct business skills. The first years of a new MSE operation present many challenges. Experiences from numerous MSE development programmes have made it abundantly clear that it is easier to work with enterprises which have been in existence for some time, rather than with new ones. MSEs often have a low survival rate; on average two of every 3 new firms disappear during the first year of operation. After MSEs have gone through their initial *teething*

problems they are a much more worthwhile subject for MSE support services, in comparison with inexperienced entrepreneurs. Figure 6 illustrates this, suggesting that the best enterprise is one which is strong and experienced. Ways in which new enterprises can be equipped with the necessary skills are discussed in Annex 8. Until they have the skills, and particularly at the early stages of MSE involvement, there is no substitute for capability and experience.

Figure 6
Selecting the best MSE



It is better, especially at the early stages, to avoid MSEs that are inexperienced or financially weak, and to contract with entrepreneurs that are experienced and capable.

This manual argues strongly for a business approach, in which subsidies and artificially low prices have no place. MSEs should be self-sufficient, meaning that they need to be profitable, as this will stimulate the entrepreneurs concerned to invest in their firms and steadily improve their services. They should therefore be able to procure the inputs they require, including capital, at market rates. Their waste collection charges or contract prices should be based on real costs, and also allow for adequate pay for their workers. Even though the resulting profit margin may not be high, in this way they do not require any subsidy or special tax benefit. Such enterprises have the best chances of sustainability and survival.

Setting up business ventures, even community-based enterprises, needs training and advice from specialists with expertise in areas such as entrepreneurship development, training, and marketing. Training could include instruction and practice in the preparation of a business plan, and determination of waste collection fees. Because of the specialised nature of such support, it is

definitely not recommended that municipalities attempt to undertake such tasks; rather it should be left to organisations that have experience in this area. There are several examples of NGOs and CBOs that have gathered experience in this field, notably the well-known IPES model in Latin America, which is largely based on this understanding of MSE support (see Arroyo 1996). (More is written about such support services in Annex 8.)

If a sufficient number of enterprises have been identified to allow some form of prequalification assessment, the factors mentioned above should be used as evaluation criteria. If it is possible to arrange competitive tendering for the selection of MSEs, it is important that the municipality has some concept of the actual cost of the work being considered. In this way it is possible to reject bids which are excessively high, or which are so low that they cannot be sustained at acceptable wage levels. Experiences of other municipalities may be helpful in determining a realistic range for charges.

R What can be done to make the partnership successful?

Key points

Active steps should be taken to build channels of communication between MSEs, the municipality and other actors who are involved. Co-ordination of interfaces between municipal and MSE systems is particularly important.

The municipality should provide guidance to MSEs on technical and operational aspects, and support for the development of business skills should come from other sources.

Public participation is vital to any solid waste management system. Campaigns to raise public awareness can be very helpful if they are designed and executed well.

When contracts have been signed or agreements concluded, this is not the end of the process, but the beginning. This section considers some of the ways in which the chances of success of the pilot stage of MSE involvement can be improved. It is largely concerned with what municipalities should do, but includes some references to ways in which other groups can help.

Developing links with the MSEs

A steering committee can play a part in guiding the further planning and implementation of the work of the MSEs. It may not be at such a high level as the committee mentioned in Section M, but it should include a senior representative of the finance department if the direct contract arrangement is employed. It would be helpful if the committee included representatives from the communities being served and any organisations providing support.

Social differences may make it difficult for municipal officials to maintain cordial relationships with the MSE leaders. Municipal managers often believe that 'development' is the same as modernisation and industrialisation, and so have problems in supporting the methods of the MSEs. (Such people should be encouraged to look at results rather than methods, being concerned about the cleanliness of the localities, not the sophistication of the machinery used in the cleaning process.) MSE managers may find it difficult to understand the problems that face municipality bureaucrats, and why decisions and payments are sometimes delayed.

It will thus require a special effort to bring these two parties together and convince them that it is in the interests of both groups to collaborate and work together. The objectives of such meetings would be

- to identify problems before they become so large that they cannot be managed, and to find ways of solving them,
- to determine what modifications should be made to the legal and administrative systems (including contracts) to facilitate improvements in services and conditions, and
- to develop an atmosphere of co-operation and mutual trust.

It may take time and experimentation to determine the best format for meetings between MSE and municipality staff. Formal committees may not be the most productive forum. MSE leaders might be invited to come to the municipality whenever they have a problem, or it might be better to schedule a regular informal meeting. If senior figures (including the mayor) show an interest in the work of the MSEs, this could help to develop the relationship, and mutual respect.

In case a considerable number of MSEs are expected to be involved in municipal solid waste services, it may be considered convenient to create a more permanent consultation platform. Such a '*Municipal Waste MSE Committee*' could play a useful role in guiding the overall process of involving MSEs in municipal solid waste management. Experiences suggest that isolated actions to engage MSEs in solid waste management are not always effective, and that it is better to integrate MSEs more generally into the overall urban development planning and management process.

There is a growing conviction that it is in the interest of local government to involve private enterprise, in order to enhance efficiency and expand the geographical area covered. Many municipalities have started to involve local MSEs in their solid waste management system. Much can be learned from these experiences, which are not always a complete success. In the case of Burkina Faso, for example,

"the major constraints have been institutional and are attributed to the City Council's ability to develop a participatory management culture, repeated absence of the representative of the Municipal Council from working sessions [with the project teams], late allocation of the plot for use as a garbage transfer station, irregularities in the pattern of waste disposal from the transfer station in spite of financial contribution from the project and, more particularly, the slow pace at which the administrative authorities approve procedures and promulgate decrees concerning the project" (Diop, 1996:7).

One of the most important subjects for co-ordination is the interface between the MSE system and the municipal system – often the transfer of waste from primary collection to the secondary transportation system. It is unlikely that this will operate smoothly from the first day of MSE operation. If the collected waste is not taken away to the disposal site but simply accumulates, support for the primary collection scheme may quickly evaporate. Solving the problems of co-ordination at this interface should be given high priority, because a failure here could undermine a large amount of hard work. Unannounced visits of senior officials to troublesome transfer areas could help to develop mutual understanding and in finding solutions.

The municipality (or another relevant public agency) retains a responsibility for public health and the environmental impacts of the work of the MSEs, and also for upholding legal requirements regarding the health and safety of the workers, and their employment conditions. Employers and their workers should know about the risks associated with waste management – particularly if sorting of waste is involved. If there are good channels of communication between local government and the MSEs, it will be possible to resolve problems in these fields in a spirit of co-operation, instead of relying on coercion or legal action.

Equipment

The productivity and efficiency of waste services are to a large extent determined by the suitability of the equipment that is used. In the case of MSEs the selection of the equipment is the responsibility of the entrepreneur. Particular attention should be paid to the maintenance of the equipment, however basic it is. Locally manufactured equipment is usually easier to repair than imported items.

In many cases municipalities use very unsatisfactory handcarts, so it is not wise to recommend in general that MSEs use the labour-intensive equipment of the municipalities or copy their designs. (Annex 4 includes some information about carts and tricycles.) Some practical and experienced municipality engineers and technicians may be able to give valuable assistance in the design or selection of equipment.

MSEs that have the responsibility of transporting the collected waste to the final disposal site make use of small trucks, or farm tractors with trailers. Sometimes these vehicles are owned by the MSE, and in other cases they are rented from a private firm or from the municipality. Renting municipal equipment reduces the need for capital, but the MSE must ensure that the type of vehicle that can be hired is appropriate (especially in terms of its loading height and carrying capacity), and that standby vehicles are available in case of breakdown.

Support

MSEs may need support in a number of fields. Aspects of this support are discussed elsewhere in this section. Annex 8 gives further information about support that may be provided by various organisations. A recommended policy for a municipality is that it should provide some technical advice and encourage regular communication with MSEs on operational issues, but that financial help and training in business skills should be provided by specialist agencies.

There may be some benefit in international technical assistance, arranged through municipalities or NGOs. Information from cities in the same or neighbouring countries, concerning their experiences in MSE involvement, may be of particular help.

Technical advice

The technical side is usually the strong point of micro-entrepreneurs, and it has been observed that waste management MSEs in the Philippines "exhibit self-learned skills as well as indigenous technology for solid waste management" (Cancellar, 1996: 9). Nevertheless, it should be recognised that the technical skills of micro-entrepreneurs are often modest and may need to be upgraded, especially of those who are not intimately familiar with waste services. IPES in Peru, for instance, also includes technical training in its preparation of community-based MSEs that will engage in solid waste collection. The Zabbaleen in Cairo (Egypt) have set up, with external assistance, a skill development centre for paper and textile recycling.

Public awareness and participation

The attitude, understanding and involvement of the public are major factors in the success of any solid waste management scheme. Public awareness campaigns, which aim to increase the level of co-operation of the public, are therefore an important part of solid waste management. Some attempts at increasing public awareness and participation fail to achieve any useful result (although it must be said that evaluating the effectiveness of a public awareness campaign is not easy). A range of methods can be used, including posters, booklets and handbills, advertisements in newspapers and on television and radio, programmes (including plays and puppet-shows) in schools, events for children at beaches and fairs, poster and story competitions, house-to-house visiting, and neighbourhood committees.

Successful public awareness campaigns usually have the following features:

- They have a simple and clear message, or a very small number of such messages.
- They ask people to develop practices that are possible. (There is no point in asking people to throw their waste into bins if no bins are available, or if the bins are always full. For this reason a public awareness campaign must be closely linked to waste collection operations.)
- They must be well presented using professional artists and producers or well-trained teams.

Typical objectives for public awareness campaigns are:

- to encourage people to put their waste into bins instead of throwing it on the ground
- to encourage residents to use a particular form of container (such as a plastic bag)
- to inform residents about new arrangements for waste collection, including procedures, timing and complaints procedures
- to encourage people to pay the charges for their waste collection system, or
- to encourage residents to sort their solid wastes so that some components can be recycled, and to train them how to do it. The separation of hazardous domestic wastes may also be taught.

Such objectives are obviously very appropriate at the introduction of a new MSE solid waste collection service. Who should be responsible for designing and implementing such a programme? It should not be done in a quick and careless way, nor by amateurs with no experience of such work. In most cases NGOs are in the best position to implement this type of public education. In some cases there is expertise in public education at the national or regional levels of government. Clean-up campaigns organised by local groups may be effective in developing awareness, but should not be seen as a substitute

for changing unacceptable patterns of behaviour or installing regular waste management systems.

A different form of public awareness campaign would be appropriate where there are no immediate plans to begin a new waste collection service. In this case the objective would be to motivate communities where waste is not collected to join together and organise a collection service for themselves. The programme would aim to create a desire for a cleaner environment and show interested residents how they could start the process of implementing their own waste collection service. (A municipality might use the response to such a programme as an indication of where to start with MSEs – focussing its efforts on communities where there is most interest.)

Another objective for public awareness campaigns has been to improve the social status of sanitation workers and waste recycling workers. Some very successful campaigns of this sort have involved heads of state (as in Indonesia) or leading citizens (Philippines) and a change of name. Attractive uniforms have also helped create a new image for waste collectors and sweepers.

The fundamental goal should be to help people to understand why good sanitation and a clean environment are important for their own health and well-being. If this message is received and understood, there will be a demand for waste management services, however they are to be provided. If there is a demand there will be co-operation and a willingness to pay waste management fees.

S What happens next?

Key points

At the end of the pilot stage, the programme should be evaluated in a comprehensive way. Institutional changes may be required.

If the programme of MSE involvement is to be extended, this may be by the growth of individual MSEs or the involvement of new enterprises.

Communication and co-ordination are vital to the success of MSEs in waste management.

If the baby is healthy it will grow.

One test of sustainability is replicability. If the initiative takes root, others may follow.

Is the baby healthy? After the MSEs have been operating on a pilot scale, there should be a review of the results achieved – to examine the MSE involvement to see if it is healthy and sustainable. The results should be evaluated in a number of ways. The physical results are obviously important – is the waste being collected and is the urban environment improved as a result of this initiative? The financial status of the operation should be evaluated, in terms of municipal finances – Has the experiment proved that MSEs can deliver certain services at a lower cost than the public sector or large private companies? Have the MSEs been financially viable? To what extent has the initiative depended on outside contributions? Have the communities that have been served paid the necessary fees? If several MSEs have been involved, it may be possible to learn some lessons by comparing the experiences of each.

The outcome of the monitoring and evaluation exercises will also determine the future of the formal arrangement with the MSEs involved in solid waste management – whether to modify or even discontinue such contracts.

If the pilot activities are found to be successful, the time has come for the last phase of involving MSEs in municipal solid waste management - the scaling up of activities. This is not always easy, and certainly not an automatic process - even if during the field testing no major problems were encountered. The model that has been developed for involving MSEs will require modifications when it is applied in another neighbourhood with different physical and socio-economic conditions.

Scaling up can be achieved in two ways. One way is that individual MSEs grow by increasing the number of workers that each employs. This would be a sure sign of the success of the particular enterprise and would be very welcome for that reason. As organisations grow, their management styles must change. In a small organisation of 5 people, the manager can serve the functions of manager, administrator, and supervisor, in addition to other functions. If the enterprise grows to 25 people the manager will not be able to undertake satisfactorily all the functions that he was accustomed to in the smaller group, and may find that the organisation does not function so well as a result. Success and size may also modify the motivation of the employees. An enterprise may rely on family members when it is small, but recruit from outside as it grows, and the loyalty and effort of the outsiders is likely to be less. If one MSE grows at the expense of others so that there is only one private waste management enterprise in the town, there is no longer the element of competition to maintain cost-effectiveness and provide an alternative supplier of services.

If the involvement of MSEs grows by the birth of more enterprises, then there is once again the uncertainty regarding the survival of each new MSE, and some may fail. However, the lessons learned from the first experiences should have improved the support services and operating environment for the new arrivals. In seeking new MSEs to provide new services, the municipality should not lower its standards for selecting eligible enterprises.

In practical terms the scaling-up can be encouraged by promoting success stories of MSEs that have involved themselves successfully in solid waste services, through the mass media (newspapers, magazines and radio & television).

T So, what is the secret of success?

Key point

There is no simple secret of success, but there are several distinct factors that have a major positive impact on MSE involvement.

Of course there is no simple formula that guarantees success. There is a wide range of conditions and types of relationship, so a simple secret of success cannot exist. However the following *pivotal points* or *keys for success* have been distilled from many experiences and provide a useful conclusion to the main part of this book. Many of the points below are based on the Proceedings of the Cairo Workshop (UMP/SDC, 1996b).

Conditions that favour successful MSE involvement in waste management:

- A dependable technical and institutional interface between the MSEs and the other players – public sector or larger contractors. This interface often occurs at the transfer of waste from the primary collection done by the MSEs to the secondary refuse collection or transport, but there are also other interfaces.
- Well functioning communication channels, effective co-ordination and active collaboration, based on mutual trust, between the local government and the MSEs. These are essential during all stages - planning, implementation, operation and evaluation.
- Adequate fee levels, and prompt and regular payments to the MSEs, so that they can be commercially oriented and not dependent on outside donations.
- Contractual arrangements which are fair to both sides, which avoid unnecessary restrictions and conditions. This may require the municipality to make modifications to the legal framework and administrative procedures.
- The use of affordable and sustainable technologies, with importance attached to the reliability and quality of the service rather than the sophistication of the technology used to provide it.

- Frequent provision of information to the users and their participation at various points in the decision-making process, and in supervision.
- A reliable monitoring and evaluation system which ensures the protection of the population and the environment;
- An operational support structure for MSEs that ensures the sustainable delivery of relevant business services. In general this should not be provided by municipalities, but by business associations, training organisations or NGOs. Networks – both locally (within the municipality and between all agencies and individuals who are involved), and on a wider scale, allow learning from the experiences of others. The wider network might take the form of a biennial workshop meeting or the exchange of printed information.

Above all, it is a question of motivation. Where there is the will, there is a way.

Annex 1

Cairo Declaration of Principles

The following principles were agreed by the participants at the end of the Workshop that was held in Cairo in October 1996.

CAIRO DECLARATION OF PRINCIPLES

MICRO AND SMALL ENTERPRISES' INVOLVEMENT IN MUNICIPAL SOLID WASTE MANAGEMENT SERVICE DELIVERY

Background

Micro and Small Enterprises (MSEs) could effectively contribute to resolving the shortage in solid waste service delivery particularly, to low-income urban areas where community relations are important, and where direct user charges may be needed. They can also facilitate the upgrading of the status, earnings and working conditions for waste pickers and recyclers and support employment generation and poverty alleviation.

For MSEs' contribution to be effective, the following constraints need to be addressed: legitimisation and contractual commitments; capital finance and cost recovery; capacity building in technical skills; citizen responsibility and public co-operation; and the enabling environment for scaling up operations.

To achieve lasting results MSE activities in MSWM should be integrated into the overall urban development planning and management process.

Legitimisation of MSEs and Contractual Commitments

Municipal recognition of the potential role for MSEs in MSWM is key. This can be achieved through: amendment of Bye-Laws to define the role of MSEs; structuring competitive procurements which facilitate entry of MSEs, including zone sizing for MSE economies-of-scale; interface MSE service with overall city-wide MSWM ; and provide equitable access to adequate urban infrastructure

National recognition of the roles of MSEs in implementing national MSWM policy should be reflected in: environmental protection laws; privatisation laws to include MSEs; decentralisation policies; levelling of the playing field with off-shore dumpers of waste materials; and government procurement specification.

Contractual commitments should be fair and transparent. Steps should be taken to provide clear contractual performance specifications and sanctions, as well as independent auditing and possible NGO monitoring; provide fair rate adjustments and arbitration procedures with service agreements as well as provision of multi-year service agreements which match depreciation periods.

Finance and Cost Recovery

Strengthen micro-finance institutions through donor guarantee funds and capitalisation and/or capitalisation through domestic savings

Open eligibility criteria for MSWM and other environmental services

Seek alternatives to collateral or develop support system that make collateral redundant

Consider tax instruments which encourage investment in MSWM, such as: accelerated depreciation; customs duties reduction on specialised MSWM equipment and other measures to level the playing field with imported recyclables

Recognise the role of donations and volunteer efforts as support to MSEs but focused on: MSE start-up capacity building and entrepreneurial skills; networking with customers for recyclables and transitional networking for expanded services in other neighbourhoods

User charges should cover total costs to enable renewal and cross-subsidies should address ability to pay

Seek locally robust cost recovery mechanisms, such as: property taxes; attachment to charges for other services; and direct user charges

Structure MSE service agreement and profitability to assure effective and reliable service

Recognise the value of customer – service provider relationship

Establish segregated MSWM accounts for transparency of cost information and to limit political intervention

Match service delivery targets to service demand and willingness-to-pay

Municipalities can enhance cost recovery for MSEs by: performance monitoring of contractual services; public awareness campaigns; ensuring transparent cost accountability; and enforcement of Bye-Laws

Capacity Building in Technical Skills

Respond to MSE training needs in strengthening human dignity and self-respect in MSWM works; technical design and operations; financial management; occupational health and safety; and customer relations

Encourage information exchange and association among MSEs in MSWM

Provide for technical assistance to municipalities on MSE contracting and supervision in programmes

Citizen Responsibility and Public Co-operation

Promote source segregation of recyclables and hazardous wastes

Awareness campaigns on public roles to meet service requirements as well as on service costs and cost recovery requirements

General hygiene and environmental education to stimulate demand for services and better MSE working conditions

Awareness campaigns to emphasise social creativity, economic contribution and human dignity of MSEs in MSWM

Scaling up MSEs Participation

Integrate MSE activities in strategic MSWM planning at city-wide level and strengthen municipal capacity to respond to MSE scale-up needs

Ensure reliable technical and institutional interface of primary and secondary collection through to final disposal

Involve NGOs in MSEs transition from project supported operations to independent operations

Promote information exchange on MSE best practices

Annex 2

Abbreviations and Definitions

A2.1 Abbreviations

BDS	Business development services – that provide credit, training and guidance to MSEs. They are discussed in Annex 8
CBO	Community-based organisation – an association comprising members of a neighbourhood undertaking work for the benefit of that neighbourhood
DCC	Dhaka City Corporation (Annex 9, A9.2.3)
KMC	Karachi Metropolitan Corporation (Annex 9, A9.2.4)
MSE	Microenterprise and/or small enterprise (See Section E)
MSWM	Municipal solid waste management – related to the storage, collection, recycling, treatment and disposal of non-hazardous wastes that are not discharged down a pipe. (See Schübeler 1996)
NGO	Non-governmental organisation (usually also a non-profit organisation).
RMC	Rajkot Municipal Corporation (Annex 10, A10.3 and .4)
SME	Small and medium enterprise (Though there is some overlap with MSEs, these businesses are generally larger than the enterprises that are considered in this book.)
SWM	Solid waste management – a more general term than MSWM in that industrial, hazardous and agricultural solid wastes are included.

A2.2 Definitions

arm roll	a type of mechanism used for loading a large container onto the back of a truck and tipping the container to empty it. This type of mechanism is also referred to as hook lift, roll-on-roll-off or roll off. (See Annex 4)
community-based enterprise	a group of people working for financial gain at the request of, or under the supervision of, the residents of a particular neighbourhood. (Section H, subsection 3)
concession	the right to build and operate a facility on behalf of a government authority. A concession for waste management grants the ownership of the solid waste to the body that is given the concession. After an agreed period the facility may become the property of the governmental agency.
disposal	the last stage of the waste management process. After disposal, nothing more is done to the waste.
dump site	an open space where waste is deposited in an unsatisfactory way. Various hazards and nuisances and forms of pollution are associated with dump sites.
economy of scale	an opportunity of reducing unit costs by increasing the size of the operation described in more detail in Section G
entrepreneur	a person who seeks to set up and operate an activity for the sake of financial gain. The owner of an enterprise can be called an entrepreneur.

formal	The formal sector is taken to mean employees of government and municipal organisations, and of private companies that are registered and have completed the formalities that are required in terms of licences and taxation.
franchise	the awarding of a monopoly to undertake a particular task in a specified area. A franchise may be awarded on a competitive basis and involve the payment of a fee by the individual or organisation that is granted the franchise.
informal sector	Different people use this term in different ways. In this book it refers to business activities that are not officially registered as businesses. As a consequence they do not pay taxes, they have no trading licence and they are not included in any social welfare or government insurance scheme. Section E
microenterprise	a group of up to ten people working together for financial gain, and operating with a capital investment of under \$10 000. (Section E)
pilot	A pilot stage or a pilot project is a trial stage undertaken at a small scale in order to learn about operational and practical points so that corrections or improvements can be made in subsequent larger scale operations.
pre-cooperative	This is a term used in Latin America for an organisation that is at an early stage of becoming a co-operative. It is easier to form than a co-operative and has tax advantages. (Section H)
primary collection	If waste is collected in two or more stages – first transported in one vehicle and later transferred to another – the first stage is known as primary collection.
productivity	A measure of the amount of work that a man or a machine does in a particular time.
public-private partnerships	The linking of government inputs with private sector inputs for a particular goal
recycling	The process of transforming recovered and sorted material into intermediate materials (such as crushed glass or ground or extruded plastic) or into final products for consumer or industrial use. (Annex 7)
refuse (as a noun, with accent on first syllable)	solid waste – unwanted material that is not discharged through a pipe.
resource recovery	any productive use of what would otherwise be a waste material requiring disposal. (Annex 7)
secondary collection	If waste is collected in two or more stages – first transported in one vehicle and later transferred to another – the second stage is known as secondary collection. It is usually accomplished by a motorised vehicle and ends at the disposal site.
skip lift	a mechanism mounted on trucks to lift a container onto the truck and empty the container. The container is attached by means of chains. (See Annex 4, figure A4.2b)
small enterprise	a group of 11 to 20 people working together for financial gain, and operating with a capital investment of under \$50 000. (Section E)
solid waste	In general it can be considered as unwanted material that is not discharged through a pipe. Legal definitions vary. Whilst some excreta may be included – mixed in with other materials – excreta itself is not usually regarded as solid waste. Some

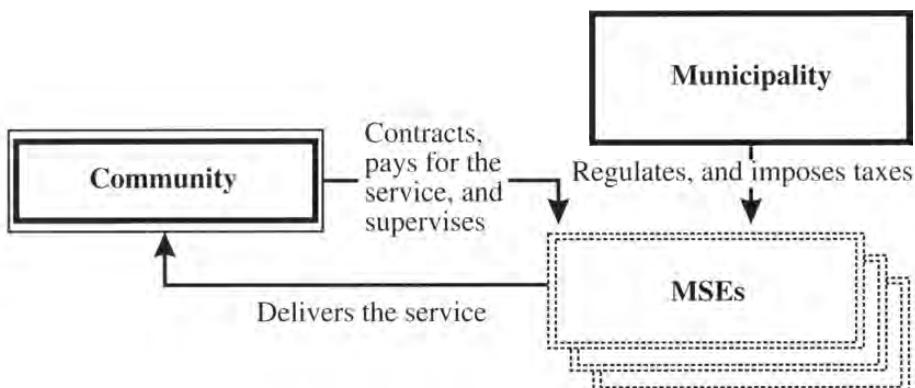
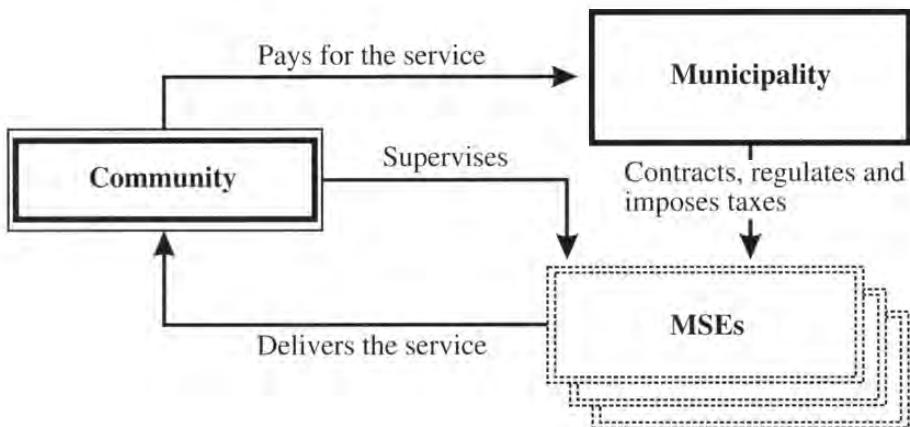
	people use the term garbage to mean solid waste, but garbage is more precisely defined as a component of domestic solid waste, comprising food waste.
source separation	The separation or separate storage of solid waste at the point of generation so that it is passed to the first collection stage as two or more streams.
stakeholder	Any person or organisation who may be influenced by the issue being considered.
survival activity	An activity which is taken up by an individual as a way of earning some money. It requires very little skill, capital or experience, offers little hope of development, and generally provides a very small income. Section E
transfer	the relocation of waste from one means of transport to another. It is a necessary stage between primary and secondary collection. (Annex 4)
transfer point	the place at which transfer takes place. It may be a designated place where waste is unloaded from primary collection carts or where a secondary collection container is placed.
transfer station	a facility that is specially constructed for transferring waste.
unit cost	the cost of performing an operation for a unit quantity (of waste). For example, the unit cost of disposal of waste could be expressed as the cost of disposing of one ton of waste.
waste pickers	men, women and children who sort through accumulations of waste and take out any item that they can use – mostly materials that can be sold for recycling, though sometimes they may take something that they use themselves. Waste pickers may look for materials in piles of waste at storage or transfer points and at disposal sites, or they may pick up wastes that have been scattered on the streets.

Annex 3

Models for involving MSEs

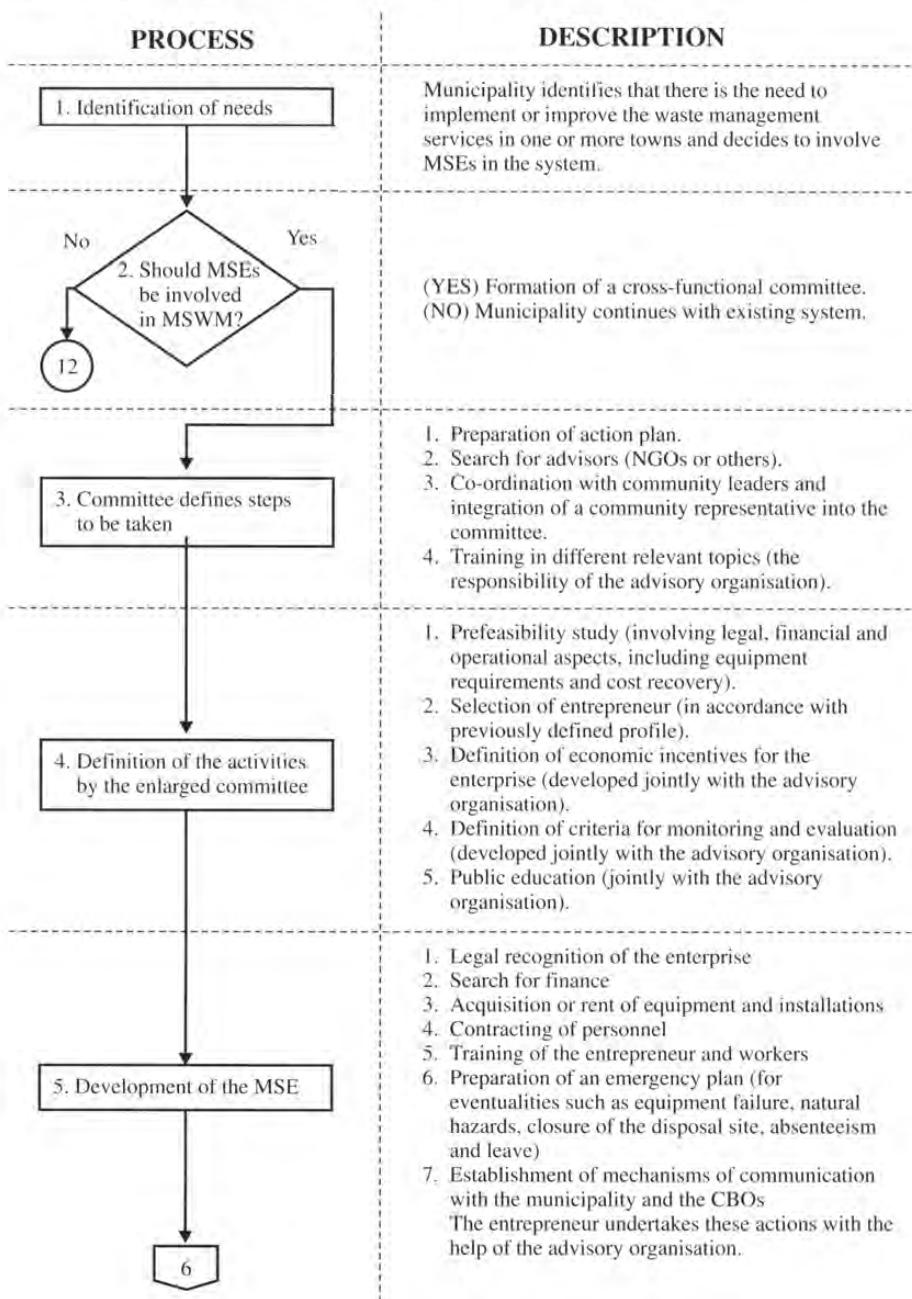
A3.1 Types of MSEs (IPES)

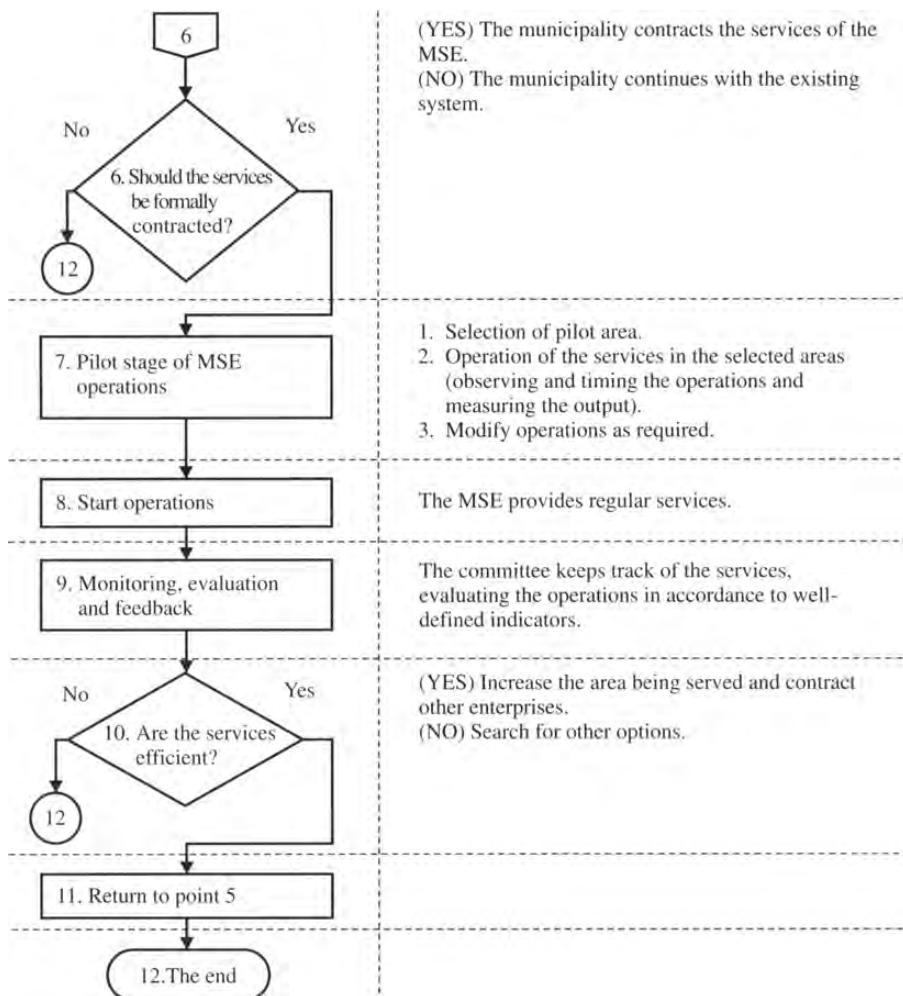
Although there are many different types of MSE, IPES has characterised two main types, as shown below (IPES, 1995)



A3.2 The ACEPESA process of involving MSEs

ACEPESA, an NGO in Costa Rica, has developed a flowchart to explain the processes by which MSEs can become integrated into municipal solid waste management systems (Rudin, 1998). The following flowchart is based on the ACEPESA model.





Annex 4

Important background information on MSWM

The purpose of this Annex is to provide some general background information about solid waste management, and some more specialised information on technologies that are suitable in congested areas, especially manually operated carts. There should be something of interest for all readers – those with years of experience in solid waste management, and those who are new to this subject and come from the fields of administration, sociology, economics or development studies. The information in this Annex will help readers who are concerned to specify or design the more technical and operational aspects of waste collection systems, but also those who do not understand the more technical aspects of this book. The sections are as follows:

A4.1 Why solid waste management is important.

What outputs or effects do we expect from solid waste management? Are false claims made about the need for solid waste management? Is it really necessary to collect all the waste from urban areas?

A4.2 Current issues in solid waste management.

What are the fashionable views about priorities in waste management, and how relevant are they? What are the common errors that can be avoided?

A4.3 Collection systems and service levels.

What are the alternatives for organising waste collection, and what are the potential problems and risks associated with each?

A4.4 Transfer and transport.

The book often mentions interfaces with municipal services and transfer - transferring waste from a small or slow collection vehicle into a larger and faster one. What are the different options, and their advantages and disadvantages? Simple illustrations are used to explain the different types.

A4.5 Handcarts and small collection vehicles.

So many of them are badly designed. What are the key features of an efficient and user-friendly cart?

A4.1 Why solid waste management is important

There are two major reasons why it is necessary to understand the reasons for undertaking any expensive activity such as the collection of municipal solid waste. One reason is that we may need to assign it a priority in relation to other activities that also make demands on scarce resources, and so must have a clear picture of what we can expect to achieve. The other reason is that we may need to modify ideas and methods that have been used elsewhere, and need to be clear about objectives in order to make the best decisions and make modifications that are appropriate to achieving the desired objectives in the local situation.

Health. It is very difficult to demonstrate the impact on the health of the general public of solid waste that is not collected. However it is clear that flies and rats breed in solid waste, and that these vectors spread many diseases. Where waste is dumped in drains, the resulting stagnant water often contains countless mosquito larvae, and the increasing incidences of malaria, dengue fever and filariasis underline the importance of eliminating such breeding places. The inhalation of smoke from burning waste and contaminated dust is linked to respiratory problems, and air pollution from poorly operated waste processing units is very serious in some cases. Drinking water has been polluted by solid wastes, resulting in both acute and long-term effects. Occupational illnesses and injuries afflict those who work with waste in unsatisfactory conditions.

It is probable that excreta disposal and habits of personal and food hygiene have more impact on public health than solid waste management, but there is every reason to believe that poor management of solid wastes causes considerable illness. It follows that it is important to collect all the waste that is generated by urban communities. Rats and flies that breed in low income areas can travel to more prosperous parts of the city, so a city should see itself as one unit and strive for complete coverage by waste collection services.

Environment. Air is polluted by smoke from burning waste (within urban areas as well as at dumping sites), and from unsatisfactory incinerators and waste processing units. Noise, dust and odours can also be added to the list. Water resources can be polluted by waste dumps and hazardous industrial wastes. Land, particularly sloping areas, can be rendered unusable by careless waste disposal practices or contaminated by hazardous industrial wastes. Plastic and paper, blowing over fields or attached to trees have an unwanted visual impact, and plastic bags have been blamed for the death of hundreds of goats which had eaten them.

These problems of air and water pollution in densely inhabited urban areas are particularly serious. To them should be added the flooding when drains are blocked by solid wastes, which is especially serious for congested settlements in low-lying marginal areas, where flooding can have a major environmental and economic impact. In such areas, if there is no waste collection service, a very high proportion of the solid waste finds its way to the drains.

Economics. Solid waste management is one of the main items of expenditure for many municipalities. It also is a major provider of public sector employment. Informal sector recycling is a source of livelihood for even bigger numbers in many cities.

Sadly, there are too many cases of solid waste collection or processing machinery that has been bought with scarce foreign exchange and has never operated properly, or ceased to operate before one tenth of the loan repayment period has passed. Such failures are often due to decisions made without reference to local conditions and technical factors, and to pressure from persuasive salesmen, and poorly conceived international aid projects.

Politics. There are many links between politics and solid waste. Failures of waste collection services have caused the downfall of at least one municipal administration, and strikes of waste management workers have resulted in considerable political discomfort in many more. Jobs in the sector have been given to supporters of successful politicians, and the voting power of certain urban communities has helped them to get waste collection services. Especially in densely populated areas, shortcomings in solid waste collection services become obvious very quickly. A change in the level of waste collection service provided may also have political repercussions. More and more central governments are calling for increased involvement of the private sector in municipal services such as waste management.

Donor support. Solid waste management has a fairly high profile in some donor assistance programmes, but in many cases the results are not positive. It is easy to imagine representatives of donor countries visiting a city and noting shortcomings in the waste collection service. With an inadequate understanding of the issues, this observation leads to the provision of sophisticated waste collection or processing equipment. Unfortunately this equipment may not suit the conditions of the recipient country and entail considerable further expenditure. As a result the country that receives the equipment is put at a further disadvantage, but the country that supplies the equipment protects its employment.

A4.2 Current issues in solid waste management

A broader view. Solid waste management is not just a technical issue, but it involves many other aspects including municipal administration and finance, social science, management science, accountancy, geology and many other skills. Unfortunately we still see walls between some of these disciplines, with very little contact (for example) between sociologists working with the informal sector, and municipal engineers. There is surely a need for working groups comprising experts from a number of disciplines. The benefits of community involvement from an early stage have been demonstrated again and again, but too often the term community

participation is limited to paying bills or putting waste out for collection, instead of sharing in decision-making and other aspects.

The need for a broader view is also demonstrated in the way decisions are made. Too often technical decisions are made without the advice of technical staff. Tenders and quotations may be accepted on the basis of the lowest purchase price, instead of going to economists and accountants to determine the most cost-effective choice considering the whole lifetime of the project or capital item.

Must it be "modern"? Methods and technologies that have been developed in industrialised countries for solving their particular problems should not be seen as the modern solution for all situations.

Solid waste collection trucks that operate in most industrialised countries have been developed for collecting

- low density waste, with large amounts of paper and plastic, and low moisture contents,
- from houses that are all easily accessible from a surfaced road,
- at a frequency of once per week (so that relatively large quantities of waste are picked up at each stop,
- using the minimum of manpower (since wage costs are high), and
- using sophisticated vehicles which can be easily repaired (because the manufacturers are in the same country and so the spare parts and expertise are readily available).

It can quickly be seen that none of these conditions apply in many tropical, low-income countries, and so such trucks are not suited to such conditions, whether they appear to be modern or not. A "modern" truck that is sitting in the vehicle depot awaiting a spare part (and requiring foreign exchange to repay its loan) is serving no useful purpose and not a good advertisement for the effectiveness of the municipality that owns it.

Street sweeping vehicles have been used successfully in some applications in industrialised countries, but they have been unsatisfactory in many low- and middle-income countries because of high maintenance costs and the unsuitability of the road conditions. Where labour costs are low it is usually preferable to use manual methods. The challenge with manual methods is to motivate the sweepers, and on this subject the private sector has some useful lessons to share.

Incineration with heat recovery is a "modern" method of waste disposal where the waste is dry and contains a high proportion of paper and plastic, but it has been a total and expensive failure in a number of low-income countries, where the waste does not burn satisfactorily.

The word "modern" can be a trap, and it has caught many municipal leaders. It is important to think more clearly, and not to be misled by emotive words.

The end, not the means. It is more important to consider what is achieved, than the method used to achieve it. It is more important to collect all the solid waste and to have a clean city than to have a fleet of beautiful waste collection vehicles that cannot cope with the problems of waste collection. If a city is cleaned using basic technology and labour-intensive methods there is no problem, in fact it is good that employment is created and local resources are used. Reliability is the most important consideration in a waste collection system.

Thinking is better than copying. The best solid waste management systems are those that are tailor-made for the particular situation, rather than those that are copied directly from another part of the world. Starting with local data and the objectives of waste management, various systems should be designed and compared in terms of economics. It is important to go back to first principles and think in a creative way. It is often helpful to study existing practices in the city under consideration and to think how existing practices could be developed and improved. Carts and vehicles that are used for other purposes could be adapted for carrying solid waste. Existing social structures might be employed to provide a reliable and affordable service.

Recycling - South and North In many cities in the south a high degree of recycling is carried out by the informal sector, at no cost to the taxpayer. The workers involved in separating and processing recyclable material are doing it simply to provide for themselves and their families. In Europe and North America, on the other hand, significant progress has been made in the recovery of resources from waste, but often at considerable public cost, and depending on

strong enforcement of the law and a high degree of environmental awareness among the general public. The two systems are so different, in terms of both technology and sociology, that ideas from the North should not be recommended for the South without very careful investigation and thorough pilot studies.

A4.3 Collection systems and service levels

The phrase *collection systems* is used here to refer to the way in which the waste is passed from the resident or generator to the collection service. There are various systems in use around the world, offering different degrees of convenience at different costs. Cultural factors also affect the choice of system. It is important to involve the community as much as possible in the selection of the system that is to be used for collecting their waste. Table A4.1 provides some information about the most common systems.

Table A4.1 - Key points concerning main collection systems

System	Description	Advantages	Disadvantages	
Shared		Residents can bring waste out at any time		
Dumping at designated location	Residents and other generators are required to dump their waste at a specified location or in a masonry enclosure.	Low capital costs	Loading the waste into trucks is slow and unhygienic. Waste is scattered around the collection point. Adjacent residents and shopkeepers protest about the smell and appearance.	
Shared container	Residents and other generators put their waste inside a container which is emptied or removed.	Low operating costs	If containers are not maintained they quickly corrode or are damaged. Adjacent residents complain about the smell and appearance.	
Individual		In these systems the generators need a suitable container and must store the waste on their property until it is collected. These requirements can cause problems if dwellings are small and containers unaffordable.		
Block collection	Collector sounds horn or rings bell and waits at specified locations for residents to bring waste to the collection vehicle.	Economical. Less waste on streets. No permanent container or storage to cause complaints	If all family members are out when collector comes, waste must be left outside for collection. It may be scattered by wind, animals and waste pickers	
Kerbside collection	Waste is left outside property in a container and picked up by passing vehicle, or swept up and collected by sweeper.	Convenient. No permanent public storage	Waste that is left out may be scattered by wind, animals, children or waste pickers. If collection service is delayed, waste may not be collected for some time, causing considerable nuisance.	
Door to door collection	Waste collector knocks on each door or rings doorbell and waits for waste to be brought out by resident	Convenient for resident. Little waste on street	Residents must be available to hand waste over. Not suitable for apartment buildings because of the amount of walking required.	
Yard collection	Collection labourer enters property to remove waste	Very convenient for residents. No waste in street	The most expensive system, because of the walking involved. Cultural beliefs, security considerations or architecture styles may prevent labourers from entering properties.	

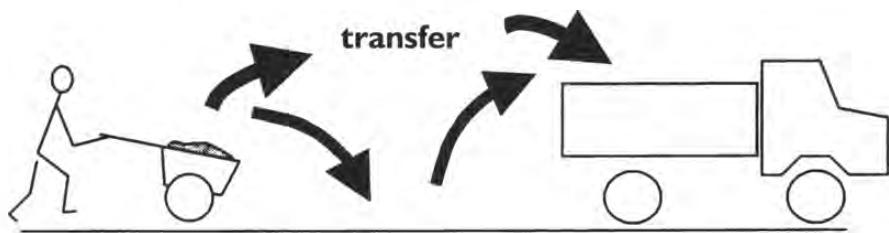
The term service *level* refers to the frequency of the collection. Some communities are accustomed to a collection seven days a week, whilst other collection agencies are striving to collect the waste from each source just once each week. If fly breeding is to be controlled, the waste should be collected twice a week in hot climates. Other factors to consider in determining the interval between successive collections are the odours caused by decomposition and the accumulated quantities. If residents are accustomed to daily collection it may not be politically feasible to reduce the frequency to twice a week.

In some cities waste is also collected on the rest day (Sunday or Friday), and in others the service operates only five or six days each week. Some municipalities collect or transport the waste at night, perhaps for cultural reasons, or because of the weather or traffic congestion.

A4.4 Transfer and transport

It is important to consider a solid waste management system as an integrated whole, and to consider the impact of any decision regarding one component of the system on the other components of the system. The suitability and cost of the method of transferring waste from primary to secondary collection depends on the design of the equipment used for each phase.

Figure A4.1
Sketch defining terms *primary*, *secondary* and *transfer*



primary collection

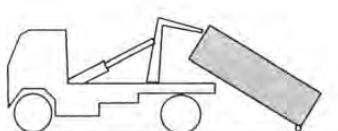
secondary collection or transport

The method of transferring waste from the primary collection cart or vehicle to the truck that takes it to the disposal site should be chosen with care, in order to avoid environmental pollution and injury and health risks to the workforce, and to keep the cost as low as possible. Transfer systems are briefly described in table A4.2

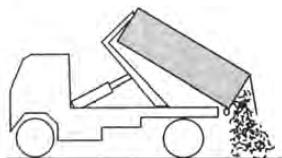
**Table A4.2
Methods of transferring waste from primary collection to secondary collection vehicles**

Method	Description	Advantages	Disadvantages
1. Dumping on road or vacant land	Waste is tipped out of the primary cart and left on the ground until it is loaded into the secondary collection vehicle. A variation is the dumping waste onto the ground beside a secondary container and then loading it into the container. Loading may be done manually or with a mechanical wheeled loader.	No capital costs	Loading is inefficient and unhygienic; residues of waste spoil environment, attract rats and flies. If waste is to be loaded into a truck this method can be expensive because the truck is delayed during loading, and so its daily productivity is reduced.
2. Direct transfer from small containers into larger container	Waste is carried in removable containers; waste is transferred into a larger secondary container by lifting and tipping the smaller primary containers. When full, the secondary containers are emptied into a large truck or taken away by skip lift or arm roll trucks. (Truck types are defined in figure A4.2).	Hygienic and efficient.	Bins suffer from damage and corrosion and must be repaired and replaced. Systems depend on specialised trucks which may suffer from breakdowns. Access for waste pickers is reduced, or they may scatter the waste around the containers.
3. Direct transfer into secondary vehicle	Waste is loaded manually or mechanically directly from primary collection cart into secondary collection vehicle.	No containers or piles of waste on the ground.	Expensive delays are caused by the need to synchronise the primary carts with the secondary vehicle. One or the other must wait, reducing productivity.
Split level transfer This arrangement can be used with methods 1, 2 & 3 above, in order to save time and effort. (See figure A4.3)			
a. Ramp. The primary collection vehicle is pushed up a slope until it is high enough for the waste to fall by gravity into the secondary vehicle or container	Rapid and hygienic transfer from simple carts	If the ramp is steep it must be long, requiring considerable space. If it is short it must be steep, restricting the weight that the primary vehicle can carry.	
b. Pit The secondary vehicle is driven into a pit, so that waste can be tipped from a primary cart into it.	No restriction imposed on the size of the primary cart.	If the pit is not well drained and regularly cleaned, it may become filled with water or waste, or both.	
c. Using natural slope to allow split level transfer.	Problems of (a) and (b) do not arise	(If the area has many slopes it may not be suitable for some types of cart.)	
d. Specially constructed transfer station (See Coffey 1997)	Can be clean and efficient	Only economical in densely populated areas	

Figure A4.2
Types of container system

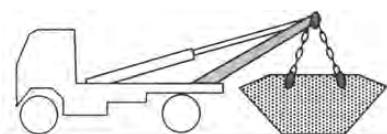


Lifting container onto truck

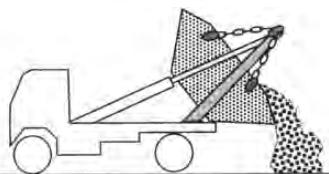


**Unloading waste
at disposal site**

a) *The concept of the arm roll truck*



Lifting container onto truck

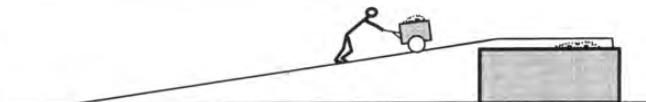


Unloading at disposal site

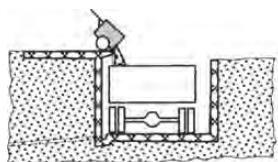
b) *The concept of the skip lift truck*

Figure A4.3
Types of split level transfer stations

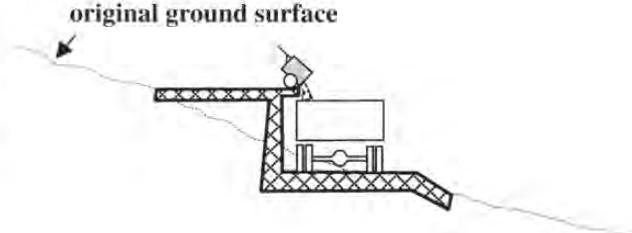
a) Ramp, which may require a large area or be so steep that it restricts the load that can be carried



b) If a pit is used for split level transfer it must be well drained and kept clean



c) If the ground surface is sloping, it may be possible to construct a split level transfer station without a ramp or a pit



A4.5 Handcarts and small collection vehicles

There are many types of cart and small collection vehicle, and very often it seems that they are designed and built locally, with very little reference to experience elsewhere. This repeated "reinventing of the wheel" leads to the same mistakes being made again and again, and to designs which are far from optimum. This section discusses the selection and design of such vehicles.

A4.5.1 Selection of small primary collection vehicles

Three common types of primary collection vehicle are

- the handcart which is pushed by the operator as he walks along,
- the pedal tricycle with a tray or box in front of or behind the operator, and
- animal-drawn carts, often pulled by donkeys.

Several types of handcart and pedal tricycle are sketched in Pfammatter (1996), but many of the types shown have serious disadvantages. The cost and operational data that follow have been provided by Bushra (1998) and refer to Egypt, but would also be useful in other situations as a rough comparison.

The handcart has a very limited capacity in terms of the volume it can carry and the distance it can move (0.25 to 1 m³ with a maximum range of 1 km.). However they are very cheap, costing between \$300 to \$500. They are usually operated by one person for primary collection and street sweeping.

They have no negative impact on the environment. Their lifetime depends very much on the design and the material they are made from, and may be as little as one year.

Pedal tricycles may carry loads of up to 1.5 m³, and their range can be more than that of the handcart, particularly because of their higher speed when empty. Such tricycles can cost up to \$750, and have a useful lifetime of about two years. The pedal tricycle does not have any negative impact on the environment.

Animal-drawn carts are commonly used for waste collection in many places in the developing world. Until recently they were used by Cairo Municipality. They can carry up to 1.5 m³ and have a range of up to 7 km. A cart costs between \$500 to \$750, but the cost of buying, feeding and caring for the animal must be added to this. Animals involved in this type of work often have a relatively short working life. The only negative impact on the environment is the excreta from the animal. The lifetime of a cart may be similar to that of the handcart.

Simple powered vehicles should be considered where longer distances require larger payloads and higher speeds, or where slopes demand extra power.

One form of this type of vehicle is the motorised tricycle, which may cost around \$1500 and last for three to five years. Some types are based on small motorbikes.

Trailers pulled by agricultural trailers are often used for waste collection. The tractors may be small, two-wheeled power tillers, or larger four-wheeled models. Trailers can be left at various points and then towed when full to a transfer station or disposal site. Tractors move slowly and may cause traffic delays in some cases. Though tractors are relatively simple machines, their lifetime may be shortened if they are always running at close to their maximum speed. Trailers typically carry about 4m³, cost between \$1000 and \$1500, and last for three to five years

A wide variety of truck types are used for collection of municipal wastes. Factors to consider in selecting the type of truck are:

- The weight of waste that the truck can actually carry (and this may be restricted by the volume of the body),
- The cost of purchasing and operating the truck, including fuel and maintenance,
- Possible delays in obtaining spare parts,

- The suitability of the vehicle for the local roads, considering the width and congestion of the roads, and the condition of their surfaces in wet and dry seasons,
- The ease with which the vehicles can be loaded and unloaded.

It is a good general rule to use makes and types of vehicles that are widely used in other sectors of the economy, in order to benefit from existing experience in operating and maintaining them, and to reduce the problems of obtaining spare parts. Careful costings should be made to compare the unit costs of different types; it is not helpful to compare only capital costs.

A4.5.2 Criteria for the design of handcarts

How much can it carry? In many situations the operator of a handcart wants to carry as large a load as possible. If (s)he is required to move the material some distance - say, over 500 metres - it will be preferable to minimise the unproductive travelling time by maximising the load, so that the journey is made as few times as possible. (If the containers into which the waste is to be put are close together, this argument may not apply since the journey to the unloading point is insignificant.) A simple test of this fact is to observe how labourers use their carts - usually they keep piling waste onto their carts until they are overloaded, indicating that the labourers regard the capacity of the cart as insufficient.

A labourer can push at least 150 kg of waste in a well-designed and maintained cart on a reasonable level surface (based on the author's observations in Iran and Chad). If the density of the waste is known, it is possible to calculate the volume of waste that weighs 150 kg. This should be the target capacity for a cart which is to be used for primary collection from houses. If a cart is to be used for street sweeping it may be appropriate for the capacity to be less because:

- (i) the waste takes more time to collect than if it is picked up directly from households and so it may not be possible to collect 150 kg during the day's work, and
- (ii) there may be community storage containers at frequent intervals so that it is not necessary to carry the waste over a long distance

How is the waste transferred? Too often one sees labourers tipping the contents of their carts onto the ground and then scooping the waste up into the container or vehicle that will take the waste to the disposal site. This practice is inefficient (wasting time), unhealthy (forcing the labourer to touch or have close contact with the waste), and polluting (often some of the waste is left on the ground or is scattered by the wind). There are two simple ways of avoiding this problem-

- ⇒ One solution is to have a split-level site so that waste can be tipped directly from the cart into the bulk container. (See figure A4.3.)
- ⇒ Another solution is to containerise the refuse in a number of bins that are small enough so that they can be lifted and tipped into the bulk container or transport vehicle. The maximum weight that can be lifted in this way depends on the strength of the labourer, the convenience of the lifting position, and the height to which the container must be lifted. If there are six containers on a cart, and the weight of refuse collected is 150 kg, then the labourer must be required to lift in each bin $150 / 6 = 25$ kg of waste, to which must be added the weight of the container. (This assumes that the weight of refuse in each container is equal, which is unlikely.) If lifting of loads of up to 35 kg is not acceptable, it is necessary to either reduce the total load carried on each trip (increasing unproductive travelling time), or increase the number of containers to eight - unless there is always someone at the unloading point who can help with the lifting and emptying of the containers.

General design features. If the cart is to carry a number of bins, the size and the shape of the bins should be such that the cart is not too wide or long, so that manoeuvring it is not difficult. The plan dimensions of the bins should be large enough that big items of waste cannot bridge across the rim and prevent the efficient utilisation of the bin's capacity. Bins that are rectangular in plan may be difficult to pack if the dimensions of large items in the waste are larger than the smaller horizontal dimension of the bin. Square and rectangular bins may be easily deformed and

develop dangerous jagged projections at the corners. Bins that are circular in plan do not fit together well – considerable space is lost between the bins, requiring a larger cart and providing more opportunity for waste to fall between the containers.

The pushing handle should be at a convenient height and orientation so that the necessary horizontal force can be provided easily, the labourer's back can be straight, and any lifting is convenient.

Wheels. The wheels of a cart are of great importance. Several features should be considered:

- ⇒ **Number.** If the cart has only two wheels, the operator is always required to apply a lifting force, adding to the fatigue and perhaps causing back injuries. Therefore at least three wheels are required, but it must be possible to tilt the cart so that only two wheels are in contact with the ground in order to turn the cart. This can be done by having one axle close to the centre of gravity so that the cart can be tilted by lifting or applying body weight. Carts that have three or more wheels may roll by themselves if left on sloping ground, but this is not generally a problem. The advantages of having four wheels are that the cart is more stable and that a wheel can be carried over a hole in the road surface, rather than going down into it.
- ⇒ **Size.** Large wheels are better on rough surfaces, and, with poor bearings, cause less rolling resistance. On the other hand, large wheels are heavier and more expensive, and may obstruct the removal of containers.
- ⇒ **Contact surface.** A wide rim is necessary on soft ground. A soft contact surface – such as a pneumatic tyre or solid rubber tyre – reduces the difficulty of pushing on stony or rough ground, but maintenance is considerably more. Manus Coffey recommends the bead section of used vehicle tyres because they are made from good quality rubber, and are easy to obtain in good condition from scrapped tyres.
- ⇒ **Bearings.** Simple journal bearings are rarely lubricated as they should be, so one often sees severely worn wheels at strange angles because of wear between the shaft and the hub. Ball or roller bearings are more expensive and must be protected from dust, and should always be specified for the wheels that carry the main load.
- ⇒ **Durability.** Bicycle wheels are generally not strong enough for this kind of duty. Motorcycle wheels have proved well suited, but they are likely to be expensive. Prototypes of new designs of wheels should be thoroughly tested before being implemented on a large scale.

It is important to design and specify all items of equipment carefully – even simple equipment such as brooms, other tools, and carts. These items are often used in large numbers, and so the impact of a more efficient or a more durable design can be very significant in economic terms.

Annex 5

The range of tasks for which MSEs may be suitable

Section G outlined the basic principles which indicate the tasks for which MSEs may be suitable. Much of the text has concentrated on using MSEs for primary collection of domestic wastes. There are, however, many other waste management tasks for which MSEs may become involved. This Annex discusses many of these other tasks.

1. Primary collection from houses

In most cities and large towns there are at least two distinct collection systems. The services differ because of the influences of economic level and access problems. In some cases residents that pay more tax receive a better service. Poor residents who pay little or no tax may be seen as the lowest priority, particularly if they have little political influence, and so, if the resources are insufficient, it is the poorest who may be left without a service. Waste collection workers often prefer more prosperous neighbourhoods since the value of the items that can be recycled is more.

Problems of access compound this difference. High-income housing is normally located on wide, well-maintained roads, whereas the large unplanned housing areas are usually characterised by narrow, unpaved, muddy roads that also serve for wastewater disposal. These access routes are too narrow for conventional waste collection trucks to enter. Such areas are often built on marginal land which is prone to flooding or at a very steep slope, adding to the access difficulties. Another disadvantage of squatter or unplanned housing is that such areas are often illegal and so outside the tax system and the official responsibilities of the municipal authorities.

Although there may be many reasons why such areas do not have a solid waste collection service, there are many reasons why they *should* have one. The small plot size of the average dwelling means that there is little chance of disposing of the waste on site, by composting or burying. A lack of hygiene education worsens the situation still further. Food cannot easily be protected from houseflies, and so potential health impacts are very serious. Waste dumped in the alleys further impedes drainage and access, and adds to the smell and unpleasanliness.

In many cases MSEs have stepped in to improve situations like these. With labour-intensive methods they are able to negotiate the narrow lanes. If the workers live in, or are familiar with, the area, they are more able to gain the co-operation of the residents. In informal settlements where the municipality has no mandate to collect taxes or provide a service, an MSE may be able to collect a fee from each house and so provide the much-needed service.

MSEs often do not have the capital to buy large trucks, and so confine themselves to labour-intensive operations. It is therefore necessary to balance the primary collection undertaken by the MSE with a secondary collection or transport service to pick up the waste from a transfer area and take it to the disposal site. There are unfortunately too many cases in which waste has been collected by a successful primary service, but left to accumulate in urban areas because the promised secondary removal system never materialised. In Central America the MSE often provides the secondary transport also.

Another opportunity for MSEs may be at the other end of the economic spectrum. If the waste collection service provided by the municipality is based on the emptying of large shared (or communal) containers, prosperous residents may be willing to pay extra to have the waste collected from their front doors, or even inside their yards, and carried to the communal containers. Usually such a service is provided by individuals or enterprises that contract directly with the householders, but it could also be provided by contract to the municipality. An added benefit to the providers of this service would be the opportunity to sort through the waste and recycle anything of value. This sorting of the waste reduces the number of houses from which one

worker can collect waste in one day, but the reuse of materials taken out of the waste stream reduces the amount of solid waste requiring transport and disposal, and generates employment in the recycling industries. Recycling is discussed further in Annex 7.

One further type of housing area where MSEs could operate is new estates or areas that require new collection vehicles and personnel. In many cities it is difficult to reduce the municipal sanitation workforce, and there would be strong resistance to any move to replace municipal workers with private sector workers. In such situations it may be feasible to introduce private sector operations only to new areas, so that existing municipal employees do not feel threatened.

2. Collection of commercial and institutional wastes

Shops, offices and institutions typically produce large quantities of certain types of waste, such as good quality, clean paper (which can be repulped and used again to make paper), and food waste (which can be fed to animals or composted). It is therefore wise to encourage MSEs to collect such waste if they plan to recycle it in these ways, so that the burden on the general waste collection service is reduced. Where there are shared (communal) bins for household waste, neighbouring shops and offices will use them also, so it would be difficult for an MSE to make a contract involving payment with such generators since they can use the communal containers at no extra charge.

3. Collection of healthcare wastes

In most cases, MSEs should not become involved in the collection of wastes from hospitals and other medical establishments.

Healthcare wastes are generated by small medical establishments such as dental surgeries and clinics, as well as by hospitals. A large proportion of the waste from hospitals is no more hazardous than household waste, provided that the infectious and hazardous wastes have not been mixed with them. It is quite acceptable that MSEs should collect the domestic-type wastes from medical establishments, if these wastes contain no hazardous wastes mixed with them. Unfortunately, such separation of the hazardous waste is rarely practised, and where the hazardous wastes are not kept separate, all the wastes must be regarded as hazardous. Extra care needs to be taken with the hazardous wastes to protect those who are handling the wastes, and also the general public. Sometimes the hazardous wastes are incinerated on the hospital premises. However, if such wastes are to be transported away from the hospital site, extra precautions should be taken to ensure that the wastes are always delivered to the official treatment or disposal point, without causing risk to man or animal. If there is no supervision the wastes may be dumped illegally at a short distance from the hospital, to save time and effort. Some wastes are attractive to recyclers, but the improper reuse of these wastes may put the users or others at risk. A contractor who is concerned only to maximise his profits, and who is unaware of the risks posed by some healthcare wastes, may prefer to dump the wastes closer to the point of generation at an unauthorised location, or may allow the wastes to be picked over in a dangerous way. Therefore, in most cases, it is wise not to entrust the transportation of healthcare wastes to MSEs.

4. Collection of industrial wastes

Many industrial wastes are less hazardous than domestic wastes, but some are dangerous, so that their collection and disposal should be carefully monitored by the competent authorities. Acceptable disposal methods for hazardous industrial wastes are usually very expensive, so producers of such waste are likely to give the contract for taking away their waste to the lowest bidder. Often the cheapest bid involves disposing of the waste in an unsatisfactory way (such as dumping it in adjacent domestic containers). To prevent this happening there should be a legal requirement to enable inspectors to check what happens to all loads of such waste. In addition, the generator should retain responsibility for the waste, even after it has been handed over to the

transport contractor. Until such laws are enacted and enforced, effort should be concentrated on training all involved in managing hazardous waste, so that they are aware of the risks associated with the materials they are handling.

Many industries produce large quantities of scraps and wastes that are of known quality and composition and free from contamination. It is important for environmental and economic reasons that such wastes are recycled. MSEs can play an important part here, but contractual arrangements are generally made with the industries directly, and not with the municipal authorities.

Large quantities of inert wastes can cause environmental nuisance if they are dumped in unauthorised places. If no legal safeguards are available, it might be advisable to keep the transportation of industrial waste within municipal operations. Since the quantities of industrial wastes from individual sources are generally higher than for domestic wastes, industrial waste MSEs should generally have larger vehicles such as trucks, or (for short distances) trailers pulled by tractors, or carts drawn by animals.

5. Street sweeping

The cleaning of streets and public open areas are very suitable tasks for MSEs, because the economies of scale are small (or even negligible), and supervision and motivation are the key to cost-effective operations. (Sweeping machines should not be considered in low-income countries because of their high cost, maintenance requirements, and lack of flexibility. Road sweeping machines can quickly damage poor asphalt surfaces.) The emptying of street litter bins could be a separate contract – because it has a bigger transport component.

6. Drain cleaning

The cleaning of silt and solid waste from drains should be linked with street sweeping. There are too many stories of street sweepers sweeping waste into drains and drain cleaners leaving excavated silt and wastes on the road. Wastes left on the street quickly find their way into drains, causing blockages which lead to flooding, muddy conditions and mosquito breeding. These experiences are strong reasons for contracting with the same enterprise to undertake both tasks in a specific locality. Drain cleaners need special tools, but the tools are not expensive, and can mostly be fabricated locally.

7. Transport to the disposal site (secondary collection)

Waste collection may consist of one, two, or even three stages. Nearly always all stages except the first rely on mechanised transport because of the distances and quantities involved. It is important that the secondary stage is co-ordinated with the primary stage to ensure that collected waste is not left at the transfer point and that the method of transfer from the primary vehicles to the secondary is convenient for both. In Central America, India and elsewhere, MSEs undertake the secondary transport also, using trucks or agricultural tractors with trailers.

8. Transfer operations

The transfer of wastes that are collected in a small vehicle (such as handcart or a tricycle) to larger vehicles or containers can be accomplished by MSEs. (Figure A4.1 defines the term *transfer*) This transfer is undertaken in a variety of ways, and MSEs can have useful roles in most types.

The simplest form of transfer arrangement is a pile of waste on the ground, which is loaded manually into a truck when it passes by. An MSE could provide the labour to undertake this work. The labourers would travel with the truck. This method is obviously unsatisfactory from environmental and health viewpoints. It appears to be a very cheap method, but the delay to the vehicle can make it more expensive than other alternatives.

The next form of transfer point is a container which can be lifted onto a truck, such as skip-lift or arm-roll (hook lift) containers. At such a location MSE labourers can assist with loading the containers and keeping the area clean. If there is sufficient land area it may be possible to incorporate the separation of recyclable materials from the waste during the transfer operation, the waste being sorted on a concrete platform before it is loaded into the container. An MSE involved in such work might do the work at no charge to the municipality, or even pay the municipality a small fee for the opportunity. There should be a formal contractual relationship with the municipal authorities so that the MSE can be discharged if it fails to keep the site clean and maintain environmental standards.

Larger transfer stations have a split-level arrangement so that waste falls directly from the primary collection vehicle (such as a handcart) into the secondary vehicle or container. In such an arrangement there is little opportunity for sorting and recycling, unless an intermediate platform is constructed. MSEs can be engaged to manage such a site and keep it clean. In general the capital requirements for acquiring the land and constructing the site are beyond the resources of MSEs.

9. Processing or treatment

Large sums of money have been wasted on large mechanised systems for treating solid wastes in low-income countries. Most of these systems have been too expensive and unreliable, and some are totally unsuited to the characteristics of the waste materials. (Examples of such processes are incineration, composting, shredding and baling.) On the other hand, large numbers of people – who would otherwise be destitute – are employed in simple manual processing, composting and recycling. These small-scale, labour-intensive operations generally work completely independently of the municipal administrations. Since most of these activities pay low wages and do not make significant profits, it is recommended that municipal administrations limit their involvement to minimising environmental pollution, and working together with these operations in a spirit of co-operation.

10. Disposal

The most common methods of disposal in most low- and middle-income countries are open dumping and open burning, with very little control. The resulting pollution and wastage of land are regrettable, and possibly dangerous. The alternative is sanitary landfilling - a method of disposal that minimises environmental pollution by using modern engineering techniques and informed day-to-day management. There is a range of options between the uncontrolled, burning, open dump and the most sophisticated sanitary landfill.

The construction and conventional operation of a large sanitary landfill where solid waste is disposed in a well-managed way, is a clear example where there is an economy of scale. The unit cost for disposal can be defined as the total costs of acquiring, constructing, operating and restoring the site, divided by the total amount of waste that it can accommodate. If the same type of construction work is needed to prepare each site and the operational practices are the same, the unit cost for the large site will be significantly less than for the small site. However, certain management and operations tasks involved in running a sanitary landfill may be very suitable for MSEs.

- a) Small sites (up to 100 tons per day) can be operated largely by manual methods, so it is possible that an MSE could be contracted to operate such a site. A very important issue is the training of the manager of the site, concerning how the site should be managed and how special types of wastes should be handled. This type of arrangement would require regular visits from a municipal inspector, so that satisfactory standards would be maintained. Small sites might prove more controllable than large ones.
- b) On larger sites a number of tasks could be subcontracted to MSEs.
 - Recycling There have been several schemes (for example in Harare, Zimbabwe) to use MSEs for extracting materials such as paper, plastic and metals from the

solid waste on disposal sites. If the employees of the MSE are clearly identified (by overalls and badges), it is possible to control access to the site. Any unacceptable behaviour (such as dangerous activities near machinery or leaving piles of recyclables on the site longer than the allowed time) can be penalised according to the terms of the contract.

- Keeping the site clean. Paper and plastic are blown around the site by the wind, and should be trapped by litter nets or screens. An MSE could be responsible for collecting such wind-borne wastes.
- Gardening Sanitary landfills should present a pleasant external appearance. One way to improve the appearance of a landfill is to plant flowers, shrubs or trees around its perimeter. An MSE could undertake this work.
- Site road maintenance. An MSE could be responsible for maintaining temporary site roads – filling in holes with stone or construction debris and modifying routes as the site is filled.

The overall management of large sites should not be entrusted to MSEs as a long-term or ultimate measure, because of their lack of capital and probable lack of training. As solid waste management systems mature, the charges for disposal increase – because higher standards of disposal cost more and because improved enforcement and awareness mean that it is realistic to expect producers to pay the true costs of disposal. Therefore considerable sums of money will be involved in waste disposal. MSEs do not have the capital to develop high standard landfills, and if they are given a contract to operate an existing site and collect fees, they may divert large sums of money illegally to themselves. If they are caught in such illegal activity or failing to meet environmental standards, it would be difficult to penalise them financially or recover the costs of restitution of any environmental damage.

It is very important to emphasise that the public sector (municipality, or regional waste management or pollution control authority) should maintain responsibility for the supervision of disposal sites. Most private companies cut corners or do less than they should if they are not properly supervised, and penalised if they fail to meet contractual obligations. Even if waste disposal is fully contracted out, there must be waste disposal expertise in the public sector to set and maintain standards and advise on specific issues, such as site selection.

11. Fee collection

The collection of direct charges for solid waste management services is difficult because of the difficulty in enforcing payment. (If an electricity bill is not paid, the power supply can be cut off and this quickly motivates the people affected to pay. But if a solid waste management charge is not paid, and the offender does not have his waste collected, he may dump his waste around the corner so that the neighbourhood is penalised more than he is.) Enforcing payment is more difficult when the collection of the waste is from a shared container rather than from each house.

If an MSE is contracted to collect waste from each house, the waste collectors develop some form of relationship with the residents, and so they may be effective in collecting a monthly or weekly fee. In this connection it is important to remember two points:

- a) The costs of waste management are more than the primary collection service, and so a significant part of the fee is to cover the costs of secondary transport, disposal, supervision and administration. Either there should be two fees, or the MSE should pay much of what it collects to the municipality.
- b) The municipality should still be ready to use its authority and powers to enforce the payment of the fees to the collection agency, even if it is not collecting the fees itself. Cases of non-payment would be reported to the municipality by the MSE, and the municipality should take the necessary action to recover the unpaid fees.

12. Other related tasks

It should be noted that there are still other activities related to the wider realm of municipal service provision (outside solid waste management), that are well suited for involvement of MSEs. The list of activities suitable for MSEs depends on local conditions. These tasks include:

- the construction and emptying of pit latrines, soakage pits and septic tanks,
- cleaning sewers,
- the maintenance and management of public toilets,
- the maintenance of parks, gardens and roadside verges, and
- the maintenance and operation of street lighting.

Annex 6

Impacts of Attitudes and Relationships on MSE involvement

by Mansoor Ali and Mariëlle Snel, WEDC, UK

This Annex discusses some of the important social issues which municipal governments could consider in preparing programmes for micro- and small enterprises in solid waste management. The understanding of social issues is important since any change will largely depend upon people, and how and what they think. Traditionally, households have received little attention in solid waste management projects, with the exception of the question of how much they are willing to pay for a proposed service. There are however a number of other social issues which should be considered before launching a micro-enterprise programme in solid waste management. For example:

- the attitudes of the public who will benefit from the proposal, and their readiness to participate;
- workers in microenterprises, their attitudes and awareness;
- attitudes of municipal officials towards the MSEs and the populations to be served;
- the relationships between the different groups concerned, and
- gender issues.

Social development experts are trained to study all of these issues in depth, and their contribution may be as significant as that of planners, engineers or solid waste management experts.

A6.1 The importance of attitude and values

It is important to identify and understand various attitudes, incorporating them into project design, and observing *interlinkages* between attitudes, values and beliefs from various perspectives. These are important for developing sustainable MSE programmes in the solid waste management sector. Through an appreciation of various attitudes and values, concrete and focused solutions can be found in which *all* groups may be satisfied with the results. For example, a policy level intervention to recognise and legitimise an MSE by the official agency may fail if the entrepreneur believes that the proposed integration may create unnecessary interference in his business. Similarly municipal officers may not be able to collaborate effectively with entrepreneurs if they perceive them as unreliable and inefficient. An understanding of the viewpoints and anxieties of each actor is important.

Attitudes may be formed by prejudice and ignorance, or by experience and evaluation. The attitude towards waste collectors may be based on the society's system of values, particularly concepts of social class or caste. Social barriers could cause problems for MSE workers seeking to

- collect fees for waste collection,
- cross the boundary of a property to collect waste,
- negotiate with residents or employers
- complain, or
- assert their rights.

The success of an initiative to involve MSEs may depend on the attitudes of the municipal official who is selected to work with the MSEs. If the official regards himself as socially superior to the representatives of the MSE to the extent that he does not wish to talk to these people, the opportunities for jointly solving problems will be few, and so problems may not be solved. Similarly, if the official is very conservative in outlook and opposed to change, and unwilling to consider that the involvement of MSEs could achieve improvements, he may try to prove himself right by erecting bureaucratic barriers to stop the MSEs. How different it would be if the official was always welcoming towards MSE representatives and enthusiastic to make the relationship successful.

The attitude of a municipal officer can have a significant impact on the health of employees and on the risks they face. The priority given by a municipal officer towards health and safety in the waste collection service depends on

- his understanding of the issues,
- the value that he attaches to the well-being of his subordinates, and
- his fears of legal action or responsibility if one of his subordinates is affected by an accident or a work-related illness.

If a municipal officer or manager is seriously concerned about health and safety issues, this concern will affect others working with and under him, and will result in safe working procedures and the use of protective equipment. Actions grow out of attitudes.

The willingness to pay fees for waste management services depends upon a number of factors, and not just income and expenditures. Satisfaction with the service and perceptions of the person or organisation to which payments are made are also important. For example, in a number of South Asian cities residents privately pay a monthly or weekly amount to municipal sweepers for primary collection of solid waste – a service not formally provided by the municipality. Residents pay in one or more of the following ways:

- a regular and agreed amount;
- additional payments against additional work;
- gifts and tips; or
- payments for festivals.

The same residents might be unwilling to pay the same amount for a less immediate service.

An important element of project design may be a structured programme to gradually change key attitudes.

A6.2 The assessment of attitudes

Attitudes cannot be directly measured. It is usually possible to determine attitudes from what people say (and their gestures and facial expressions - or *body language*), their evaluations and priorities, and their responses to people or situations.

Social development experts have developed a range of methods for assessing attitudes including surveys, participatory discussions, case studies and institutional histories. Describing future or past scenarios and assessing reactions of the respondents can be another way of testing attitudes among groups. Such measurements are particularly important at the planning stages of an intervention. The findings are useful in analysing a broad range of issues affecting policy and planning, such as willingness to pay for a service and user satisfaction.

It may be important to review the findings through direct observations. The findings from one area may also be compared with those from a similar area, where there has been no intervention.

A6.3 Groups and their perspectives

Attitudes and values are also influenced by the group to which a person belongs and the groups with which he interacts. The following is a brief list of the main actors in both formal and informal sectors (in the South Asian context) and some examples of their perspectives. These perspectives give an indication of their overall viewpoint towards the potential development of microenterprises.

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- 1 *Institutional histories means developing a time line of related developments, reasons for change and their impacts.*
 - 2 *Note that MSEs in Latin America are often registered and formal. In the South Asian context, MSEs are often informal actors.*

Actors	Role	Possible Perspectives regarding MSEs
Public Sector		
<i>Municipal Officers</i>	Municipal officers are responsible for the provision of waste management services and the associated administration (financial, personnel etc.). This may involve actually operating the services and/or engaging and supervising contractors.	If municipal officers have no past experience of working with MSEs, they may need time to accept the idea of MSE involvement and become committed to making the relationship with MSEs successful. There may be barriers of social class. The relationship will operate in the best way if there is a degree of mutual trust.
<i>Municipal sweepers</i>	These individuals are responsible for sweeping roads, streets and public areas. In addition they often collect waste from middle- and high-income neighbourhoods as an unofficial activity to gain extra income privately. They also separate recyclable items to boost their personal incomes.	In general, municipal labourers oppose private sector involvement because they fear losing their jobs or being obliged to work in a new way. (In many cities municipal labourers work shorter hours and under less pressure than their private sector counterparts.) If sweepers are concerned that the introduction of MSEs will reduce their opportunities for earning extra income, they can be expected to oppose the MSEs, perhaps by strikes, intimidation of MSE personnel on an individual level, or asking residents not to co-operate with MSE workers. Their perspective might be radically different if the sweepers were to be integrated into the MSEs.
Formal Private Sector		
<i>Medium and large enterprises</i>	Companies providing SWM collection services on a relatively large scale, replacing municipalities as providers of the service. The area in which they operate may be limited by the municipality, but they may hope to expand their operations in the future.	These enterprises may feel that MSEs might restrict their opportunities for expansion and undercut their charges, and so for these reasons oppose the introduction of MSE services. Such opposition might be avoided if the role of MSEs is clearly different – for example collection in areas where the larger enterprises do not wish to operate (perhaps because their vehicles cannot go there).
Informal Sector		
<i>Private (self employed) sweepers</i>	They provide a primary waste collection service to areas where the municipal service is not available (or ineffective). They collect payment directly from the households they serve.	They may see MSEs as stronger competitors. They may also explore the opportunities of being employed by MSEs.
<i>Itinerant collectors</i>	These individuals purchase all types of materials ranging from paper and glass, to metal and plastic, usually directly from households. The items they collect are cleaner and in better condition than recyclables that are picked from mixed waste.	Itinerant collectors may not be effected by the formation of MSEs for primary collection, since the items they collect are separated from the waste that is put out for collection. Since they would not be affected by primary collection MSEs, they would not oppose them.

Actors	Role	Possible Perspectives regarding MSEs
Street Pickers	Waste pickers usually collect pieces of recyclable waste found in street bins or around the locality, and occasionally they receive accumulated waste from households for a small fee.	Whether this group supports primary collection MSEs will depend on whether they benefit from them. The newly formed MSEs may reduce waste quantities on streets and restrict access of pickers. If the method of collection of the MSE favours sorting of the waste, the quantities of recyclables left for the street pickers may be less.
Dump Pickers	Dump pickers work on disposal sites, sorting through the deposited waste looking for items or materials that can be sold.	This group may not be effected by primary collection MSEs. They would resist any changes to management of the disposal site that restrict their access or reduce the quantities of recyclables available to them. In some situations dump pickers exert very strong control over all operations at the disposal site.
Others		
Residents	These individuals may receive solid waste collection services, and the streets where they live may be swept. They are usually charged for this service either directly or indirectly.	Their attitude towards MSEs will be strongly influenced by their level of satisfaction with the existing services. If they feel that the existing service is unsatisfactory, inconvenient or too expensive, they may welcome the introduction of an MSE service. Individual residents who get extra services from municipal labourers may be suspicious of changes. If the introduction of MSEs is accompanied by an increase in direct charges, there may be opposition. Some may oppose certain forms of technology (such as donkey carts or noisy handcarts). If the new MSE service is regarded as less convenient – for example if residents are accustomed to throwing their waste onto the street or into a community container at any time of day or night, and they are required to keep their waste for collection at certain times – there may be opposition.
Politicians	These are individuals elected by residents to represent their interests at the local or national government level.	Providing a cleaner - and therefore healthier - city is one of the promises politicians often make to the public to enhance their chances of being elected. The introduction of new MSE services may make the city cleaner and healthier. Therefore politicians may perceive MSEs as being helpful to their political ambitions. On the other hand, if politicians fear that the introduction of MSEs may provoke municipal strikes, reduce the number of votes they receive, or be to the favour of a political rival, they may oppose MSEs.

The table reveals how individual perspectives change according to role or position. Inevitably, those who benefit most directly in terms of power or financial gain usually view MSEs in a positive light.

Our point here to reflect on is whether the various actors are involved *directly* or *indirectly* with MSEs. In the box on municipal officers, we note that a relationship of trust needs to be developed with MSEs, and this in time can evolve into a successful ‘contractor-client’ relationship. There are various ways in which this relationship can be built, including

- discussing together issues of common concern, in workshops or informally, and
- visits by the municipal official concerned to the office and working area of the MSE.

Starting with a small-scale pilot project is a good way to begin this relationship, since the consequences of misunderstandings and problems are not large.

A6.4 Attitude in the context of the relationship between residents and the service providers

As discussed above, attitudes and values are influenced by relationships. This section mainly discusses the attitudes in a typical user-provider relationship, where the providers may be the municipal agencies and/or MSEs and users are residents. The attitude of residents towards municipal officials dealing with SWM has often been a rather demanding one. Generally residents think that it is the municipality’s responsibility, as the official agency, to provide them with reliable SWM services. The attitudes of residents towards municipal officers however may not take into account the various internal and external constraints that affect the provision of effective SWM services. Sometimes, residents are not aware of their own roles and responsibilities in the effective provision of such a service. These observations suggest the need for communication between the two groups, so that the residents understand their own responsibilities and the consequences of their behaviour, and the constraints under which the municipality is working. The polarisation into two groups – *us and them* – is an unfortunate consequence of a lack of communication, and the failure of the service providers to involve the users (or beneficiaries) in decision-making at an early stage.

The introduction of MSEs is like a new phase in solid waste management, and may be a good opportunity to rectify any previous shortcomings of municipalities in their approach to, and relationship with the community. Here is an opportunity to involve the community in decision-making and to keep the users better informed regarding expectations and constraints. In most cases it will not be possible to involve all residents in decision-making, so it may be necessary for representatives to be selected, but these representatives should be encouraged to keep their community informed of developments. NGOs may also have a part to play in bridging the gap between the users and the municipality. Public meetings may be a useful means of communication.

New MSEs should be given training and assistance in communicating with the residents they are serving. After some time residents will form an opinion about an MSE on the basis of the service that it provides. There may be mistakes, uncertainties and misunderstandings in the early stages, as both MSEs and municipalities learn their new roles, and in such cases honesty and openness are very important in dealings with the users.

The following observations indicate aspects of the relationships between users and service providers.

Beall (1997) recorded the following from an interview with a male user (in Faisalabad, Pakistan):

“They (municipal sweepers) keep changing because people complain about them and so they get transferred. But none among them takes our household waste as part of his duty. So we have a permanent arrangement with a female sweeper to take our household waste. We pay her Rs 20 a month. But the man who presently sweeps our lane, I do not know his name, shouts abuse at our female sweeper and pesters her to give him our

private work. He has asked us many times to allow him to take our household waste. But he is just greedy for the extra money. And how can we give him permission? He is a man and cannot enter our house. So we have kept this old woman who works for five or six houses in this lane".

This example touches on gender roles, and the importance of personal relationships and reliability. It also mentions conflicts between rivals (the municipal sweeper and the informal sector collector) and how they can involve the users. Competition has two sides – it helps to keep prices down and ensure high standards of service, but it can also lead to conflict which affects both the rivals and the residents. This example suggests some observations about gender issues – male users may be more supportive towards female workers, female workers were regarded as “safe” and so that they were allowed to enter property, and older women were perceived as being even more reliable and trustworthy.

A6.5 Conclusions

- Preparations and planning for MSE involvement must fully recognise the importance of the attitudes and relationships of the people involved – the users of the service, the providers and the regulators.
- Social issues can be assessed using a variety of methods. Whenever possible, trained social scientists should be responsible for undertaking these assessments.
- Attitudes are influenced by relationships, gender, religion, customs and social class.
- It is important to understand the various perspectives of the different groups of people involved. Attitudes are often strongly affected by each individual's perception about whether he or she will gain or lose from a particular change or situation.
- Open communication and involvement in decision-making can have very positive effects on attitudes and relationships.
- The *attitudes and values* of municipal officers concerning MSEs are a key factor in the development of new linkages between local government and micro- and small enterprises.

Annex 7

MSEs involved in recycling

Very little has been written about recycling MSEs in the main body of the text, because these MSEs usually do not have close links with municipalities. But recycling is considered to be an indispensable part of solid waste management and many MSEs are involved in this activity. Therefore it is important that municipal administrators are aware of the benefits of recycling and of the possibilities for enhancing the involvement of MSEs in recycling.

A7.1 What is recycling?

Recycling can be defined as:

The process of transforming recovered and sorted material into intermediate materials (such as crushed glass or ground or extruded plastic) or into final products for consumer or industrial use.

Another term often used is *resource recovery* which refers to any productive use of what would otherwise be a waste material requiring disposal. Although resource recovery is a more general term, both terms are used here interchangeably.

The following types of resource recovery can be distinguished:

- Product recovery or reuse.** A discarded product can be repaired or directly reused in its original form, for the same or a new purpose. In this way, maximum reuse is achieved of the energy and materials used in the original production process. An example of product recovery is the reuse of bottles, which make several trips from the drinks factory to the consumer and back again, where they are cleaned and refilled.
- Material recovery.** The material of a waste product is reprocessed in the production process of a new product. For example, waste plastics are washed, sorted, shredded, extruded and finally made into various new products.
- Energy recovery.** The heat of combustion of the material of which the waste product is made is recovered. Here the incineration of car tyres to heat ovens can serve as an example.

From an environmental point of view product recovery is the best option when compared to material and energy recovery.

A7.2 Who is involved in recycling?

Besides the large-scale private sector (which is mostly involved in the reprocessing of waste materials into intermediate materials or final products), many small-scale entrepreneurs are active in recycling. In general, the small-scale private sector consists of two main groups:

- individuals and families, performing activities which provide them with just enough income to live on, and
- MSEs, operating in much the same way as their larger counterparts, but not always officially registered.

Whilst the income generated by the first group is usually very low, MSEs involved in recycling sometimes manage to make considerable profits, for example when recycling plastics. These two groups are sometimes referred to as belonging to the informal sector, if they operate in an unregistered and unregulated way. In general waste work is done by religious or ethnic minorities, low castes or immigrants from rural areas. Recycling is often the only way they can find to earn money in an urban context. Municipal, national and international bodies are beginning to recognise the importance of recycling. As a result the informal sector is gradually being accepted as a useful part of the waste management system and a partner to municipalities.

Informal resource recovery activities, in contrast with the formal private sector, are often driven by poverty and are initiated personally and spontaneously (and sometimes haphazardly) in the struggle for survival. Consequently, the choice of materials to collect is firstly determined by the value of the waste materials, and secondly, by their ease of extraction, handling, and transport. Paper, metals and plastics, usually collected from more wealthy residential areas, or industrial or commercial zones, tend to attract more attention than organic or biodegradable materials, even though they are present in much smaller amounts than organic wastes.

Many people are involved in the various stages of the resource recovery process, as the 'waste' materials are transformed to final product. The following roles are involved:

- waste pickers: - persons who separate recyclable and/or reusable waste materials from mixed wastes, usually at dump sites or in the streets;
- itinerant waste buyers or collectors of source separated recyclables: - persons that go door to door to obtain unwanted items and materials by gift, barter or sale;
- municipal collectors: - persons employed by municipalities for sweeping or collecting waste, who sort recyclables from mixed wastes to obtain extra income in addition to their municipal salaries;
- intermediate dealers: - middlemen who buy recyclable waste materials from waste generators, waste pickers and itinerant waste buyers, and sell them, after sorting and pre-processing, to wholesalers or recycling enterprises;
- wholesalers: - large-scale dealers, usually specialised in one type of waste material, who sell the recyclables to recycling enterprises;
- recycling MSEs: - enterprises that (pre-)process recyclables into intermediate materials or final products.

While these are usually the main actors in large cities in developing countries, it should be pointed out that large variations exist between cities. The situation in Bangalore, India, is explained in Figure A7.

A7.3 Why is recycling important?

Recycling can result in potential benefits to the waste management system, the local economy and the environment in general. These benefits are listed below along with some examples (Klundert, 1995). It should be emphasised, however, that these are potential gains, whose realisation depends on the care taken by the MSEs, and on the degree of oversight and control exercised by the local government responsible for waste management.

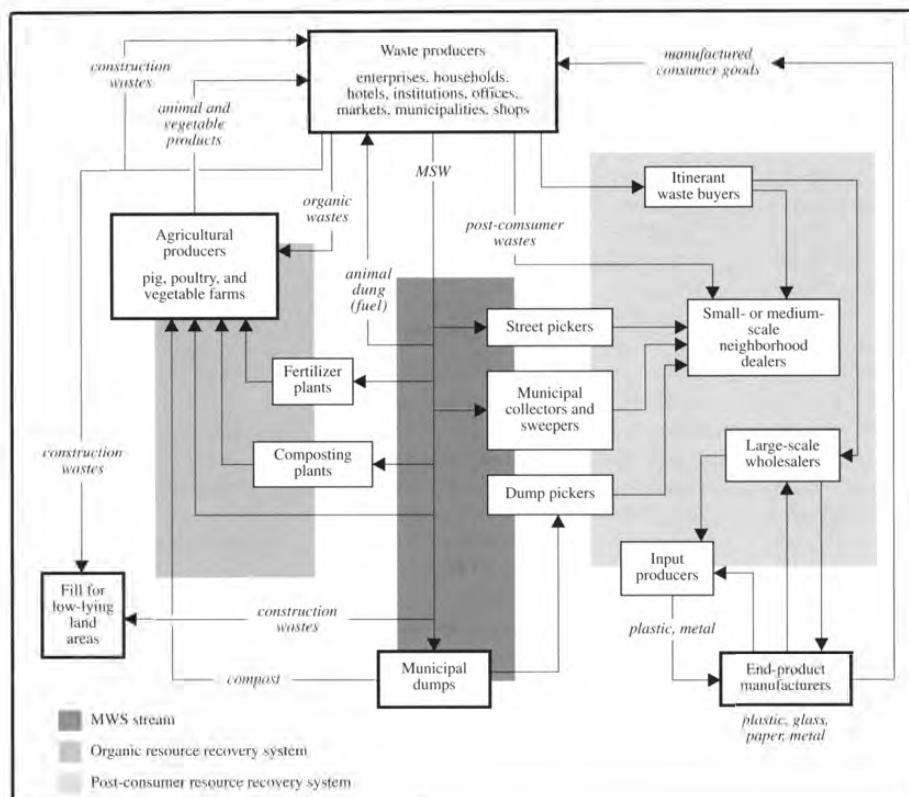
Benefits to the waste management system:

- There is a reduction of the amount of waste materials requiring collection and disposal. This is a result of the recovery and return to productive use of materials that would otherwise end up in the waste stream. Since the municipal authorities have less waste to manage, there are savings in both operating and capital expenditures. For example,
 - Cairo is renowned for its extensive informal waste recycling system. In the Cairo metropolitan area, 6000 tonnes of municipal solid waste are generated daily. The local government waste management organisation collects about 2400 tonnes per day, whilst informal sector workers, called the Zabbaleen, collect about 2700 tonnes of household waste per day meant for resource recovery (EQI, 1991).

The lifetimes of capital investments, such as environmentally appropriate sanitary landfills or composting facilities, are extended because of the reduction of throughput.

- In some cases there may also be benefits resulting from the removal of a large proportion of certain materials from the waste, if the municipality would need to remove these materials itself before processing the waste.
- Expenses of street cleaning may be reduced if paper and plastic is collected by recycling workers.

Figure A7
Overview of post-consumer, organic and construction wastes in Bangalore, India.



(Source: Chris Furedy and Glen Richardson in IETC 1996)

Benefits to the economy include:

- The supply of raw materials to the local manufacturing sector, avoiding using foreign exchange and import procedures. Countries which import energy (oil, gas, and hydropower) can save on their foreign currency bills, because of the reduced need for imported energy, when recycling is promoted.
- The maintenance of a large and available stock of secondary resources to stimulate industrial production.
- Provision of income—generating activities for large numbers of people, many of whom might otherwise not be able to survive. It is not unusual in the large cities in Asia and Latin America for around 50,000 persons to be involved in recovery activities in each city.
- The availability of a range of products that can be afforded by poor people, such as containers, harnesses, and wheels, made from recycled materials.

Environmental benefits include:

- Conservation of resources when materials are recovered. For example, the recycling of aluminium scrap results in energy savings of up to 96% when compared to the production of aluminium from bauxite. The production of paper pulp from waste paper demands 60% less energy than paper production that uses wood as the raw material.

- Reduction in environmental damage from exploiting primary resources, - that is, less mining and deforestation.
- Reduction in the use of water in primary production.
- Reduction of litter and illegally dumped materials (paper, plastic, bulky items and other wastes) because these materials are picked up for recycling purposes.

A7.4 What materials are being recycled?

All waste materials that have a monetary value in the local market are recycled, to varying extents. Recyclables that are usually collected include plastics, paper and cardboard, aluminium, steel and other metals, glass and textiles. Different types and qualities of these materials fetch different prices. In general, the cleaner the material and the less worn out, the higher the price. Many MSEs are involved in recycling activities, among others, in countries where the development of MSEs has been stimulated by the government, as is the case in India. Plastic is probably the material that is most recycled in the small-scale sector. In the larger Asian cities and in Cairo, Egypt, hundreds of plastics reprocessing MSEs exist, and they recycle a large percentage of the plastics waste that is generated (up to 70% in Cairo).

More hazardous wastes, such as household and car batteries, photographic materials, motor oil and medical wastes (including syringes), are being recycled in many cities, although to a lesser extent than the non-hazardous materials mentioned above. It is clear that such practices may constitute a health hazard for the workers and the public.

Organic wastes, such as food leftovers and yard waste, are recovered because of their monetary, nutrient or energy value. They can be reused as animal feed, soil improver or fuel. The recovery of organic waste can contribute considerably to the reduction of wastes to be disposed of, since it comprises about 50-80% of the urban solid waste in cities in developing countries. MSEs using organic wastes are mostly involved in animal raising activities, such as pigs and goats. Composting can usually not be carried out as a financially feasible business, except perhaps on a small scale.

The extent to which any particular material is being recycled is largely influenced by local economic and political factors, such as

- the level of industrialisation in a country - which influences the local availability of machinery and technical expertise, and the possible use of recyclables in industrial production processes,
- the local market - which is defined by factors such as the number of potential buyers, their income level and their need for certain products, and
- government intervention - for example, financial incentives and regulations.

International economic and political factors may also have an effect. Examples of these factors are

- the prices of virgin materials on the world market,
- the international shipment of non-hazardous recyclable wastes resulting from recycling and disposal policies in industrialised countries,
- international agreements such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and
- the General Agreement on Trade and Tariffs (GATT).

A7.5 What are the problems with recycling?

Whilst waste recycling has many benefits, it may also create employment opportunities that conflict with environmental and health objectives. The recovery methods themselves are not always environmentally sound and may pose health hazards for both the workers and the public in general.

Working conditions

Risks associated with waste recycling may include (Eerd, 1996):

1. occupational accidents, such as falling objects, cuts and accidents with machinery and vehicles;
2. physical risks, such as noise, weather conditions and hand-arm vibration in the use of powered hand tools;
3. chemical risks, from organic solvents, other gases and vapours, and hazardous wastes;
4. ergonomic risks, such as the high occurrence of musculo-manual work, the use of low-technology working methods and the inadequate design of work rooms;
5. psychological risks, such as stress, low self-esteem, and sexual harassment of female workers;
6. health risks, such as diseases (e.g. diarrhoea, eye and skin infections and respiratory problems) caused by microorganisms, protozoa and helminths, and by the inhalation of dust, smoke and powders;
7. others, such as bites from dogs and rats.

It is difficult to draw straightforward conclusions about the health effects of working with waste. There are two categories of causes of health risks, and they should always be distinguished when risks are being assessed. Some risks are according to the type of work carried out (e.g. picking at dumpsites, door to door collection of recyclables, recycling). Other risks are associated with the type of waste material used (e.g. organics, plastics, paper, hazardous materials).

Whilst many consider the conditions in which much recycling is done to be inhuman, in most cases it is of no use to seek to abolish these kinds of activities. Waste forms a source of income that is essential for many poor people. One must look for low-cost measures to improve working conditions.

Environmental pollution

In terms of pollution load, many of the MSEs are not the major waste producers and/or polluters, as compared to the larger industries (Benavides, 1992). Most waste recycling activities are considered to be an environmental enhancement, since they reduce the quantities of solid wastes to be collected and disposed of. However, the number of enterprises makes effective monitoring of their emissions (solid wastes, wastewater, fumes, noise, smell, etc.) virtually impossible. Such enterprises are often located in areas of high-density housing in low-income, unplanned areas, so that large numbers of people are exposed to air pollution or are using polluted water. These small-scale enterprises may lack funds for improvements or be unaware of the environmental problems they cause. The nature of the materials they handle adds to the pollution load, because of the need to clean the items or materials and separate out contaminants.

Few quantitative field data are available. The following examples illustrate the problems (Lardinois, 1994).

- Dry cell batteries are stripped down with the aid of simple tools, and the valuable materials like zinc and the carbon pins are recovered, whereas the residue containing heavy metals is simply discarded.
- Copper from electric cables is recovered by burning off the plastic insulation.
- Car tyres are burnt to recover the steel wires used for various purposes such as baling waste paper.
- Used paint containers are set on fire to burn paint residues so that the container can be reused.
- On or near dump sites a variety of containers are cleaned with water from brooks or rivers. The dirty wastewater flows back into the water sources, polluting the environment downstream.

A7.6 What can municipalities do to improve recycling?

For various reasons, informal resource recovery, either by entrepreneurs or by communities, has not received the support it deserves from public authorities. Waste pickers and collectors of recyclables are often seen as social outcasts, their businesses as illegal, and their work as a nuisance to modern urban life. But the atmosphere is changing, and there is a growing recognition among policy makers that the informal sector, including recycling MSEs, should not be neglected, but rather valued and recognised. Attention is now focusing on finding new ways of dealing with the problem of waste and building on what already exists. This approach appears to be working. Experiences in the Philippines and Brazil (among others) show that it is counterproductive and more expensive to establish a new (formal) recovery system than to improve and expand the one that already exists.

There are several measures that municipalities can undertake to encourage recycling activities:

- Studying the whole waste management system, including the 'informal' one, in order to understand existing recycling practices by households and MSEs, and including the requirements of the recycling sector in the design of an improved waste management system. For example: modern systems of waste collection keep the waste containerised as much as possible, thus making waste picking more difficult. It may be possible to develop an efficient collection system that allows waste picking without causing the waste to be scattered.
- Influencing the activities of waste pickers on the streets and at dumpsites. This can be difficult to do because municipalities generally do not have a mandate to improve conditions among those outside their workforces. There may be ways of encouraging waste pickers to work with local government. One example is giving them the exclusive right to salvage recyclables at a particular location, provided that they keep the location clean. Another example has been demonstrated in Zimbabwe and South America, where MSEs have been engaged to separate materials from deposited waste at disposal sites, provided that they wear identification and follow the instructions of the site manager.
- It may be possible to reduce harassment by police and municipal staff.
- Training in personal hygiene and providing access to toilet and washing facilities might be feasible and effective. Providing gloves and protective clothing may have no effect since the recipients may simply sell the clothing.
- Promoting source separation of recyclables by providing guidance and incentives to residents, and trying to include this approach in new recycling projects.
- Facilitating MSEs by providing low-rent or free space for storage, by providing access to loans, and by reducing the barriers to MSE involvement as discussed in Section K.
- Providing information on working conditions and environmental pollution, and on low-cost measures to improve conditions and reduce pollution. (This should be combined with a programme of visiting and inspecting recycling operations. If requirements are too expensive or complex, the effect of increasing pressure for improvements might close the MSEs or force them to operate outside the view of the government.)
- Educating the general public by undertaking awareness raising campaigns to promote recycling and to show the importance of the MSEs.

Annex 8

Supporting and strengthening MSEs

This Annex is divided into two parts. The first part is a review of the ways in which MSEs can be supported and helped to develop, drawing on experience from the production sector as well as the service sector. The second part describes how waste management MSEs have been supported in Latin America.

A8.1

A8.1.1 Introduction

Micro- and small enterprises offer a number of advantages when compared to medium and large firms. They require less capital investment for the creation of one job (meaning that a country can, for the same amount of capital, generate more work in the MSE sector than in medium and large industries. It also implies that it is easier to establish MSEs in less urbanised and especially rural areas, as small enterprises can thrive on a limited demand for their services or products.) MSEs can furthermore play an important role in fostering local entrepreneurship. They use equipment and materials that rely less on imports, so that they are less dependent on foreign exchange. And perhaps most importantly, MSEs make more use than large enterprises of materials and inputs from other sectors of the national economy. Through such ‘backward and forward linkages’ their growth stimulates work and incomes in other economic sectors in the country, leading to so-called ‘multiplier effects’.

As a result of their background and characteristics, MSEs have a substantial need for support services. Because of their small size they often have serious problems in obtaining loans from the commercial banking sector (since small loans are thought to have higher costs and higher risks). There is usually a wide variety of support services available for medium and large enterprises, such as training programmes, business consultants, management advisers, accountants, etc., but these are not always relevant or accessible to micro- and small enterprises.

In view of the perceived advantages of MSEs, governments and others have for some time tried to actively promote and support them. The first programmes for assisting MSEs started in the 1960s and invariably concerned credit programmes. Other support programmes of long standing involved management training. Growing interest in the MSE sector in the 1970s led many governments in low-income countries to set up ‘Small and Medium Enterprise Development Agencies’ to take care of the promotion of MSEs. Such SMEDAs provided integrated packages of support, including credit, skills upgrading, technology transfer and marketing assistance. However, because they had such a broad mission, they were often inefficient, and since the services were (at least partly) subsidised, they proved unsustainable and so they have disappeared in most countries.

As a reaction the “minimalist” approach emerged, in which MSE support organisations concentrated on the delivery of only one service (often credit), which was provided without frills and under minimal conditions (for example, without previous courses in credit management).

Since then the pendulum has started to swing back. There are now in many countries a large number of MSE-support programmes, offering different services under different conditions.

In general, municipalities should not become involved in the provision of support services for MSEs. This annex is included to give some ideas about forms of support that have been offered to MSEs, in the hope that municipal managers might be able to direct MSEs towards support services that might help them.

A8.1.2 Financial services

Over the years, credit programmes have remained the mainstay of efforts to promote MSEs. In the last decades, important progress has been made in the development of models of 'micro' credit for MSEs. In most low-income countries there are now several schemes, operated by specialised NGOs and increasingly also by formal financial institutions. Some of the features of these schemes are: flexible loans, commercial interest rates, appropriate collateral and, possibly, intensive pre-credit preparation, loan monitoring and loan use supervision.

It is now generally accepted that the provision of credit to MSEs should be granted on the basis of commercial interest rates. Soft loans with interest rates lower than the market level have proven to be unsustainable because of their dependence on subsidies. Low-interest loans also tend to cause various operational problems - for instance, it was found complicated (and costly) to verify the actual use of the credits. However, the main argument for unsubsidised credit for MSEs was the general view that MSE promotion should target those MSEs that have a genuine potential for development. Only then can MSE support programmes be viewed as an economic investment. Such MSEs can be expected, at least in principle, to become self-sustainable. (Whether this happens or not also depends on a number of other factors, including management capacity, economic policies and circumstances). Various studies have shown that the main problem related to credit for micro-producers is usually the inadequate access to financial resources, and not so much the level of the interest. The same is likely to be true for MSEs that provide services, such as those in the waste management field. (This observation refers to interest rates within the range of those charged by banks. Many MSEs have been forced to rely on small loans from informal moneylenders who charge several times the regular market rates, and in such cases the interest payments are a major problem.)

In spite of these comments there may still be cases in which it is reasonable to set up credit programmes for specific target groups or for circumstances that require a more social approach. In such cases it may be appropriate, at least initially, to charge interest rates that are lower than the prevailing market rates.

The Social Fund for Development (SFD) in Egypt has started to disburse soft loans for new graduates and non-employed people to open their own businesses. One of these businesses is waste collection and recycling. However, the SFD asks for a feasibility study from a consulting office. The SFD usually supports such studies for the sake of these micro and small businesses. This is happening now in Ismailia and Kafir-el Dawar cities

(Bushra, 1998)

In the domain of financial services, most progress has been made in the area of collateral. Early programmes operated with excessively strict collateral conditions (such as mortgaging of land) so that only small and medium enterprises benefited. Often these enterprises ignored these schemes so that they quickly disappeared. Current wisdom is that the sustainability of credit programmes demands appropriate collateral. The actual form of collateral depends on the circumstances, and particularly the characteristics, of the target group. It is irrelevant to offer loans to MSE entrepreneurs on the basis of mortgages, since they usually do not possess any real estate. More appropriate guarantees can be obtained from personal guarantors, and in screening the background and qualities of the borrower as the basis of so-called 'character loans'. Other models that have been successfully tested are group loans, where the producers are asked to form a group and the members are made collectively responsible for the repayment of the loans. 'Micro-credit' schemes are based upon small initial loans, which can be increased for repeat loans.

Other micro-credit programmes have achieved good results with minimal collateral requirements but intensive monitoring of the clients. However, the need for intensive preparation and supervision makes such credit schemes quite expensive (necessitating a real interest rate of about 2 % per month).

A final element, which has been found quite important, concerns a link to the promotion of saving as part of credit programmes for MSEs (hence the name 'micro-finance' programmes).

Golden rules for credit provision to MSEs:

- MSE entrepreneurs usually think that credit will solve all their problems. The credit amount should be kept as low as possible, but it should include due provision for working capital.
- Credit to MSEs should be provided on a cost-recovery basis, with interest paying for: cost of capital, administration and transaction cost, and including a provision for bad loans
- Credit provision should be based on an actual analysis of the economic sector, enterprise and entrepreneur. The capacity to pay back the credit is at least as important as formal collateral.

A8.1.3 Business development services

In comparison, non-financial services have been less frequently used to promote MSEs, and, as a result, the area has seen less development and application. However, in recent years, business development services (BDS) as they have now come to be called, are attracting a growing interest. The emergence of BDS coincides with a growing concern to increase the effectiveness of the credit made available through the micro-finance schemes. Whilst less development has taken place in this area, a number of innovations have been introduced into existing BDS over the past decade. Recently a number of entirely new non-financial support mechanisms have been developed for MSEs.

Management training and entrepreneurship development

The first area in which special training programmes for MSEs were developed is management training. Such training concerns the application of simple management practices. Small producers are especially weak in keeping some kind of administration which is necessary to calculate the cost price of their products. The same is likely to be true for waste management MSEs regarding the costs of their services. Personnel management and marketing are also common weak spots of MSEs.

A related field refers to entrepreneurship development. Intensive orientation is needed to introduce potential entrepreneurs to the world of business. The need is especially great for those with little experience of the business environment, especially the unemployed, low-paid workers, laid-off waged workers, and discharged civil servants. They need to become acquainted with work discipline, business dealings, market considerations, credit management, personnel matters, taxes and licensing, and other related aspects of business.

One way to impart simple management techniques and stimulate entrepreneurial development is to help aspiring leaders of MSEs to produce a business plan. This has the additional advantage that it can subsequently be used in an application for a bank loan or small credit.

A word of caution is needed here. Courses for entrepreneurship development and management training can not be expected to turn everybody into a fully fledged and capable businessman or -woman. Entrepreneurship includes an element of business instinct which different people have to different extents. Certain factors in a person's background make it more difficult for him or her to become an entrepreneur. Such factors include a background of poverty and irregular working habits, membership of a social minority, a lack of self-confidence, and a poor level of education. In any case it will take time and effort from all sides to form a successful entrepreneur. In one town in South Africa, potential leaders of community-based MSEs are required to take a training course and pass an examination in business skills before they are eligible for leadership of an MSE.

Technical training

Even though technical skills are usually the strong point of micro-entrepreneurs, it should be recognised that their understanding of design and effective methods of operation may be rudimentary. Technical skills also may need to be upgraded. It is not always easy for leaders of MSEs to find ways of acquiring new skills that are relevant to their work, especially for a type of service that is relatively new to MSEs. Some skills could be acquired through the traditional apprenticeship system. NGOs have also started to fill this gap.

Training for MSEs needs to be short and, if possible, given at special times (for example, in the evenings after work, during weekends, or on only one day a week). The training should be modularised, so that various individual courses can accumulate into a complete training programme for a particular occupation. Such programmes could even be rewarded with a certificate or diploma.

The training for the micro-entrepreneurs should be given by tutors with practical experience. They should not only know the trade from experience, but should also complement the transfer of purely technical skills with relevant information about suppliers of equipment, purchase of materials, technical aspects of supervision, and so on.

An interesting new concept of training for MSEs is Community-Based Training. It combines technical training with entrepreneurship development, and focuses particularly on the promotion of self-employment in rural and peri-urban areas. It identifies self-employment opportunities before actually organising the courses, has a flexible approach to skills delivery (with short courses given in the community at a convenient time schedule), and a training content that is tailor-made for the opportunities identified. It also includes forms of post-training assistance for trainees who want to enter into self-employment or set up a micro-enterprise, including guidance and assistance with credit and marketing.

Technology

One of the main challenges for the MSE sector is to increase its productivity and improve the quality of its products and services. This requires the selection of relevant technologies, including innovations in methods and equipment.

More innovative ways are now being tried, including:

- **Advisory services** MSEs have been found to benefit substantially from programmes which render advisory services and technical assistance to individual enterprises at affordable prices. Essentially the process starts when business counsellor makes a quick analysis of the situation of the enterprise and prepares a 'support action plan' in close consultation with the entrepreneur. The business counsellor may provide the required assistance him/herself or arrange assistance services from another organisation.
- **Participatory Technology Development**, which is mainly for MSEs involved in producing equipment. It involves establishing contacts between the producers of equipment and the end-users, to facilitate communication of the needs of users and production constraints of the producers, as well as feed-back on new or improved equipment. It has been shown that by exchanging ideas between these two groups, tools and equipment can be manufactured that are better adapted to local circumstances.
- **Enterprise Exchange Visits** MSE leaders visit others working in the same business (both other MSEs and larger operators), to increase their knowledge on technological matters, and to learn more about suppliers of equipment, and techniques of management and supervision.

Marketing assistance

MSEs involved in production of goods often require help with matching product design to the requirements of the market, and in promoting their products. Services have been developed to support them in this. Some of these concepts may be useful for recycling MSEs. It may be possible to develop parallel support for MSEs that provide services such as waste collection and disposal. The following list refers to the assistance that has been offered to production MSEs and suggests possible parallels in the waste management sector.

- *Rapid Market Appraisal* is essentially a simple 4-morning training course to strengthen the market orientation of small producers, and to help them to diversify their product range. The training, which can be given directly to entrepreneurs or to leaders of MSE associations, aims to introduce simple market research instruments which the entrepreneurs themselves can explore potential market niches for new or improved products, and link up with 'institutional demand'. Waste management MSEs could be encouraged to look for new types of clients and consider how to modify the services they offer to make them more attractive to existing and potential clients.
- *MSE Exhibitions and Trade Fairs* can be very valuable for showing actual products, but are less suitable for advertising waste management services, which appear to be relatively similar. The size of the market does not justify exhibitions of equipment that might be used by MSEs. An exhibition open to the general public might be a helpful way of initiating MSE waste management services on a large scale, and a conference on preparing for MSEs or supervising MSEs could be very helpful for municipal officials.
- *Creation and strengthening of MSE-clusters*. There have been some interesting experiences in grouping MSEs into clusters which can be used to organise 'flexible specialisation' in which various micro-producers each manufacture a different part of the product, which in the end is put together and sold to large firms. Such specialisation can increase quality, lower production costs, and lead to stable sub-contracting relations. If the same approach could be applied to waste management MSEs there could be significant advantages in reducing duplication (vehicles of several MSEs collecting from the same street) and time spent on winning new customers. Municipal officials might prefer to deal with one cluster rather than a number of fragmented MSEs. Concerning specialisation, there could be one MSE specialising in collecting from densely inhabited areas, another collecting from scattered settlements, a third from industries, and so on. If MSEs are required to provide their own secondary collection, a co-ordinated cluster would be very beneficial – one specialised MSE providing secondary collection for a number of primary collection MSEs.
- *Shop visits*: many micro-producers are not in regular contact with the final consumers of their products. They sell to middlemen and shopkeepers, who tend to give very little feedback on the product. A simple way to acquaint MSEs with 'the workings of the market' is for them to visit a shop or other marketing channel through which their products are sold to the final consumers. Here they see similar products, gauge the prevailing fashions and even receive first-hand comments on the design and quality of their products. In the same way, leaders of waste management MSEs should be encouraged to investigate the degree of satisfaction of their clients, and perhaps also investigate the perceptions of the clients of rival MSEs, or enterprises offering similar services in other cities.

Golden rules for business development services for MSEs:

- BDS are a necessary addition to financial services, as they permit the micro-entrepreneurs to make optimal use of the credit they have obtained.
- BDS should be 'incremental', focusing on the most pressing problem of an MSE first, without pretending to be able to remove all constraints at the same time.
- The delivery of BDS should be left to specialised organisations, preferably those having a commercial orientation.
- BDS should be provided on a cost-sharing basis. Unlike the case of credit, not all non-financial services can be delivered in a self-sustainable manner, but there is no reason why MSEs should not contribute (if possible, increasingly) to the cost of the service.
- An interesting way to subsidise BDS may be the use of vouchers, which entitle the beneficiary to purchase certain services from a (possibly pre-selected) group of service providers.

A8.1.4 MSE-associations and informal groups

MSEs are by definition small, and they may feel weak and almost insignificant in the market in which they operate. Therefore MSEs sometimes decide to band together as an informal group or even set up a formal association. Associations of MSEs tend to focus foremost on lobbying and advocacy on behalf of their members. However, such groupings of MSEs can also engage themselves in the organisation of training events, marketing assistance, and various other support activities.

Golden rules for associations of MSEs:

- Formal, legalised associations normally have few advantages over more informal groupings of MSEs, except when they play a role in formally representing a number of MSEs, such as in the signing of a contract.
- It requires substantial time and effort to set up a well-functioning MSE-association, and it is generally to be preferred (if possible) to work only with existing associations.
- MSE associations are generally more appropriate for advocacy and lobbying than for organising and channelling of actual support services.
- Smaller associations, with membership concentrated in one economic sector or geographical area, and motivated by mutual self-interest, are usually stronger.
- Well-functioning and sustainable MSE associations need to be carried by a stable membership and have a dedicated and efficient leadership which changes periodically.

A8.1.5 Conclusion

Clear progress has been made in the past decades with regard to the promotion of micro- and small enterprises. Especially in the area of financial services, a number of well-tested models of micro-credit and finance have emerged, allowing for sustainable, large-scale provision of credit and loans to the MSE-sector. A start has recently been made to answer the challenge of providing business development services on a similar basis.

To summarise, the following points are suggested as rules for the promotion of micro- and small enterprises:

- Focus on existing enterprises (or at least on entrepreneurs who already have experience), working in sectors which have a clear potential for economic development
- Do not try to provide 'integrated packages' of various services for MSEs, but rather start with one or a few relevant services and seek to specialise in them. (This will help to bring down the cost of the services.)
- MSE-support services should be provided in a business-like manner, and based on cost-sharing by the beneficiaries. The objective of the programme should be to become self-sustainable, which does not allow for continuously subsidised services.
- Whilst grouping MSEs lowers the cost of the delivery of the services, experience shows that associations of MSEs are generally not a stable and efficient channel. A market-based approach should be taken.

Municipalities should generally avoid becoming responsible for the delivery of MSE-support services. The provision of assistance to MSEs should, as much as possible, be left to specialised organisations. Experiences in the past have made it abundantly clear that government agencies are not the most appropriate entities for providing such support, as they tend to have difficulty in responding to the needs of MSEs, lack qualified and dedicated staff, and be perennially under-resourced.

A8.2 Development of waste management MSEs in Latin America

This section is a summary of the approach of the project PROESA (Promoting Employment, Health Care and the Environment) executed by the Peruvian NGO IPES (Institute for the Promotion of Social Economy) (IPES, 1995). More than 100 MSEs have been set up, most of them to solve problems of inadequate waste management - especially in low-income areas - while at the same time generating employment for the urban poor. PROESA's strategy is called the 'Social Privatisation of Public Services' as it is a process of decentralising public services with the active participation of the municipality and the community organisations in order to transfer environmental management to specialised enterprises.

The type of enterprises that have been set up in Peru include the following (IPES, 1995):

- street cleaning and sweeping
- waste collection
- disposal
- maintenance of parks and gardens
- management of public parking places
- management of public toilets
- sorting, pre-processing, composting and recycling.

Each PROESA enterprise is formed through the initiative of a community organisation and the municipality, with the support of a specialised technical organisation, usually an NGO. The actors involved sign a Co-operation Agreement that specifies the commitments and responsibilities of each partner. The formation of the MSEs comprises three basic phases (IPES, 1995):

1. A preparatory phase consisting of an analysis of the problems, a waste study that determines the quantities generated and composition, and the development of a proposal to improve urban environmental management through MSEs. This proposal includes feasibility studies of the enterprises, technical design (locality, type and number of enterprises, operational aspects, costs, financing etc.), a training programme and a concept for the monitoring and evaluation of the system.
2. The actual formation of the MSEs, which includes the following steps (Zela, 1998):
 - a) Selecting the candidates for the enterprise:
The community organisations select candidates from unemployed young people - men and women who demonstrate a high level of commitment to the development of the community. The requirements include being healthy and physically capable, and preferably knowing how to read and write.
 - b) Training the candidates:
The NGO organises a course to train the candidates in the following areas (IPES, 1996):
 - environmental management, such as the relation between environment and health and the importance of involving the public in environmental protection
 - working in a group
 - business management, for example organisation, administration, planning, control, bookkeeping.
 - c) Selecting the members of the enterprise:
The NGO gives a psychological and skills test to the candidates to evaluate their level of skills and the ability of each person to work in a team. The test also determines the level of knowledge and understanding gained from the training course.
 - d) Setting up the enterprise:
The NGO supports the formal constitution of the enterprise within the existing

legal framework. In Peru the formation of a limited liability company is recommended to facilitate a more democratic management style in the enterprise.

e) Equipping the enterprise:

The NGO grants a loan directly to the enterprise (usually from a revolving fund run by the NGO) or supports the enterprise in applying for a loan from a financial institution to finance the purchase of equipment and uniforms, and in some cases, to cover the capital needs in the first few months of operation.

f) Signing the contracts:

After the enterprise is formally registered and equipment has been acquired, the municipality or community organisation signs a contract with the enterprise. The contract specifies the type of services, the cost of the service, the form of payment, and the penalties for not delivering the services adequately and for late payment.

g) Start and supervision:

Before starting the work, a public awareness campaign is organised to inform the community that the service will start soon, what the service will include, the working hours and so on, and to ask for support. The community organisation and the municipality are responsible for supervising the services of the enterprise. The supervision is carried out by environmental inspectors and/or community leaders.

h) Supporting the management of the enterprise:

In order to improve the service and management of the enterprise, the NGO offers assistance for six months on issues such as enterprise management, organisation of technical and operational aspects, financial management and marketing of services. The NGO also offers legal assistance and organises the following workshops:

- conflict resolution
- self-esteem and assertiveness
- human relations
- gender roles
- promotion of a business culture.

3. The third phase is the execution of an environmental education programme, which is directed at the following target groups:

- the public in general through the mass media,
- the neighbourhood receiving the service, through information leaflets and street marches,
- schools and other institutes, through information leaflets and visits.

Annex 9

Examples of MSEs – case studies

A9.1 Case studies in other books.

Some case studies are included in this Annex, but many others are available in other books. A short review of some of these sources will be given to help the reader decide if any of these other sources would be interesting. Other case studies are referred to in the main body of this book, and information about their sources can be found in the Bibliography (Annex 12).

Books featuring case studies:

Non-governmental refuse collection in low-income urban areas: lessons learned from selected schemes in Asia, Africa and Latin America; by Roger Pfammatter and Roland Schertenleib, 1996; SANDEC Report no.1/96, available from

SANDEC, EAWAG, Ueberlandstrasse 133, CH – 8600 Duebendorf, Switzerland

The case studies in this publication comprise eleven from Indonesia, two from China, one from Cameroon, one from Burkina Faso, one from Colombia and one from Peru. For each one there is a General Description, followed by detailed and comparable data under the following headings: Organisation & Management, Characteristics of the Perimeter, Technical & Operational Parameters, Service Costs & Financing. Finally, under the heading Main Problems, there is a brief statement of the shortcomings and difficulties that were observed.

Workshop Report "Micro and Small Enterprises Involvement in Municipal Solid Waste Management in Developing Countries". The workshop was held in Cairo (Egypt) from 14–18 October 1996. Copies of this report can be obtained from

Adrian Coad, SKAT, Vadianstrasse 42, CH- 9000 St Gallen, Switzerland.

This report summarises the workshop and includes condensed versions of eight case studies. The cases are taken from the Philippines, Thailand, Burkina Faso, Senegal, Peru, Egypt and Yemen, and an overview of the situation in Latin America is also presented. These case studies are presented in the following format: Background, Characteristics of the Area of Operation, Technical and Operational Parameters, Service Cost and Financing, Organisation and Management, and Key Challenges and Lessons. The summaries are mostly one page long.

Some of the original case study reports that were prepared for the workshop are available, and can be supplied by SKAT on a limited basis. These case studies cover the following situations:

Ouagadougou – private MSE
Ouagadougou – community based MSE
Dhaka

Accra, Ghana
Bangkok, Thailand
Colombia - recycling
Costa Rica – overview
Dar es Salaam, Tanzania
Dakar, Senegal
Durban, South Africa
El Alto, Bolivia

(Some information about these MSEs is included later in this Annex)

India (Exnora)
Kenya - overview
Lebanon – recycling cloth and glass
Peru - overview
Philippines (Payatas)
Sana'a, Yemen
Sao Paulo, Brazil – recycling training

Solid Waste Management in Latin America: The Role of Micro- and Small Enterprises and Cooperatives; by Jorge Arroyo Moreno, Francisco Rivas Ríos and Inge Lardinois; Urban Waste Series 5; IPES/ACEPESA/WASTE, Lima, Peru, 1998. Available from

WASTE/UWEP, Nieuwehaven 201, 2801 CW Gouda, the Netherlands. Cost: \$20 (including postage)

This publication describes the results of a study to document and analyse the experiences of 89 micro- and small enterprises in seven countries in Latin America. The following type of MSEs were studied:

- street cleaning and sweeping,
- waste collection,
- final disposal,
- separate collection of recyclable materials and
- the sorting and pre-processing of recyclables.

The first part of the publication provides an overview of the state of the art in solid waste management in Latin America, and the contribution of the MSEs to its development and operation. It also discusses the different aspects of each operation: the daily activities of the MSEs, their interactions with the municipalities and the civil society, their economic and financial circumstances, their technological development, their work environment and conditions of work, and the role of women in the enterprises. The second part provides a brief review of the MSE cases in each country included in the research: Guatemala, El Salvador, Costa Rica, Colombia, Brazil, Peru and Bolivia. A general overview of the solid waste management context and the organisation of urban services is provided for each country, together with a description of MSE operations and relationships with other actors. The current status of the MSEs is also discussed, followed by an analysis of the internal and external factors which strengthen or weaken their activities, provide opportunities for expansion or threaten their survival. Information from this source has been widely used in the preparation of the present book. Table 1 in section G lists the enterprises that were studied.

A9.2 Summaries and discussions of case studies

The following five case studies have been chosen as examples to illustrate a range of experiences and approaches. In selecting these examples there has been no attempt to give a uniform geographical coverage; no case studies for Latin America have been included, because they are well referred to in the main body of this book and in other published sources. These examples indicate that there is a wide range of MSEs involved in waste management, and underline many of the points raised in the main part of the book.

A9.2.1 Community-based and private MSEs in Ouagadougou by Dr Ousseynou GUENE, CREPA, Ouagadougou

Ouagadougou, the capital of Burkina Faso, has a population of 900 000. Two types of MSEs are operating in this city – private MSEs and community-based MSEs. Both are working successfully. The city now integrates the MSE operations into its solid waste management planning. This case study provides some information about how they started and the services that they provide.

The city of Ouagadougou is divided into 30 secteurs, and 16 of these are served by community-based MSEs that collect waste from households and deliver it to transfer points. There are also private MSEs operating in similar areas and in other high-income residential areas. Domestic solid waste from the more prosperous areas is also collected by the municipality using compactor trucks.

a) Community-based enterprises

The first community-based enterprise in Secteur 10 (named Wogodogo) was set up by CREPA and IAGU in April 1993 as a pilot project.* After that two other MSEs were supported by CREPA only.

The pilot project of Wogodogo was funded by the founding organisations for the first 6 months. The others were only supplied at the beginning with equipment such as carts and donkeys. Now they are financially self-sufficient, except for some donations for capital items.

In the 16 areas with community schemes, households pay FCFA 500 (about US\$0.85) per month for the primary collection service. Not all the households in the areas served are part of these schemes – about 50% have joined in one secteur, and in other parts the proportion is lower. Waste is collected only from households that pay. Others are obliged to take their own wastes to large arm-roll containers which are removed by the municipality, or to authorised transfer points within the secteurs, or their waste is collected by some private MSEs.

These enterprises use donkey carts, though consideration is being given to upgrading to a different method of transport, especially where long distances are involved. These enterprises negotiated a transfer arrangement with the municipality. The MSE pays the municipality FCFA 2000 (about \$3.40) to take away 7m³ of refuse that has been collected in the donkey carts.

The local communities are involved in the setting of priorities, in planning, evaluation, and in paying for the service.

Three of the community-based MSEs are supported in terms of technical advice by CREPA, and their activities include raising community awareness. In general the MSEs have a president, a financial agent (who must be literate), a secretary (also literate), awareness builders, donkey cart drivers and waste collectors. Sometimes the administrative members are also collectors (in which case the administrative work is done in the afternoon). Sometime there is a council board which includes elders, traditional leaders and local administrative workers. All the team members (including the president) receive a salary, but advisory functions are not paid.

The household fee is FCFA 500. This was set on the basis of willingness to pay survey conducted in 1993 when the pilot project was to be started. This fee was later adopted everywhere. After the devaluation of the currency, most of the existing MSEs adjusted their expenses to suit their reduced income. (For instance in the pilot project of Wogodogo, the salaries were reduced.) It would be difficult to increase the fee now. Fees are collected monthly by the waste collectors of each sub-zone or by someone in the team who is partly responsible for fee collection. Sometimes subscribers come to the office of the MSEs to pay their fees.

These enterprises have joined together to form an association which negotiates on their behalf with the municipality. CREPA maintains links with the enterprises, providing some administrative support (including writing letters), and keeping informed about developments with these MSEs.

b) Private MSEs

There are 6 private MSEs which collect solid waste in Ouagadougou. ECONFA is the biggest (Guene, 1996). It was created in 1990 by a group of Ouagadougou graduates, who were looking for a way to earn money, and had also been considering selling fish or firewood. Some left the group when waste collection was selected as the field of activity. The MSE started by collecting waste from 24 clients, using a small hired van. At first the operation was dependent on contributions from a number of institutions, and the promoters (the graduates) worked without pay.

By 1995 only two of the original promoters remained, and in the following year they split up because of a personal disagreement, dividing the assets between them. The more active group became ECONFA.

* (CREPA is a member of the International Training Network in water supply and waste management, and has been active in the field of solid waste management since 1990. IAGU is the African Institute of Urban Management, which is based in Dakar, Senegal.)

This enterprise received help in a number of forms, including advice about its administrative structure, assistance with the acquisition of equipment, financial contributions and training. By 1996 it was operating with 5 tractors, pulling trailers of capacity 3m³, each making an average of four trips per day. Customers include households, companies, commercial establishments and embassies.

At the start, for a three month period in 1990, no wages were paid to the workers and promoters. The wages were then set at FCFA 100 per day. By 1991 workers and promoters were being paid FCFA 25,000 per month. In 1996 the fee for households was FCFA 1000 whilst public or private institutions paid between FCFA 4,500 and 8,000. Table A9.1 below shows how the financial fortunes of ECONFA have improved.

Table A9.1
Financial statement of ECONFA between 1991 and 1995

Sums quoted in millions of FCFA. (FCFA 1 million is equivalent to about US\$ 2000)

Budget items	Year				
	1991	1992	1993	1994	1995
Receipts	6	8	18	25	30
Wages	3.45	3.45	3.45	3.45	7.74
Operational expenses	1.73	1.73	2.98	4.63	6.16
Profit	0.82	2.82	11.57	16.92	16.10

Source: Guene 1996

The following lessons can be drawn from the experience of ECONFA:

- Collection of household waste constitutes a viable employment opportunity in African cities.
 - A small scale solid waste enterprise can be created with modest means.
 - The promoters must be highly motivated to ensure their success,
 - The enterprises need technical and material support (including training, and political and administrative backing).
- c) Unauthorised dumping

In spite of these schemes, and perhaps because they do not cover all of the residents in any particular secteur, small unauthorised piles of waste can still be found in certain places within the city.

d) Secondary collection

The waste which is collected by the MSEs or brought by the residents is placed in the large arm-roll containers or dumped onto an area of open ground that serves as a transfer point. The municipality faces real difficulties in removing all this waste because it does not have sufficient equipment. There are 115 of the 7m³ containers, but only six trucks that can carry them, and three additional compactor trucks.

A9.2.2 Seychelles – MSEs integrated into planning

(The following information has been taken from a paper presented by Rockie E. Thésée at the ILO Workshop *Using Micro and Small Enterprises for Cost-effective Waste Management*, which was held at the ILO Training Centre in Turin, Italy in June 1998. Mr Thésée is Administration and Finance Manager of the Solid Waste & Cleaning Agency of the Seychelles.)

a) Background

The Seychelles consists of 115 islands spread across an area of 13 million square kilometres of ocean to the north-east of Madagascar. The three main islands are home to over 95% of the population of approximately 75 000 people, and are divided into 23 districts.

Prior to 1995, waste management policy in the Seychelles was guided by means of inter-ministerial co-ordination. For example, the government parastatal, the Public Utilities Commission (PUC) was responsible for waste collection, whilst the Division of Environment was responsible for the environmental aspects of the dumping site, and the Ministry of Health was responsible for public education and awareness.

In 1995, following the government's decision to move to a market-driven economy, steps were taken to privatise waste management in the Seychelles. A parastatal, the Solid Waste and Cleaning Agency (SWAC) was set up as the principal regulatory authority for solid waste management in the Seychelles. This was followed by the closure of the solid waste management section of the PUC, the employees forming a private company working in solid waste management. Integrated waste management for the main island, Mahé, was then put out to international tender. The tender included the construction and operation of a composting plant, management and operation of a sanitary landfill, and management of all types of waste including waste oil, ship waste, clinical waste and hazardous industrial waste. A twenty year contract was awarded to STAR (Seychelles) – the affiliate of an international waste management company from France.

b) Involvement of MSEs

An important part of this contract concerns the involvement of small businesses. STAR (Seychelles) has retained the collection of domestic solid waste as its own responsibility because of the capital requirements for purchasing sophisticated collection vehicles. However, there are also 170 licensed waste pickup truck owners who compete for the collection of commercial and industrial wastes, (which adds up to about 40 % of the total solid waste), and who also collect some household waste. They are also involved in the trimming the vegetation at the sides of the roads and keeping the beaches clean. (Tourism is an important part of the economy.)

With the transition from a state-run economy to a free market economy, the government has invested heavily in small business programmes, providing enterprise financing, business facilities and business training. There have also been trade fairs and business promotion campaigns. This emphasis has also been supported by the private financial sector, especially the commercial banks that have assisted with venture and start-up capital. The government business initiative is spearheaded by the Seychelles Industrial Development Corporation (SIDEC). SIDEC provides training in financial management to small businesses, provides business premises on industrial estates, and mounts promotional campaigns both locally and overseas. Many entrepreneurs have used these facilities to start waste management operations.

Contracts for road cleaning are readily available because of the Government's continuing housing construction programme. With an increasing number of houses and housing estates, there is an increase in demand for waste collection services. This has resulted in small entrepreneurs being given contracts for road cleaning along the roads that lead to these estates.

MSEs are also involved in other aspects of waste management. Wastes from ships calling at Port Victoria are collected by four privately owned boats. A paper recycling enterprise has been established to collect and recycle paper from government offices. On La Digue Island a small enterprise has been set up to recycle discarded bicycles for spares.

c) Prospects for MSEs

MSEs have an important role to play in the social and economic development of the country. The following initiatives show that this is recognised and that co-ordinated action is being sought:

- The Solid Waste and Cleaning Agency's Education Unit is undertaking a broader-based public awareness campaign highlighting the need to address waste management issues at a community level. This will involve the District administrations under the Ministry of Local Government, the Ministry of Education, the Ministry of Industry and International Business, the Ministry of Health, the Seychelles Chamber of Commerce and Industry (SCCI), the Federation of Employees (FES), the Union of Non governmental Organisations, SIDECA, the Ministry of Tourism and the Seychelles Hotels Association.
- Concurrently, solutions will be sought at the community level to propose solutions in the form of MSEs to alleviate the problem. This will include liaising with overseas organisations such as WASTE to seek assistance in the selection of technologies.
- SWAC will assist in the providing of financial information for the costing of waste management functions at the district level, while SIDECA will provide business training and also assist in establishing financing and credit schemes. The Youth Enterprise Scheme and the SCCI will also be asked to provide the back-up and follow-up that is needed by first-time entrepreneurs.

A9.2.3 Kalabagan, Dhaka, Bangladesh The impact of an individual

This case study is taken from a presentation to the Cairo workshop (Rashid, 1996) with additional comments from Mansoor Ali during the WEDC/Garnet electronic conference on Primary Collection by Microenterprises in December 1997.

a) Background

Kalabagan is a densely inhabited and unplanned housing area. As a consequence of the lack of planning there are few open spaces and the roads are so narrow and tortuous that refuse collection trucks can hardly enter these areas and there are few possible locations for community waste storage. When the poor performance of the municipal sanitation workers was added to this, the inevitable result was that the streets were strewn with decomposing waste and drains were blocked. This was the case, but the situation has changed because of the initiative and determination of one individual and the co-ordinated action of the residents themselves.

b) Starting the scheme

The individual was a young man called Khurram Mahboob, who returned to his home in Kalabagan after completing his studies abroad. He was dismayed at the sight and smell of the scattered waste around his home. He discussed the situation with friends and neighbours and received a range of responses, often discouraging. The head of the Dhaka City Corporation (DCC) was hostile to Khurram's intentions, calling them interference in DCC affairs. Undeterred, Khurram persisted.

Proposals were discussed with residents. It was proposed that fees would be charged only when the success of the scheme had been demonstrated. The DCC refused to loan some spare tricycles that could be used to carry the waste, so plans were prepared to manufacture two of them.

Residents were asked to keep their waste in containers or plastic bags within their houses or yards until they were collected during the afternoon. The waste was then taken to a municipal storage point on the main road. However, there were problems. Residents, who had been accustomed to throwing their waste outside their property whenever they wanted to, were not happy to keep it until a certain time. Some residents did not like the collectors coming into their yards to collect the waste. Nevertheless, a clear improvement in the appearance and sanitation of the neighbourhood had been achieved. Modifications to the procedures were made because of the residents' complaints – plastic bags were used to store the waste so that the smell was contained.

and collectors announced their presence with a hooter or horn and waited for residents to bring out the waste, instead of going into the properties. (Here we see examples of communities finding solutions to problems when there is flexibility in the approach of the service provider.)

As promised, there was no charge for the service for the first month until it had been demonstrated. Khurram paid the wages of the labourers from his own pocket. From then on a monthly fee of Tk. 10.00 per household was charged.*

c) Operation

The labourers were mostly sweepers employed by the municipality, and they worked in this scheme as a second job, earning a monthly wage of Tk.400 to 600. As the scheme developed, two more labourers were hired, bringing the total to six. A further person was hired to collect fees from the households. Khurram continued to manage the work.

There were some problems at the interface with the DCC, which provided the secondary collection service, taking the waste to the disposal site. Initially the truck was scheduled to pick up the waste at 4 pm, but it was often not possible for the primary collectors to deliver the waste to the storage point by then. The result was that the waste was left lying at this storage point for almost 24 hours, causing a significant nuisance. The DCC was asked to reschedule the arrival of the truck to 5 pm, and they agreed to do this. Later the location of this transfer point was changed because of the development of a museum nearby, so the collection labourers were obliged to transport their waste to a more distant point.

By 1996, the system had been operating smoothly for eight years. The fees had just covered wages and depreciation costs, but the demand for a wage increase and the need for new equipment made an increase in the fee to Tk15 seem likely. There were about 600 contributing households, with about 20% to 25% of the households having their waste collected even though they paid no fee, and another 15% defaulting frequently on payments.

d) Reactions of outsiders

Local and foreign NGOs have showed considerable interest in the scheme, but the Ward Commissioner showed no interest and the DCC initially put several obstacles in the way. Later the DCC asked Khurram to manage the system for the whole city, but he refused. He showed no interest in being involved on a larger scale, though he has advised others who wished to start similar schemes themselves.

e) Lessons learned

This experience shows that middle-income communities can take responsibility for the primary collection of their waste. In this case they needed the initiative and determination of an individual to take the necessary step – the community was more reactive than proactive. Khurram's refusal of opportunities to expand shows his conviction that such schemes must be local.

f) Is the scheme sustainable?

Perhaps there are two main threats to the sustainability of this system. One is that the DCC might refuse to allow its employees to continue to do this work as a second job. If this happened, there is the question about whether others could be found to do this work. The second question is whether the system would continue if Khurram's input were withdrawn. Since the system has been operating for some time, it is likely that the users have become so accustomed to the improved convenience and the higher standard of cleanliness that they would take a more active role in maintaining the system than they took in setting it up.

* Based on 1998 exchange rates, Tk.10.00 is about US\$0.20.

A9.2.4 *The "Suzuki" system in Karachi*

Information about this system has been taken from research conducted by Ali (1997). The name of this system comes from the use of small Suzuki pickup vehicles which were used to provide a primary collection service.

The area where the Suzuki system operated is a middle-income area of Karachi, with a population of about 7000. Before the scheme started, waste could be found scattered on the streets, and the storage points were insanitary and a considerable nuisance to the residents living nearby. The scheme was started by Mr Rafi, a member of an alternative local government council, in 1988. The area concerned was in the ward that he represented.

His first step was to send letter to the 1000 houses in the area, informing them of his proposal and of the monthly fee which would be charged for the service. Positive responses came from 950 households, so he purchased two second-hand Suzuki pickups to start the service. At first only 650 households were prepared to pay the monthly fee of Rs 15*, but Mr Ravi ordered that the waste from all the houses should be collected. Solid waste was collected from each house by a team of three working with each vehicle. One labourer walked ahead of the vehicle, shouting to indicate their arrival and ringing door bells, and the other two walked with the pickup, taking the containers that were handed to them and emptying them and returning them. Two of the three with each vehicle were waste pickers who were not paid, but obtained their income from the sale of materials that they separated from the waste as it was being collected. Once a month the driver stopped at each house to collect the fee.

At first the waste was taken to an official disposal site at a distance of 10 km, but because of the distance and problems with the traffic police, a nearer transfer point was sought. A walled enclosure was constructed for this purpose, but nearby residents complained. Therefore another transfer space was constructed in an industrial area, in a playground adjacent to the collection area. The Karachi Metropolitan Corporation (KMC) collected the waste from this point and took it to the disposal site.

Mr Rafi managed the operation, and was in charge of the finances and administration, though he kept no formal, written records. Since he was a man of influence and political connections, he was able to ensure the smooth operation of the scheme, with no interference from police or municipal officials. (A similar scheme elsewhere which did not have an influential organiser, was stopped by municipal and police pressure.)

The residents had little influence over the operation of the scheme except that they would pass on any complaints to the collection crew or Mr Rafi. If they were very dissatisfied with the system, they could stop handing over their waste and paying their fee, and they could also engage a municipal sweeper to take their waste.

By 1994, Mr Rafi had lost his official position, and so competition from the municipal sweepers sprang up. (The official task of the municipal sweepers was to sweep the streets, but they supplemented their wages by contracting to take waste from individual houses, and perform other cleaning work.) The charges for the Suzuki service were generally lower than payments made to the municipal sweepers, but the latter also offered other services, apart from waste collection. An estimation of the costs and income of the Suzuki system in 1994 suggested that expenditures were only 53% of the income (with no allowance for the remuneration of the organiser, Mr Rafi), suggesting that the operation was financially viable. Allowing for depreciation, the system made a small loss in the first year, and a healthy profit for the remaining time for which it operated. Over the eight years of operation the internal rate of return was over 40% (compared with prevailing interest rates of 15% to 20%).

In terms of the impact on the environment, the area covered by the Suzuki system had fewer piles of garbage on the street, but more piles of construction and garden wastes (because the Suzuki loaders were reluctant to pick up the heavier and bulky material). The level of satisfaction with the general degree of cleanliness was much higher in the area served by the Suzukis than in a comparable area where only municipal sweepers offered primary collection.

As time went by, the Suzuki service became less and less regular because of maintenance problems, which included corrosion of the bodies. There was no standby vehicle, even though estimations of the balance sheet indicate that sufficient resources were being generated to fund the purchase and upkeep of a spare vehicle.

The Suzuki system finally died in April 1995, killed by the loss of the political influence which had enabled it to survive during the earlier times of its patron's power. Has the experience of this scheme raised the expectations of the community so that in future they will work for higher standards of waste management? Unfortunately, we do not have the answer.

The system itself was not perfect, but it was viable, and capable of improvement and strengthening. Above all else, this story shows the importance of political factors and the influence of stakeholders - groups whose income or position is affected.

A9.2.5 A dynamic enterprise in Nairobi

The following case study has been prepared by Antony Ndungu, who is a director of Tacentac Enterprises —commonly known as Blue Bin Services —, a company that collects solid waste in Nairobi. Its success is a testimony to energetic management and team spirit.

a) Brief history

We started collecting refuse in 1990, but the company was fully fledged in 1992. The main reasons for starting included the great accumulation of garbage all over the city and the general apathetic attitude towards garbage by the society.

The high accumulation of garbage was mainly due to the inability of the Nairobi City Council (NCC) to cope with all the garbage generated by the rapidly growing population in the city. This led to great garbage heaps dotting the whole city, and whilst this was a great eyesore and its odour was not particularly appealing, it also posed a serious threat to health and had a negative environmental impact.

One of the keys to that situation was the attitude of most of the people towards the solid waste. Garbage was regarded as the responsibility of the NCC, and otherwise it was seen as the domain of the underprivileged, and collecting it as the means of livelihood of waste pickers. The efforts of the waste pickers were hardly recognised and the mountains of waste kept growing.

These two factors created a favourable environment for entering into the business.

b) A description of our operation

We provide a house-to-house collection of solid waste, operating on a twice-weekly frequency, that is, we collect refuse after every three to four days. Residents who sign up for this service are given distinctive blue plastic bags in which the waste is collected. The residents are responsible for putting the refuse outside each day on which there is a collection service - the kerb-side collection system.

The company consists of two management staff and seven operational staff – a driver and six loaders. Currently, we are providing the services using two trucks. The two managers do most of the driving, and the driver replaces one of the managers to avoid delays if the manager is talking with an existing or potential client. The total length of a collection route is less than 20 km because the clients are all located within a concentrated area.

The driver and loaders must work together as an efficient team. For this reason we pay careful attention to the opinions of the loaders regarding the suitability of any new employee. After the new recruit has worked with the rest of the team for a short time, the existing employees are asked for their opinions about the new loader – whether he works well and is a good team member. Their opinion is respected by the management.

We have maintained an open culture - that is, there are no barriers whatsoever between staff and management.

If one truck is in the garage for repairs all the crew work very intensively with the other truck, and a small car goes on ahead to make sure that everything is ready so that the truck will

experience no delays. Vehicle maintenance is always regarded as a priority because of the importance of reliability – customers want a punctual and dependable service.

The customers sign contracts that are valid until a change of residence occurs. Payments are made on a quarterly, half-yearly or annual basis. This encourages regular payments. When necessary, repeated reminders are issued when payment is due. Prompt and efficient services result in happy and satisfied customers, who are therefore more willing to pay.

The collection crews look for new clients along existing routes as they are collecting waste. The importance of staff motivation cannot be overemphasised. Successful operations require an enthusiastic but polite approach towards signing up new customers, a reliable and efficient service, and a positive and conscientious attitude towards enquiries and complaints.

Good communications and public relations are important. (Recently there was a complaint that private waste collection companies were illegally dumping the wastes they had collected. Immediately Blue Bin Services issued a circular explaining that it always takes its waste to the authorised site and operated in an environmentally acceptable manner, and that our service should not be confused with the work of other companies which had started using blue plastic bags).

c) Lessons learned and secrets of success

The following points are regarded as important factors that have led to the success of Blue Bin Services

- Competitive pricing and aggressive marketing. Since there are other enterprises competing to offer the same services, and residents may need to be persuaded that they should engage a refuse collection contractor, it is necessary to continue to seek new customers and to find new ways of expanding the operation.
- Efficient services, leading to customer satisfaction and low costs. Customer satisfaction is essential so that existing customers do not switch to other suppliers, but instead recommend the company to their friends. Operations should be continually reviewed to show ways in which costs could be cut by eliminating wasteful use of time or resources.
- Good customer and public relations. Complaints, whether from customers or others, should be dealt with quickly, and the person who made the complaint should be informed about the action that was taken. Advertisements and fliers have been used. Staff should be instructed in how to talk to customers.
- Creativity and flexibility are important. The management is always looking for new opportunities and is ready to consider new methods of providing the service or of promoting the company. Opportunities in related fields (such as recycling or disposal) are considered.
- The motivation of the staff is crucial. One way to this goal is employee empowerment – making all the staff feel that they are important to the success of the operation and that their ideas and wishes are important. (The participation of the loaders in decisions about new team members is an example of this empowerment).
- Reconciliation of revenues. Sound financial management is vital in such a competitive situation.
- Well maintained vehicles The company has no desire to have its vehicles out of action for any length of time. Planned, preventive maintenance (ensuring that oil changes, inspection and replacement of worn parts are carried out according to a programme), and the use of the best quality spares and oils, are essential steps to ensuring reliability.

d) Problems and fears

The Nairobi City Council exerts little influence over waste management activities. This has led to the mushrooming of dubious companies. These companies operate in an undesirable manner leading to a negative image for the industry. Some companies have been dumping waste

beside roads and in other unauthorised places. The NCC has placed newspaper advertisements to instruct these companies to take all the waste they collect to the authorised disposal site, but has found it difficult to take further action.

We fear the adoption of a centralised system of collecting revenues because of corruption, political interference the lack of policies to safeguard the business that we have built up. If we lose our direct contacts with customers our business could easily be hijacked.

e) Outcomes of our approach

Our philosophy is simply to provide efficient and effective services. If this is done, the rest automatically falls in place. The results are:

- A clean and desirable environment. The number of garbage dumps along our operational route has drastically reduced and in some areas there are none.
- A happy and satisfied clientele who in the long run receive good value for money and a service leading to a clean environment, reduced health hazards, increased property values and other benefits. In turn our clients introduce other clients.

When a reliable service is coupled with an aggressive marketing technique, the business grows.

Annex 10

Sample contracts

This annex contains five contracts. The first is based on a contract that is used in Peru and is presented as a model contract in the SANDEC publication "Non-Governmental Refuse Collection in Low-Income Areas (Pfammatter, 1996). The second comes from La Ceiba in Central America. The other three come from India and are also included in "Lessons from India in Solid Waste Management" (Coad, 1997). Following the five contracts there are some comparisons and discussions.

A10.1 Cajamarca, Peru

In introducing this model contract, Pfammatter and Schertenleib suggested that there should be a clear definition of the work to be undertaken, which should include the following points:

- **Exact definition of the area to be served** (e.g. street names)
- **Description of the type service** (e.g. collection of domestic refuse, street cleansing, transport to a landfill)
- **Frequency of the service** (e.g. twice a week)
- **Duration of the contract**
- **Contractual payment** (including inflation)
- **Conditions relating to overdue payment** (e.g. cost increase due to bank charges)
- **Consequences of inadequate service delivery** (e.g. payment reduction, cancellation of contract)
- **Restrictions or conditions relating to subcontracting**
- **Establishment of a supervisory committee** (e.g. consisting of representatives of each party involved)
- **Legal aspects and conditions**

The following model contract was drafted by Rutas – IPES as the basis of a contractual agreement between the Municipality of Cajamarca (Peru) and "Limdovesa" - a small private enterprise contracted to collect the domestic refuse of about 50% of the marginal urban population, and to transport the collected waste to the municipal landfill.

Contractual Agreement with the Public Cleansing Services

A contractual agreement with the Public Cleansing Services, which includes the following terms and conditions, is concluded between the Provincial Municipality of [] with registered office in [], represented by the Municipal Director Mr/Mrs [], duly identified by ID No. [], hereafter referred to as the Municipality, and the Micro-Enterprise [] with registered office in [], represented by Mr/Mrs [], identified by ID No. [], hereafter referred to as the Micro-Enterprise:

Art. I: Legal Basis

The Municipality signs an agreement with the Micro-Enterprise in accordance with the duties, responsibilities and restrictions as stipulated by the Municipalities Law No. [], the Budget Law for the Public Sector No. [], including the corresponding standards. If the requirements do not meet the limits and conditions foreseen by the aforementioned standards, the decisions will be taken in accordance with the latter.

Art. 2: Purpose

Based on the municipal resolution and by unanimous vote of the ruling parties, the Municipality establishes: "[] a [] % participation of the Micro-Enterprise in the Public Cleansing Service subject to the scope and conditions imposed by the Law[]".

Art. 3: Service to be delivered

As described in the enclosed Annex I (detailed description of service to be delivered and service area), which forms part of the present agreement, the competent municipal authorities have defined the scope of duties of the Domestic Waste Collection and Transport Services to be provided by the Micro-Enterprise. The service is contracted to work according to the "Clean Zone" system (including cleansing of streets if necessary) at a collection frequency of twice a week. The total population to be covered by the Micro-Enterprise amounts to a maximum of [] inhabitants. If the difference between the estimated and the actual population varies more than [] %, the parties will decide on the increase or decrease of the total amount agreed upon in Article 6.

Art. 4: The Micro-Enterprise

The structure of the Micro-Enterprise was decided upon with the support of the Municipality through the Neighbouring Councils which guaranteed the presentation of eligible candidates for the micro-enterprise. The selection of candidates was carried out by an Evaluation Committee composed of Mr/Mrs [] representing the Mayor of the Province, five neighbouring mayors, the head of the Environmental Sanitation Unit of the Municipal Province, the Deputy Director of the Basic Sanitation Area of Health, and a representative of the consulting NGO []. Annex II contains the documentation on the call for candidates and the selected micro-contractors.

Art. 5: Term of the Agreement

Without prejudice to what has been established in Art. 9, the present agreement is valid for [] years and can be renewed annually. Both parties agree to carry out a joint evaluation of the service at the end of the first year.

Art. 6: Contractual Payment

Both parties agree to a monthly payment for the rendered service amounting to US\$ []; this amount does not include taxes. This sum will be increased due to (inflation) every month by [] % up to max. [] % annually.

Art. 7: Payment Conditions

The rendered public cleansing services, as stipulated in Art. 3, will be paid by the Municipality to the Micro-Enterprise not later than on the fifth day of every month and at the end of one month service. The said payment will otherwise be increased by extra charges comprising payments of interest and negative bank interests.

Art. 8: Sub-Contracting

The Micro-Enterprise may not hand over or transfer totally or partially its contractual agreement to third parties, nor restructure, associate or subcontract the service in order to delegate its responsibility. In terms of costs, it may also not contract third party services payable by the Municipality.

Art. 9: Cancellation of the Agreement

The present agreement can only be cancelled by the Municipality if a non-performance of the contracted service is established in accordance with Art. 3 of the present agreement and bearing a notary authentication of half plus one of the members of the Supervisory Neighbourhood Council of the Public Cleansing Service foreseen in Art. 10 of the present agreement of all the Neighbourhood Councils serviced by the Micro-Enterprise.

Art. 10: Quality Control

The "Supervisory Neighbourhood Committees of the Public Cleansing Service", which will have to be set up in each Neighbourhood Council where the Micro-Enterprise operates, is the Control Entity of the Public Cleansing Service operating within the radius of the Micro-Enterprise as established in Art. 3 of the present agreement. These Supervisory Neighbourhood Committees will be composed of the Director of Ecology, Environment and Settlement of the Provincial Council or

his representative, the Neighbourhood Mayor and the President of the Board of Directors of the Micro-Enterprise. In the event of any non-performance other than Acts of God, the Micro-Enterprise is liable for the solving of the said problem as quickly as possible. In the event of repeated non-fulfilment (more than three times), the Municipality is authorised to deduct % from the last monthly payment. Repeated non-fulfilment will be registered, certified and signed by the Neighbourhood Mayor in the area of jurisdiction of the unfulfilled service.

Art. 11: Renewal Terms

At the end of the contractual agreement of three years, both parties will evaluate the possibility of concluding a new contract or terminating it.

Art. 12: Miscellaneous

Since the parties fall under the jurisdiction of the judges and courts of the Municipality, the undersigned are to indicate their registered office at the beginning of the present agreement.

- 12.1 Fulfilment and execution of the present agreement is only valid if written notification is sent to the above-mentioned registered office.
- 12.2 Should a registered office of one of the parties involved change address, it will only be legally valid with regard to the other if the new address is located in the same city and attested by a notary. Meanwhile, notification forwarded to the registered office indicated in the present agreement remains in force.
- 12.3 All those aspects which have not been taken into consideration in the present agreement will be solved jointly between the contracting parties.

The contracting parties hereby declare that in honour of the present contractual agreement with the Public Cleansing Services they are not aware of any contributory negligence which would nullify or cancel it. The agreement is signed in good faith here in the Municipality of [].

Date: []/[]/[]

Mr/Mrs []
Municipal Director

Mr./Mrs []
The Micro-Enterprise

A10.2 La Ceiba, Honduras, waste management services

The following sample contract between MSEs and the Municipality of La Ceiba, Honduras, will be used to set up waste collection, street sweeping and park maintenance MSEs. The contract has been drawn up by IPES based on its experience in Peru. (IPES 1996)

The municipality of La Ceiba, as represented by the undersigned....., hereinafter "the municipality", and the enterprise,, hereinafter "the enterprise", represented by the undersigned, agree on the following:

1. By this contract the enterprise agrees to deliver the following services: in co-ordination with the municipality for the purpose of promoting environmental health and the welfare of the public.
The above-mentioned services are to be delivered daily (or.....times a week). The enterprise agrees to:
2. For the execution of the services, the enterprise will use its own equipment consisting of: This equipment is the property of the enterprise. The enterprise is responsible for all repairs and maintenance, and the municipality has no responsibility (financial or otherwise) for any damage or wear of the equipment.
3. The enterprise agrees to ensure that its employees wear uniforms while delivering the service. In addition the employees must pass medical exams in accordance with the directions of the municipality.
4. The municipality agrees to
5. The municipality agrees to pay the enterprise the amount of monthly for the delivery of the services. This amount is to increase automatically in proportion to the increase of the legal minimum wage for the workers in the private sector according to Supreme Government decree.
6. To guarantee a good quality of the service, the enterprise accepts the supervision of the municipality and commits itself to have regular meetings with the persons responsible for supervision.
7. The enterprise names as its legal representatives the General Manager and the Treasurer, who are jointly to co-ordinate directly with the municipality, and who are responsible for the enterprise's performance, jointly with the other persons that form the enterprise.
8. The duration of this contract is three years, starting on the date of validity with the possibility of renewal by mutual agreement between the parties.

The contract can be dissolved by either party, if it can be proved that the other party is not complying with the contract.

9. This document is valid from 199..., being the date on which the enterprise will start to deliver the service.

Signed by both parties to indicate agreement with the contents of this document on 199...

Municipality

Enterprise

A10.3 Rajkot, India, street sweeping

This contract was used for engaging a contractor for street sweeping in Rajkot in India, in 1995. The client was the Rajkot Municipal Corporation, referred to as the RMC. The arrangement was considered by the RMC to be operating satisfactorily. (As a guide to the currency, Rupees; - the exchange rate with the US Dollar was approximately Rs. 30 = US\$ 1, and the wages of a municipal street sweeper in Rajkot were in the region of Rs. 1800 per month. The minimum legal wage was set at Rs. 42 per day.)

RAJKOT MUNICIPAL CORPORATION HEALTH DEPARTMENT YEAR 1995-6

Terms and Conditions for Cleaning Works on Contract base in ward No. 7, 9 and 10.

TERMS AND CONDITIONS

- 1) The Contractor shall have to arrange at its own cost the materials related to cleaning i.e., Box, Brooms, Fan, Bamboo, Trikum, all sizes of shovels, Phenyle, Acid etc. All materials shall have to be provided by the Contractor. The Corporation shall provide B.H.C. Powder and Cost of the B.H.C. Powder will be deducted from the Bill of the Contractor.
- 2) The Contractor shall have the list of Sweepers.
- 3) The Sweepers shall be paid their Wages as per minimum Wages and as and when declared by The Labour Department of Government. The Contractor should have Provident Fund Number and E.S.I. Number.
- 4) The Contractor shall have to maintain, regularly, The Attendance Register and Attendance Card.
- 5) The Contractor have to get the work done for half day on Holidays declared for the Sweepers, i.e., on Thursdays and Sundays and on Holidays as and when declared or published by the Government.
- 6) The Contractor shall get done, the work of cleaning of areas as well as cleaning of gutters from each sweeper for not more than 30,000 Sq. Ft. area.
- 7) Daily, twice a day, cleaning of areas and gutters shall be carried out by the sweeper in the area distributed.
- 8) The solid waste shall be collected at prescribed places and solid waste box.
- 9) The Areas of cleaning shall be as decided by the Survey Deptt. of R.M.C.
- 10) Penalty of Rs. 100/- per day will be imposed for each area if any area is found uncleaned.
- 11) The Bill Of Sweeper shall be submitted by deducting Rs. 50/- per sweeper those found unattended.
- 12) The Contractor shall have to get the work done for cleaning on the days on which the Government declares holidays for Festivals and Public Holidays as and when declared by The Government.
- 13) The Rules and Regulations of Labour Department and the Rules related to Sweepers should be followed fully. The Rules and Regulations are subjected to change from time to time.
- 14) A daily Report of the daily taken attendance shall be submitted next day at 11.00 a.m. in the Health Department.
- 15) The Working hours and attendance of sweepers shall from 6.30 in the morning to 10.30 a.m. and from 3.00 p.m. to 6.00 p.m. respectively. The attendance timing for morning and afternoon shall be 6.30 a.m. and 3.00 p.m. to 3.15 p.m.
- 16) 20% more sweepers can be kept in addition to the total sweepers.
- 17) If the entrusted cleaning work is not found satisfactory or if not done properly as per the standards, the Contractor will be issued a Notice by the Competent Authority and the Contract will be terminated, as well as the deposit paid by the Contractor will be forfeited.
- 18) Cleaning of Manholes main gutter, closed gutters, as well as Public Toilets and Public Urinals in the entrusted area shall be carried out regularly.
- 19) Payment shall be made on submission of bill every month.
- 20) R.M.C. reserves the right to accept or reject the rates without assigning any reason thereof.
- 21) The decision and order of the Municipal Commissioner will be final in case any dispute arises.

- 22) An agreement shall have to be executed within 7 (seven) days and an amount of Rs...../- shall have to be deposited in the Accounts Department of R.M.C. against Security Deposit.
- 23) The Contractor shall have to arrange to lift the demised Dogs, Pigs, Goat, Cat, etc. whose weight is about 20 kg or below 20 kg.
- 24) The Competent employee of Corporation will Supervise the daily work and the instructions given by the employee shall have to be followed scrupulously.
- 25) The place for attendance shall be the respective ward.
- 26) The Rates shall be quoted for the period of one month for the work in question, and agreement shall be executed for one year on the basis of rates quoted for one month.
- 27) Earnest money deposit should be paid by way of Demand Draft amounting to Rs/- in favour of Rajkot Municipal Corporation and the said Demand Draft should be enclosed alongwith the Tender.
- 28) The copy of Registration Certificate registered for the respective class, Solvency Certificate, Income-Tax Completion Certificate as well as Experience certificates should be enclosed alongwith Tender.
- 29) The corporation shall arrange for Wheelbarrows.

*Medical Officer of Health
Rajkot Muni. Corporation*

A10.4 Solid waste collection, Rajkot, India

The following contract was in use in Rajkot, Gujarat State, in 1995 for engaging contractors to provide a vehicle, driver and labourers for collection of solid waste from community collection points and taking the waste to the disposal site.

RAJKOT MUNICIPAL CORPORATION HEALTH DEPARTMENT

Terms and Conditions for lifting of Solid Waste, Wet Solids, Rubbish, etc. collected by way of cleaning in general in the different wards under Health Department of R.M.C.

TERMS AND CONDITIONS

- 1) The Contractor shall have to quote the rates for Daily lifting up of Solid Waste, Garbage, Rubbish, Fillings etc.
- 2) The Contractor whose Tender will be accepted by the R.M.C. shall have to enter into an agreement on Stamp Paper with R.M.C. by affixing required stamp as per Stamp Duty Act.
- 3) The Time Limit for the said work will commence from the date of agreement up to1995/96. However till the new Contractor is not entrusted the said work, the First Contractor should be continued for further two months.
- 4) The Contractor shall have to pay the Wardwise Security deposit in favour of R.M.C. amounting to Rs. 20,000/- by Cash or F.D.R.
- 5) The Solid Waste, Garbage, Rubbish, Filling, and the Solid Waste from Vankala, as well as filling shall be lifted as per the instructions and satisfaction of the Sanitary inspector or Sub-Inspector of The Ward, and shall be dumped at Sinduriakhan which is located near School No. 63 on Kothariya Road behind Indiranagar Public Toilet and the so lifted solids etc. shall be spread as per the instructions of the Supervisor-in-Charge at Sinduriyakhan.
- 6) The Contractor shall have to quote the rates per day including loading, unloading and Spreading Solid Waste etc. as per the instructions and labour Charges and lifting by Truck from the place as directed including Labour charges etc.
- 7) The Solid Waste etc. shall be lifted by making 4 Trips in Ward No. 9, 11, 13, 17, and 20.

- 8) The Solid Waste shall be lifted by making 3 Trips in Ward No. 3, 4, 5, 7, 8, 14, 18, 19, and the Solid Waste etc. shall be lifted by making 2 trips in Ward No. 16
- 9) After every Trip, the Contractor shall take the Signature of Supervisory staff of R.M.C., in prescribed form.
- 10) The Contractor will have to make his own arrangements for necessary equipment, labourers and Transporting the Solid Waste etc. at his own cost and as such the complete responsibility will be of the Contractor.
- 11) The Contractor shall have to complete the prescribed Trips without fail in every Ward. The Contractor shall have to keep informing in respective Ward without fail, the Trips carried out for the Work. The Contractor shall take the signature of the respective Supervisory staff for Spreading of Solid Waste, Wet Solid, Garbage, Rubbish, Filling, etc. at the place where spread.
- 12) The Dry Solid Waste, Solid Waste, Rubbish, Fillings, as well as The Rubbish from the Varkala, shall be lifted as per the instructions of Supervisory Staff of respective Ward. The Driver shall get Daily Certified by the Supervisory Staff of The respective Ward, for the Solid Waste etc. lifted, as per the Instructions.
- 13) The prescribed Time Limit For Lifting of the Solid Waste etc. will be from morning 6.30 to 2.00 afternoon. The Vehicle should be brought at 6.30 in the morning at Ward Office. The Solid Waste etc. shall be lifted as per the prescribed trips, failing which, a Penalty of Rs. 100/- per Trip will be imposed.
- 14) In The respective Ward if it is observed that the Solid Waste etc. is not lifted or not lifted fully, the same will be lifted fully through other agency at the Risk & Cost of the Contractor and a penalty as per the Condition No. 10 will be imposed as well as the additional expenditure required to be incurred, if any, will be collected / deducted from the bill of the Contractor.
- 15) The Prescribed Trips of the Truck will have to be carried out by the Contractor and if required, the Contractor shall carry out more trips than the prescribed for lifting of Garbage, Solid Waste etc. and cleaning of Ward, especially in Rainy Season and Festival like Janmashtami, Diwali, Makar- Sankranti, and other such occasions.
- 16) The Complete Details viz. from which Ward the Solid Waste etc. is to be lifted by making how many trips, etc. is given in this Tender. In the given limits of trips, the complete solid Waste etc. are required to be lifted. However if the complete Solid Waste etc. is not lifted by the Contractor within the prescribed trips, the Contractor shall lift the remaining Solid Waste etc. completely by making additional trips for which will not be paid extra amount.
- 17) Due To some or the other reason if the Truck doesn't come, the Contractor shall have to arrange for the another Truck immediately.
- 18) The truck loaded with Garbage or Solid Waste etc. shall be covered with Tadpatri. The floor of the Truck body shall be in level and without damages or holes, and shall be of sheet metal fixed at the bottom.
- 19) The Competent Authority or Employee of R.M.C. will carry out the Day to Day Supervision of the Work and by them, if the work carried out is not found Satisfactory, then the Rojkam will be prepared and competent officer will be at liberty to impose and deduct the penalty and will instruct for completion of necessary cleaning Work.
- 20) During the Day to Day Supervision by the Sanitary Inspector, Sanitary Sub-Inspector, competent officer or employee, if the work carried out by Contractor is not found as per the requirement or irregularities in the work, if any, on the basis of report from above staff of R.M.C., the Contractor will be issued a Notice through competent Officer, for declaring the Contract as terminated as well as forfeiting the deposit paid by the Contractor.
- 21) After entering into an agreement with R.M.C., if the Contractor fails to follow the same or if abandons the work uncompleted in that case the deposits paid by the Contractor will be forfeited and the remaining work will be carried out through other agency at the Risk and Cost of the Contractor and it will be sole responsibility of the Contractor for whatsoever expenditure. Also legal proceedings will be carried out against the Contractor.

- 22)** During the Contract of work till completion of the same if any damage to any property, Lives of People or any accident or damages occurs due to the fault of the Contractor, his Truck Driver or his Labourers then the Contractor will have be solely responsible for the same and R.M.C. will not be responsible for the incidents, if any.
- 23)** The Bill For The Work shall be submitted in the Health Department of the R.M.C., in the prescribed form of statement.
- 24)** The Contractor those who are filling up this Tender should have their own vehicle and the capacity of the vehicle should be of minimum 4-5 cum, which is necessary.
- 25)** Alongwith the Submission of Rates for the work, The Contractor shall have to pay Earnest Money Deposit by a Demand Draft in favour of Rajkot Municipal Corporation, amounting to Rs. 2000/- wardwise. The Offer received without Demand Draft for Rs. 2000/- against E.M.D. will be rejected.
- 26)** If the Work will not be carried out up to the mark of Satisfaction or if the work will not be carried out as per the written / oral instructions of the Competent Authority / Employee or if the Contractor is found breaching any condition/s of the Contract, in that case Security Deposit will be forfeited. Also the contract will be declared as terminated, for which no Notice will be required to be issued nor any reason thereof.
- 27)** R.M.C. will be at its liberty entrust the work to another agency in case if it is found that the work carried out by the Contractor is not satisfactory and the same will be binding to Contractor.
- 28)** If any dispute / legal / or litigation arises, the decision of the Municipal Commissioner will be final and binding to Contractor.
- 29)** Upon acceptance of rate of the Contractor whose rate is found to be lowest if the Contractor fails to work, the Earnest Money Deposit will be forfeited.
- 30)** R.M.C. will be at its liberty to terminate the Contract of any ward whenever it is felt that R.M.C. is in position to lift up the Solid Waste.

*Medical Officer of Health
Rajkot Municipal Corporation*

A10.5 Hire of trucks for solid waste collection, Mumbai, India

The last contract is for the provision of an open truck with a driver for the collection of solid waste in the city of Mumbai (previously Bombay) in 1995. The labourers for the loading and unloading the vehicles are provided by the Municipal Corporation. The contract itself is reproduced in full, but there is also supporting information which is not shown in order to reduce the length of this Annex. Information included in the supporting documentation includes

- specifications for trucks with two different carrying capacities (5.66 and 10.58 m^3),
- the number of trips required in each ward (according to the capacity of the truck and the distance to the disposal site),
- the disposal sites that should be used by vehicles from each ward, and
- the numbers of vehicles required for each ward (which vary between the “lean season”, when waste quantities are lower, and the “peak season”).

Specifications, terms and conditions for supply of lorries without labourers, on hire for removal of refuse from wards in the City, Suburbs & Extended Suburbs for the period from _____ to _____.

- 1) Lorries as per specifications at Page 20 & with carrying capacity exclusive of space provided for loaders and implements as indicated in Appendix 'B' at Page 30 shall be supplied to work in the wards during a shift of 8 hours.

Normally timings will be as under:

Lorry supply hours:-

6.00 A.M. to 2.00 P.M.

9.30 A.M. to 5.30 P.M.

2.00 P.M. to 10.00 P.M.

5.30 P.M. to 1.30 A.M. (Next day)

10.00 P.M. to 6.00 A.M. (Night shift as and when required)

S.W.M. Working hours:-

6.30 A.M. to 1.30 P.M.

10.00 A.M. to 5.00 P.M.

2.00 P.M. to 9.00 P.M.

6.00 P.M. to 1.00 A.M.

10.00 P.M. to 5.00 A.M.

Tenderers will note the approximate lorry shifts required in the above shifts, as indicated in Appendix 'I' at Page 31-32.

- 2) The Lorries shall reach the Ward Office not later than half an hour after the notified time. Lorries received thereafter are liable to be returned without use and the Municipal Corporation will not pay any charges whatsoever for the return of such lorries received late.

- 3) If the contractor is called upon to operate the vehicle beyond shift hours, he will be paid an extra rate of Rs. 20.00 per hour. However, less than 30 minutes additional operations will not be paid extra.

- 4a) The cubic capacity of the lorry excluding the space provided for loaders and implements as referred to in clause 5 shall be as indicated in appendix 'B' at Page 30 and the correct dimensions should always be made available with the driver of the lorry. In case the contractor supplies lorries of less capacity, then the rate to be paid shall be proportionately reduced to the actual capacity of vehicle supplied and the charges will be paid proportionately. Cubic capacity will be taken as the product of length, breadth and height of the body of the lorry. In case of vehicles of 10.58 cum. capacity the portion behind the driver's cabin provided for the space for the staff shall be of the same height as the said boards, if the rear board is not of full height as the side flaps, the vehicle will be treated as of less capacity.

- 4b) In case dimension of the lorry is increased for raising the height by providing additional planks, there shall remain no gap which will cause to fall the refuse there from through the gap and litter on the road. However, the partition earmarked for accommodating the labourers and implements shall be kept at nominal height to permit free in the side and rear boards shall be rejected.

- 5) The vehicle of the make prior to 1980 will not be accepted for work as mentioned in tender.

- 5a) Every lorry supplied shall have (a) closing and opening type of tail board of permissible height at the back, (b) fixed strong partition of full height in front side of body as mentioned under condition 4(a), (c) a clear distance of not more than 0.457 mt. from driver's cabin. This shall be provided for use as standing place, for loaders and to keep implements, (d) seating arrangement for six loaders shall be provided in this compartment and this compartment shall be provided with temporary cover of canvas/hood, (e) leaving above space a clear loading space of approx. 5.66 cum. in respect of lorries of 5.66 cum. capacity and app. 10.58 cum. in respect of lorries of 10.58 cum. capacity shall be available for loading adequately with any of the items covered under condition 7. The contractor should take the advantages of length of the body and keep the height as minimum as possible to get the required volume of 10.58 cum or 5.66 cum.

- 6) The contractor shall supply full number of lorries indented for the day. The intimation would normally be given by previous day evening. Contractor's man should attend ward office daily to take the indent. In case of failure a fine of Rs. 25/- per day will be charged.

- 7) The lorries shall be used for the removal of refuse mixed with earth, debris, silt, any other waste materials including carcasses of animals.

- 8) Log sheets will be provided by the ward staff and countersigned by the officer in charge, on production of intimation slip from the contractors wherein it shall be mentioned the registration Nos. of lorries sent, their type whether Petrol or Diesel operated. The contractors shall ascertain that these details are incorporated in the log sheet issued.

- 9) Loading and unloading of refuse shall be done by the Municipal labour.

- 9a)** The Contractor shall make arrangement for unloading the garbage when asked to do so in case of unforeseen circumstances. In that case the contractor will be paid Rs. 60/- as unloading charges per trip of 10.58 cum. capacity & Rs. 30/- for one trip of 5.66 cum capacity.
- 10)** Average number of lorries required daily in the ward will be shown in the Appendix 'I' & as mentioned in clause 3 of the agreement.
- 11a)** At the unloading grounds, the drivers of the contractors' lorries shall obey the instructions of the dumping ground staff for proper entry of log sheets , for treatment by disinfection operations and for systematic parking at the site as shown by the municipal staff. The failure to comply this will be viewed seriously. The contractor shall depute a responsible person at the dumping ground from time to time to see that the lorry drivers are following the instructions of dumping ground staff.
- 11b)** The contractors shall be levied a penalty of Rs. 100/- per trip per lorry if he fails to unload the vehicle at appropriate place and as per instructions.
- 12)** In case of emergency, the contractor shall be asked to work in any of the Wards A to G in the City and H/East, H/West, K/East, K/West, L, M/E, M/W, N, S, T, P/S, P/N, R/S, R/N, Wards in the suburb as and Extended suburbs other than that allotted to him and he shall be paid at the rate quoted by him in the Ward he is operating or the rate quoted by the successful tenderer for the Ward where he is directed to work whichever is higher. However, the vehicles for unloading shall be taken to the dumping ground shown against that ward in which he is directed to operate.
- 13)** In case of breakdown of lorries the proportionate cost would be paid to the contractor according to the actual hours of working. Proportionate cost at Rs 5.00 per man-hour of the entire gang of Municipal labour together with Mukadam, to the lorry will be deducted from the relevant bills of the contractor, based on the man-hours of actual works.
- 13a)** In case the contractors vehicle fails on the road due to the mechanical break-down etc, then the contractor will make necessary arrangement to transfer the refuse immediately to other vehicle and transport the same to the site of disposal.
In case the contractor fails to make necessary arrangements within 3 hours to transport the refuse, necessary arrangements will be made by the Corporation through its own staff and vehicles or through private agency and cost of the same alongwith 15% supervision charges will be recovered from the contractor in addition to penalty for non supply.
- 14)** If the lorries are indented but not utilised for some reason or other and returned within half an hour from the commencement of conservancy working hours, no charges will be paid to the contractors, If the lorries are detained and returned within two hours thereafter 1/4 of the lorry shift charges shall be paid thereafter if the lorries are detained and not utilised for any period not exceeding 8 hours of the shift 1/2 of the lorry shift charges shall be paid.
- 15)** In the event of non-supply of lorries, if the contractor fails to supply the number of lorries indented for the day, the cost of the labour and supervisory staff wasted due to short supply of lorries will be recorded as under:
- 15a)** In case the labour gang together with Mukadam is wasted Rs. 5.00 per man hour of gang will be recovered in proportion to number of hours wasted.
- 16a)** In case the contractor fails to supply number of lorries indented for the day and number of lorries thus supplied less by the contractors shall be hired from any private agency of from open market of Municipal vehicle will be engaged at his risk and cost and the additional cost incurred if any plus 15% supervision charges will be recovered from the contractor in addition to usual penalties.
- 16b)** Penalty equivalent to amount quoted per lorry will be recovered for each vehicle not supplied.
- 16c)** If the lorry is indented for double shift and the contractor supplied only for one shift, the rate payable to him will be 50% of the accepted rate for a double shift and for non-supply for the other shift will attract penalties as mentioned above. Single shift will not be admissible.
- 17)** The Contractor shall provide a board showing that the lorry is on Municipal duty (conservancy work) and the name of the Ward should exhibited on the front side of the lorry at a conspicuous place so long as the lorry is on Municipal Duty. Failure to display the board will render the contractor liable for penalty at Rs. 25/- per vehicle per shift.
- 18a)** Lorries shall be sent to work in perfect working order having proper registration and fitness certificate for road worthiness from R.T.O. and with adequate supply of fuel oil. If the lorry goes for fuelling after it is received for work at the Ward Office the time wasted thereby will be taken into consideration at the time of payment of bills, in case the output of work is affected adversely. Similarly if the driver takes away the vehicles without allowing the vehicle to be loaded adequately proportionate deduction will be effected for the under-load. Mukadam of the loading gang shall be allowed to travel in the driver's cabin.
- 18b)** If it is found that any vehicle has made an accident or is liable to make an accident due to the vehicle not being road worthy or due to mal-operation by the contractors driver or by rash driving by contractors staff such vehicles shall be debarred for use permanently anywhere in any of the wards and it will be contractors responsibility to make up the quota immediately.

- 19) The Contractor shall supply the lorries with tarpaulin cover as per municipal specification which should be in good condition and of a suitable size so as to cover the lorry completely. If the contractor fails to supply cover a fine of Rs. 50/- per trip per lorry will be levied and deducted from the bill. The tarpaulin will cover both side planks and the rear tail board completely from top to the floor of the vehicle and properly fixed by the hooks.
 - 19a) In respect of 10.58 cum. lorries tarpaulin cover should be tied by putting the rope on side and on the back side and tied in the truck.
 - 20) Lorry must go back to the Ward Office after unloading its last trip for relieving the Municipal Labour staff and depositing implements, failing compliance a penalty of Rs. 10/- per shift per lorry will be levied and deducted from the bill.
 - 20a) For each trip lorry must report for inspection of M.L.J.O. [Motor Loader Junior Overseer] or their representatives at a fixed point for each Ward, as decided, for checking each trip before the lorry goes out of section to the dumping ground. Failure to route the lorry through check point will render the contractor liable for penalty at Rs. 25/- per trip per lorry.
 - 21) The cost of any damage injury or death caused by the Contractor's lorry or any claim arising out of it, will be recovered from the contractor through his bill.
 - 22) Commissioner shall terminate the contract for supply of lorries for a Ward or Wards after giving one calendar month's notice without assigning any reasons whatsoever.
 - 23a) In case the contractors come forward with a request to allow them to withdraw from fulfilling their contractual obligations normally such a withdrawal is not allowed. However, if due to circumstances such a withdrawal is allowed, such firms may not be considered for award of work for a period of FIVE YEARS.
 - 23b) The rates quoted should be firm for the entire contract period.
 - 24) The contractor shall prepare separate monthly summaries of bills preferred by them against the various Municipal Departments during the month and send on or before the 5th of the next month these summaries to the respective units of the Accounts Department where the bills are admitted for payment. In case of discount bills, the contractor should submit fortnightly summaries say on 5th and 20th of the month to enable the Accounts Department to admit payment in time. The Corporation will not be responsible for delay in payment of their bills if summaries of bills as indicated herein are not submitted by them by due date as per the clause of the contract.
 - 25) The contractor shall ensure that the payment of wheel tax for the lorries hired by the Corporation from them are cleared by their owners. If any such vehicle or vehicles supplied by the contractor are found to have run in arrears of such wheel taxes, the same shall be recovered from the contractor's bill or deposit after giving him the opportunity to clear the same.
 - 25a) The requirement of the lorries are administrative [administered] wardwise, however for administrative convenience requirement is shown against conservancy wards in some wards. However, it shall be open for the Corporation to use any of the lorries in any of the conservancy wards in the same administrative ward without any extra cost.
 - 26) For evaluation purposes rates as shown in Appendix 'B' at Page 30 will be taken into account.
 - 27) In case the Refuse Vehicles are directed to dumping ground other than principal dumping ground and if the distance of other dumping ground is more than the principal dumping ground the Contractor will be paid at the rate of Rs. 5/- per km. for the additional distance in one direction irrespective of the capacity of the lorry. For example if the dumping ground of A/S Ward is changed from Deonar to Mulund then the contractor/s will be paid additional amount of Rs. 57.50 only.
 - 28) In case the distance of other dumping ground where the Refuse lorries are directed, is less than the principal dumping ground then an amount of Rs. 5/- per km. will be deducted from the rate of Principal dumping ground for the distance less than principal dumping. The distance is as mentioned at Page 33-34 of the tender form.
 - 29) The representation regarding dispute in distance at Page 33-34 will not be considered.
 - 30) The contractor should display the registration No. of the vehicles and the name of the ward on the top portion of the cabin on the cleaner's side.
 - 31) In the wards whose contractor/s vehicles, are supposed to make two trips per shift, but in case their vehicle does only one trip in a shift due to breakdown. In such cases 50% amount of the rate quoted per shift will be recovered from the contractor's bill as a penalty.
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A10.6 Comments

This collection of five contracts shows a wide range of styles. Before preparing a contract it is worthwhile to take some time to study all the contracts in some detail. On one hand, there are benefits in a simple contract, and on the other, it is important to specify exactly what is required and what actions will be taken if the contractor fails to do what is required. Some basic differences between these contracts are:

- The contract for Cajamarca starts by referring to laws and objectives, but others do not refer to the relevant laws.
- The first and fifth examples are much longer than the others, because they also include a number of annexes that are not reproduced here. A longer contract may be more precise from the lawyer's perspective, but may be more difficult for the microenterprise owner to use.
- The two Latin American contracts are for periods of more than one year and suggest ways that the monthly payments are to be increased – for Cajamarca "up to" a certain percentage, for La Ceiba according to increases in the minimum wage.
- The Cajamarca contract also specifies when the MSE is to be paid, whereas the others leave this important point open.
- The Indian contracts place heavy emphasis on the requirements that tenderers must comply with, including documents relating to registration, payment of taxes and experience. There are also some significant financial outlays (as fees and deposits) that are required before a contractor can start work.
- The Indian contracts also specify clearly what the consequences of specified failures will be.

The contract for sweepers in Rajkot includes requirements for monitoring the attendance of sweepers, and penalties for non-attendance of sweepers, (rather than only being concerned that the work is done) so the client becomes involved in the detailed management of the contractor.

The contract for refuse collection at Rajkot requires that vehicles should do extra trips for no extra payment, at times of extra waste generation, such as festivals.

Several payments and deposits are payable in connection with the Rajkot collection contract. Apart from the tender fee, there is a security deposit of Rs. 20,000 and an earnest deposit of Rs 2000 which is forfeit to the Municipal Corporation if the selected contractor decides not to undertake the work.

The following requirements relate to the equipment that is to be supplied by the contractors in Mumbai (Section A10.5). To conclude this annex, the contracts are contrasted in a table.

Administrators like to write strict conditions and demand a high specification, but consideration should also be given to how the regulations and standards will be enforced, and whether some of them are really necessary. For example, it is likely that many of the contractors' vehicles do not meet the requirements for age and some may not meet the requirements regarding the dimensions of the loading space. Since the unit cost of waste collection depends upon the volume of waste loaded, it is important to uphold the requirements for the loading space.

The terms and conditions clearly show the benefits of using contractors to supply vehicles. All concerns about availability and maintenance are taken care of by the contractor. Enforcement of discipline in terms of timing and deviation from required operational procedures can be achieved by reducing the fee that is paid at the end of the month, provided that the staff are not intimidated by the contractor.

Perhaps a major issue is the quality of the vehicles. Loading and unloading are slow and unhygienic, and a large area of the disposal site is required for large numbers of open trucks that require 25 minutes to be unloaded. The vehicles that the contractors supply are old and suitable for a wide variety of purposes, and if a contractor does not win a contract, he might use the vehicles for other purposes. Could contractors be persuaded to supply vehicles that are specially

designed for handling solid waste? Modern and efficient solid waste collection vehicles are not well suited to transporting other types of materials, so before a contractor would consider investing in a specialised refuse collection truck, he would need to know that he had a contract for a long period (at least five years) and that the contract would pay enough for him to recover the cost of his investment. An alternative might be for contractors to lease the vehicles, but there is always the problem of how to ensure that the operator maintains the vehicle well and takes good care of it. A maintenance contract is another possible way of reducing the workload of municipal managers, but the municipal corporation must then find the capital required to purchase the vehicles.

The contractors trucks system in Mumbai may not be elegant or modern, and it may be more expensive than some alternatives, but it has provided a reliable service, and reliability is of great importance in solid waste management.

A10.7 Comparisons of contracts

Aspect of contract	Articles or clauses					Comments (The numbers in this column refer to the five contracts (So (1) refers to the contract for Cajamarca, (3) for sweeping in Rajkot etc.)
	1. Cajamarca	2. La Ceiba	3. Rajkot sweeping	4. Rajkot collection	5. Mumbai transport	
Background and administration of contract	1, 2, 12.1.	6,	13, 20, 21, 22, 27, 28.	2, 4, 24, 28.	25.	(2) Regular supervisory meetings (3,4) Earnest money to be deposited, it is forfeited if contractor fails to take up the work. Copies of registration and taxation documents to be provided.
Definition of the task	3 + annex.	1,	5, 6, 7, 8, 9, 12, 15, 18, 23, 25,	1, 5, 6, 7, 8, 10, 13, 15, 16, 17, 18,	1, 6, 7, 9, 11,	(1) Defines range of population size to be served. (2) Little guidance in contract document (3) Defines service on public holidays, defines working hours. (4) Number of trips for each truck is specified, but if more trips are required, they shall be made at the contractor's expense
Additional requirements of contract		3,	1, 2, 3, 14, 16,	22, 24,	3, 4, 5, 12, 17, 21, 30,	(2) Uniforms and medicals (3) Provision of equipment, provision of list of sweepers, requirements for pay and benefits for sweepers, maintenance of attendance register. (4, 5) Specification of vehicles. (5) Working extra hours
Client's responsibilities		4,	29,		28, 29,	(2) No requirements in contract document (3) Client to arrange for handcarts (5) Extra payment if alternative disposal site to be used.
Selection of the contractor	4 + annex,			29,	26,	(4) Lowest tender price (5) Truck specifications
Duration and renewal	5, 11,	8,	26,	3,		(4) If the contract is not renewed, the contractor must be ready to continue to provide the service for a further 2 months, if required.
Arrangements for payment	6, 7,	5,	19,	23,	14, 24,	(1, 2) Allowance for monthly increase in line with inflation (5) If vehicles are not required.
Consequences of inadequate service delivery			10, 11, 17,	13, 14, 20, 21, 26, 27,	2, 11b, 13, 15, 16, 18, 19, 20, 31,	(1,2) Not specified, except possible non-renewal of contract (4) A penalty is payable if the prescribed number of trips are not made, or if some waste is not removed. (5) Breakdown
Subcontracting	8,					(1) Contractor must retain responsibility
Cancellation	9,	8,	17,	26, 30,	22, 23a,	(2) Terminated if either party proved not to be keeping to agreement (4) Contract can be terminated even if contractor's performance is satisfactory. (5) One month's notice required. Penalty if contractor withdraws
Supervision	10,	6,	24,	9, 11, 12, 19,	8,	(1) Neighbourhood supervisory committees to be set up. (2) Contractor accepts municipal supervision (3, 4) Municipal corporation supervises
Information about contractor	12,					(1) Address of registered office
Provision for changes	12.2,					
Provision for amendment to contract	12.3,					

Annex 11

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Annex 12

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