

Solid waste management and the Millennium Development Goals

Links that inspire action

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with contributions from Sanjay K Gupta and Jonathan Hecke



CWG

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1. Introduction

1.1 What are the priorities?

Does it really matter what happens to our garbage and other unwanted materials and items? Is solid waste management an issue that we should be concerned about, or is it only of marginal importance? Is there any justification for devoting resources to the collection, recycling and disposal of wastes, or should we focus on other issues first?

The urgent need for improved living conditions for most people in the world led to the formulation and adoption of goals for improving the lives of the poor and those who live in less developed situations. The purpose of these goals is to focus policies and efforts on activities that can have the greatest beneficial impacts. What guidance do these goals – known as the Millennium Development Goals (MDGs) – give us about the urgency and relevance of improving our solid waste management practices?

Not all attempts to upgrade solid waste sanitation have been successful. Some initiatives that have relied too much on capital investment in technology have proved disappointing. However, new approaches are evolving. More attention is now being given to alternative providers of services, in particular the private sector, community groups and the informal sector. The importance of citizens' participation is being realised. Sustainable improvements are possible.

Solid waste management is not just a question of aesthetics. Lack of management of solid waste leads to serious risks to public health and the environment, each risk having its own economic cost. There is also evidence that aesthetics – the appearance of a locality and the absence or presence of nuisance – influences behaviour that can lead to pollution and impacts on health, as well as indirectly causing economic costs. Solid waste management is an issue that deserves to be taken seriously.

Solid waste management provides many opportunities for livelihoods, both from employment within the formal sector (public or private) but also in the informal sector, particularly in connection with recycling. The status within society of people working with waste is of considerable significance, particularly in connection with education and healthcare, as will be shown later in this booklet.

1.2 What is the purpose of this booklet?

It is intended that this booklet will be useful to two groups of readers:

- If you are aware of the Millennium Development Goals and seeking to implement them, and wish to know more about how improvements in solid waste management can impact on the achievement of Targets and Goals, this booklet will help you. The following pages show how better management of our wastes can lead to the improvements demanded by the MDGs. This booklet is not written for specialists in solid waste management, but for readers from a wide range of backgrounds. For this reason there is a word list in Part 5 at the back of this booklet that provides explanations of the terminology that is used.
- If your responsibilities include solid waste management and you are wondering how to direct your resources and efforts to achieve the most benefits for the communities you serve, you will find help in these pages. The Millennium Development Goals were formulated by leading thinkers and actors in the field of development, and reflect their wisdom and experience in identifying the priorities for achieving lasting improvements in the lives of the poor. The MDGs have the support of national leaders and international organisations, so programmes and projects that are in harmony with these Goals are most likely to attract political and financial support. If you are not familiar with the Millennium Development Goals, this booklet will tell you what you need to know, starting with the introduction in Box 1.

Box 1 An introduction to the Millennium Development Goals (MDGs)

In September 2000, the Millennium Declaration was ratified by 189 heads of state at the United Nations Millennium Summit. The Declaration outlines eight broad Goals. Within these are eighteen Targets – most set for 2015 using 1990 as a benchmark – and forty-eight Indicators. These Millennium Development Goals represent a global commitment by all nations who signed the Declaration to reduce poverty and improve lives.

Solid waste management is not mentioned explicitly in the Goals, Targets or Indicators, but this booklet demonstrates clearly that the right approach to solid waste management can produce significant progress towards achieving many of the Goals. All eight Goals are discussed, as are eleven of the Targets, and links between solid waste management and the MDGs are identified. In the following sections, each Goal will be stated, together with the most relevant Targets.

Applications for funding and expertise to help improve solid waste management are likely to be more successful if it is shown that the objectives of the improvements are in line with the MDGs.

1.3 How are the contents arranged?

In Part 2, the eight Goals are presented, together with relevant Targets. For each one, the links between solid waste management and the Goal and Target(s) are explored, often with the aid of an example. Suggestions for improving the situation are presented. The number and strengths of the links between solid waste management and each Goal clearly vary from one Goal to the next, but there is no need for a strong relationship to every Goal. Even if only one Goal is served by improved solid waste management, that is sufficient justification. However, the following discussion will show that there are links between solid waste management and all the Goals.

1.4 The origins of this booklet

This booklet¹ is based on discussions and presentations at a recent international CWG workshop². Many of the examples that are mentioned are taken from the papers that were presented at this workshop. A list of these papers is included at the end of this booklet. The Collaborative Working Group on Solid Waste Management in Low- and Middle-Income Countries (CWG) is an international network which encourages interaction between partners on key solid waste management issues. It covers the wide range of aspects that affect solid waste management, including institutional, social, financial and technical aspects. This publication is one of a series that can be obtained from the CWG³.

1 The material in this book was researched by Barbara Gonzenbach, with contributions from Sanjay K Gupta and Jonathan Hecke, and the final version was written by Adrian Coad.

2 In February 2006, 70 solid waste professionals from 45 countries met in Kolkata, India for the CWG-WASH workshop entitled "Solid Waste, Health and the Millennium Development Goals". The workshop report and the full text of each paper can be downloaded from the CWG website:- www.cwgn.net.

3 Other booklets in this series are listed in Section 4.3 at the end of this booklet.

2. The links – How improved solid waste management can contribute to achieving the Millennium Development Goals

Goal 1	Eradicate extreme poverty and hunger
Target 1	Halve, between 1990 and 2015, the proportion of people whose income is less than a dollar a day.
Target 2	Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

The solution to poverty is not begging or a dependence upon handouts from the state, but employment in economically useful activities. Solid waste management provides many opportunities for employment – in street sweeping and waste collection as well as in the recycling of useful materials.

In many countries, significant proportions of the urban populations are involved in recycling. In general, recycling involves

- collecting – directly from houses and businesses – discarded items that can be sold for reuse or reprocessing,
- sorting through mixed wastes and taking out material and items that can be sold,
- washing and sorting these salvaged recyclables and
- processing them into raw materials that can be used by others, or manufacturing new products.

The production of compost from organic waste is a particular example. If excluded from such work, tens of thousands in each of many of the world's largest cities would have no income and no means of supporting their families.

Many employment opportunities are found in waste collection, as municipalities, NGOs and community groups work to extend collection services to all of the rapidly-growing urban populations. In many areas this work is labour-intensive because access to houses in traditional and unplanned areas is too restricted for motor vehicles, because labour-intensive methods are cheaper or more reliable, or because of a deliberate policy to favour employment generation.

Employment in solid waste management can be found in the formal sector – as employees of local government or of registered companies – and in the informal sector – working independently or within an organised system that is not registered as a commercial undertaking. In many cases the informal sector is more efficient than the formal sector, and able to provide services that local government and formal companies cannot provide in a sustainable way. Increasingly the informal sector is being seen as an important partner, though there are still many officials who oppose or ignore it.

Manual jobs in solid waste management are largely open to any who wish to work in this way, since many of the tasks require neither starting capital nor specific skills and training. Consequently, recycling and house-to-house collection provide opportunities for many to earn their living. Information about the household incomes of people involved in informal sector operations is not known for many situations, but data from Mexico show that informal collectors of recyclables earn significantly more than the minimum wage [Medina, paper 10]. Incomes are generated not only from collecting and trading recyclable material, but also from processing it and selling the products. Solid waste management clearly contributes to achieving Millennium Development Goal 1.

Box 2 Recycling in India

In India, nearly one million people find livelihood opportunities by engaging in waste collection and recycling, through systems that are well organised, though informal in nature. Some segregation at source is practised – newspapers are kept separate and sold to dealers, and the law now requires segregation into two categories – wet waste and dry waste – in order to aid the separation of recyclables. Materials that can be recycled are collected from the streets, and sorted at street containers and at disposal sites. [Dasgupta, Paper 47]

Recycling of waste results in many benefits for society – expenditures on transporting and disposing of wastes are reduced, demands for raw materials and energy are reduced and, as a consequence, the production of greenhouse gases is likely to be less. Estimates for Buenos Aires suggest that, each day, recycling activities save more than US\$ 10,000 in municipal expenses and recover materials with a value of more than US\$ 20,000 [Koebs, Paper 34]. However local pollution is often caused by recycling activities, and, in general, the health of recycling workers is threatened by unhygienic and sometimes hazardous working conditions. The public can also be put at risk by the reuse of food, drink and medicine containers, and by the reuse of medical supplies.



This recycled plastic is being dried after having been sorted according to colour, shredded and washed.



Many people earn their living by picking up waste at disposal sites. There are obvious safety and hygiene problems, but there is no alternative source of income for these people.

Waste workers often face hostility and harassment, because they are distrusted or their work is considered to be dirty and therefore not deserving respect. If the status of the millions of street sweepers, waste collectors, and recycling workers can be improved, we will move a step closer to the eradication of extreme poverty and hunger. Collaboration between local government and NGOs in Brazil has been very successful in raising the status of recycling workers [Dias, Paper 11]. The status of waste workers has relevance to other MDGs also – particularly Goals 2 and 5.

Some development approaches to alleviate poverty tend to treat waste pickers as a social problem, rather than seeing them as economic actors. If solid waste management is to contribute to the achievement of the MDGs, it is important to look for ways of increasing the scope and improving the productivity of these activities, and of upgrading the status, as well as the living and working conditions, of those involved. Attempts to upgrade these working conditions must be undertaken wisely and gradually in order to ensure that this employment opportunity is not stifled. New approaches in providing solid waste collection services (such as involving the private sector) should be developed as much as possible in harmony with existing informal sector recycling activities. The aims of action that affects the informal sector should be to reduce hazards and improve productivity, rather than attempting to stop these activities, thereby causing conflict and threatening livelihoods.

→ What could be done (Goal 1)

- Legalise or protect informal waste workers (for example, providing identity cards) to reduce harassment and hostility towards waste workers. It may be necessary to direct police officers and local officials to deal with these workers in a more sympathetic way.
- Provide suitable facilities and assist recyclers to buy or rent tools (containers, carts, protective gear, etc.)
- Organise collection services such that recyclers have access to the waste.
- Promote at-source segregation of waste, so that sorting is more efficient and less unpleasant.
- Keep hazardous industrial and healthcare wastes out of the general municipal wastes.
- Make citizens aware of importance of waste management (using a range of methods) and encourage them to value waste workers and so enhance their status.
- Develop means of communication with the informal sector, to allow negotiation of working practices and to provide information regarding hygiene and safety.
- Consider options for involving the community, NGOs and the private sector in the provision of waste management services.
- Consider the needs and activities of the informal sector when establishing contracts, policies and mechanisms.

Goal 2 Achieve universal primary education

Target 3 Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

In contrast with Goal 1, solid waste management does not provide a means for substantial achievement of this Goal, but the right approach to some aspects of waste management can contribute to progress.

Many of the children of waste workers share in the work of their parents to supplement the family income and reduce the need to hire paid labour. Other children work independently. Most work as informal sector waste pickers. In some societies children also work in waste collection, since it is culturally acceptable for a child to collect waste from inside private property, but not acceptable for a man to do this.

Box 3 The role of children in solid waste management

According to an ILO report [Reference A], scavenging children can contribute a considerable share of the family income (varying from 10 to 50% of an adult's income), which makes it difficult to convince their parents to let the children go to school. In the Philippines, children can earn more at scavenging than do neighbourhood adult factory workers working a ten hour shift. In Tanzania, children from 6 to 12 earn 10 to 25%, while children from 13 to 16 earn 50% of an adult income. In Egypt, children can earn 30 to 50% of an adult's income, or provide unpaid labour, which saves the family the cost of hiring someone from outside.

A study carried out by UNICEF in 1998 estimated that 45,000 children in Brazil worked in waste picking, 30% of them without schooling [quoted by Dias in Paper 11].

The reason why children cannot or do not attend school is not simply because they are working. In many cases parents cannot afford the costs of sending their children to school (fees, uniform, meals, school materials, etc). Families working on disposal sites may live far from the nearest school. Children may be required to look after younger brothers and sisters. Some may be refused entry because they do not have birth certificates. Furthermore, education may not be considered important in the culture of the parents.

Children who work in waste are likely to face discrimination at school from teachers and other children because of the social stigma attached to their work, their dirty clothing and lack of hygiene. Children who are enrolled in school but continue to work in the waste business may often be absent or arrive late, and their concentration may be reduced due to their exhaustion or lack of sleep.

Until it is possible to eliminate child labour in the waste industry, it may still be possible for children involved in this work to attend school, since the working hours are usually very flexible, and families involved in this work remain at one location rather than travelling from place to place, as they might if looking for casual work. If the productivity and earning power of waste pickers is improved, parents have less need of the labour of their children. As links between the informal sector and the community and authorities are improved, it should be possible to negotiate a means of providing some education for these children. Where the informal sector continues to be victimised or ignored, not much progress can be made.



A daughter of waste pickers riding on a cart in Brazil [Dias, Paper 11]

→ What could be done (Goal 2)

- Until child labour on disposal sites is eliminated, ways should be found to enable those children to attend school (such as making schooling times compatible with waste workers' schedules, and establishing free crèches for younger children of waste workers).
- Awareness campaigns for waste workers with children about the importance of education.
- Improve working productivity and earning power of waste pickers so that there is less need of the labour of their children.
- Prevent social exclusion of waste worker children.
- Provide basic hygiene facilities for waste picker families.

Goal 3 Promote gender equality and empower women

Target 4 Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

The obstacles to gender equality are much influenced by culture, and so vary greatly from place to place. Gender roles are determined both within the family circle and by society at large. In the waste business, it is often the case that males are involved in collection and transportation of waste while females are given the unhealthy tasks of picking on disposal sites and sorting collected waste. Women are usually more concerned for the cleanliness and environment of the home, particularly as it relates to the health and safety of their children. Reference B provides a useful review of gender aspects related to waste management.



Gender inequality. The man is responsible for driving, so he relaxes while women load the vehicle.

Because women are often more involved than men in the local community and in the condition of their surroundings, they can be very effective in providing sweeping and primary waste collection services for their communities. Such services may be an integral part of the service under the responsibility of the local government, or they may be services organised by the community itself. Some examples are mentioned in reference C. In situations in which these services are contracted out, it is wise to divide up the work so that at least some contracts can be taken up by microenterprises led by women serving their own communities.

The particular Target is concerned with education, and the main contribution that can be made by solid waste management policy in this regard is to seek to integrate waste workers and pickers into society and improve their status so that there are fewer barriers to the integration of their children into the education system. Partnerships with NGOs that seek to provide girls with education should be encouraged. Box 4 gives an example of an imaginative and effective scheme to provide daughters of recycling workers with a practical education.

Box 4 New opportunities for the daughters of informal sector waste workers

For more than 50 years, much of Cairo's waste has been collected by the informal sector. The waste that they collect provides the main source of income for these people, who are known as Zabbaleen. The sorting of the waste is done by women and girls, and so few of the girls have the possibility of obtaining a formal education. A local initiative has provided them with skills and training that will assist them to find new opportunities. The skills are based on recycling – initially the weaving of rags into carpets, but subsequently also sewing using scraps of clean cloth, paper-making and other handcrafts. Education is woven into the vocational training. The students must demonstrate good standards of personal hygiene and timekeeping, and learn the considerable arithmetic and literacy skills needed for their work. When they have mastered the skills of weaving, they are assisted to obtain microcredit to pay for their own looms and set up their own businesses, working from home. More information is available from reference D.



Sitting in front of the rag-carpet looms, this daughter of an informal sector waste collector and recycler is making attractive handwork articles out of waste materials.

[Source: Laila Iskandar]

➔ **What could be done (Goal 3)**

- Before establishing a project, investigate the gender roles in the local society and plan activities accordingly. Take concrete steps to ensure that women are consulted [especially in situations where they might normally be excluded from decision-making processes].
- Establish crèches to enable mothers to work and older sisters to attend school.
- Write tender documents for primary collection and sweeping services such that it is possible for groups of local women to bid for them.
- Ensure that any loan facilities are available to women as well as to men.

Goal 4 Reduce child mortality

Target 5 Reduce by two thirds, between 1990 and 2015, the under-five mortality rate

Diarrhoea is a major killer of young children in developing countries. Solid waste is implicated in the spread of childhood diarrhoea. One transmission route for this class of diseases is the housefly carrying microbes from faeces to food. Houseflies breed in piles of rotting garbage. Good solid waste management – involving storage of waste in containers, removal at a frequency of at least once a week, and effective disposal – is effective in reducing the numbers of houseflies and therefore reducing the spread of diseases that kill young children. Pollution of water by waste, the reuse of contaminated containers and reduced general hygiene (because of indiscriminate waste dumping) are other ways in which gastro-intestinal diseases are transmitted.

Box 5 Health impacts on children

■ Importance of regular collection

The Federal University of Bahia, Salvador, in Brazil looked at the effect rubbish has on young children's health. The study was carried out in Canabrava, a poor district near to Salvador's rubbish dump, amongst children under the age of two. The results suggested that children from families where there is no rubbish collection are four times more likely than other children to have diarrhoea. This is due to the fact that adults touch the children after handling rubbish, because children play near the rubbish and may pick it up and play with it, and because the rubbish attracts animals that defecate near the home, the faeces attracting insects which then contaminate food. [Reference E]

■ Risks faced by children on disposal sites

In Buenos Aires, according to a survey reported in Paper 34 [Koehs]:

- 1 in 4 children from 0 to 10 years old had already suffered a work-related injury
- one third of the 10 to 14 years olds had been hurt while working
- half of the adolescents from 15 to 17 had been injured one or more times as a result of their work.

Smoke from burning dumps causes chronic respiratory problems in people on the sites and those living downwind. Fires also cause unopened food cans and aerosol cans to explode. Eye disorders are caused by smoke and poor hygiene. When children cut themselves (there are many sharp and dangerous items in municipal solid waste) there is a risk that they will contract tetanus and hepatitis.

Children have been killed in accidents involving abandoned domestic appliances, and hazardous industrial wastes improperly disposed of present various serious health risks.



A waste dump is a dangerous place to play.



Sitting in the waste each day, this little boy is likely to suffer many serious health problems.

➔ What could be done (Goal 4)

- Improve the solid waste collection service [including storage of waste in containers and removal at a frequency of at least once a week] to reduce the numbers of houseflies and other carriers of disease, thereby reducing the spread of diseases that kill young children.
- Raise awareness regarding the risks that children face from contact with waste and from flies, especially when living near dumpsites or when working as waste pickers.
- Upgrade waste disposal sites from open dumps to landfills, ensuring that there are no fires in the waste, and that any particularly hazardous wastes are properly disposed of. Control access to the site so that children do not enter.

Goal 5 Improve maternal health

Target 6 Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio

Every year, more than half a million women die in pregnancy or childbirth. Of these deaths, 99% occur in the developing world. For every woman who dies in childbirth, around 20 more suffer injury, infection or disease⁴. High maternal mortality rates in many countries are the result of inadequate reproductive health care for women and inadequately spaced births.

Women who work as waste pickers, sorters and recyclers – and their new-born babies – are at particular risk from infection because of the high concentrations of disease-causing bacteria associated with solid wastes, because of the lack of access to sanitation and washing facilities, and perhaps a lack of awareness of the importance of cleanliness. Their health may also be threatened by chemical pollutants, some of which are mentioned in Box 6.

Box 6 The effects of chemical pollution

Exposure to chemicals emitted from locations where wastes are stored, processed or disposed can lead to a variety of illnesses and defects, including low birth weight and shortened gestation.

- A California study found children born to mothers living within a quarter-mile of a superfund (hazardous waste) site had a higher risk of birth defects, such as heart defects and neurological problems;
- Pregnant women handling electronic waste put their unborn babies at considerable risk because of the heavy metals and other materials incorporated into electronic components;
- People living or working downwind of crude waste processing facilities (plants that are not designed to minimise air pollution and that are not inspected and monitored by environmental experts) may be exposed to dangerous concentrations of heavy metals.
- Smoke from burning plastic often contains dioxins which can lead to malformations of the foetus, decreased reproduction and growth rates, and impairment of the immune system.

Some of the effects of heavy metals are:

- cadmium interferes with the growth of unborn babies,
- exposure to lead can cause early delivery or dead births, and has been proven to cause physical and developmental damage to the unborn children, and
- mercury can cause brain damage in foetuses.

[Based on information from Reference F.]

4 <http://www.who.int/mdg/goals/goal5/en/index.html>



A pregnant woman should not be doing this kind of work, especially in the last months of her pregnancy.



The processing of electronic waste presents new hazards.

[Additional paper by Joseph and Ramesh]

➔ What could be done (Goal 5)

- Attitudes and understandings regarding maternal health should be discussed with waste workers to identify the barriers, real or imaginary, that prevent or discourage pregnant women from having prenatal checkups and seeking medical attention.
- Working with the local medical authorities, methods should be developed for overcoming these barriers. Education and information should be available for women working with waste, especially if they are or feel socially excluded and so do not participate in schemes used by women outside the waste industry.
- In situations where recycling workers belong to co-operatives, or dump pickers are controlled by the management of a disposal site, there should be a simple insurance scheme that allows pregnant mothers to avoid strenuous work during the last months of their pregnancies and in the first months of their babies' lives, and that enables them to have essential medical attention.
- In some situations it may be possible to ban pregnant mothers from working as waste pickers in the last months of their pregnancy, provided that this does not result in their financial hardship.
- Informal metal processing plants should be included in the regular monitoring carried out by environmental staff, and they should be upgraded or relocated as necessary.

Goal 6 Combat HIV/AIDS, malaria and other diseases

Target 7 Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

There is a wide range of health risks and potentials for injury associated with solid wastes that are improperly managed, but the discussion here will be limited to HIV/AIDS, hepatitis, and malaria and other mosquito-borne diseases.

HIV/AIDS The HIV virus does not remain viable for long in the open air, so the numbers at risk of transmission via solid waste are small. However, the seriousness of the infection means that great care must be taken to prevent even one case. The most likely transmission route for HIV is needles that contain infected blood. It is likely that the virus remains viable in the blood inside a needle much longer than in the open air, and so great care should be taken in handling and disposing of needles used for giving injections, taking blood samples and administering intravenous infusions. Methods used by hospital staff for discarding used syringes must be carefully developed. Hospital staff should be thoroughly trained so that the risk of any needlestick injury is as low as possible. Containers used for storing used needles should be puncture-proof and not prone to spilling their contents, and methods of handling and transport should be carefully developed and strictly enforced. Even most types of protective clothing provide no protection from the points of needles – heavy leather gloves and aprons provide reasonable protection, but they are expensive and difficult to work in. Unfortunately, many initiatives to improve hospital safety focus on the much easier task of installing incinerators, but without safe practices in the stages leading up to incineration, good storage, and intensive training and supervision, the provision of incinerators is likely to have no impact on the transmission of HIV. All the main risks occur at the earlier stages.

Hepatitis The hepatitis B and C viruses survive longer than HIV, and so prevention of these diseases requires control of wastes that may be infective over a longer time period. In addition to the risk of accidental needlestick injuries there are also risks resulting from the reuse or recycling of such wastes. In some countries used syringes and needles are washed (but not effectively sterilised), neatly packaged and sold for subsequent use in medical treatment. This is a very dangerous practice. A further risk arises because children like to play with syringes and tubing. The materials from which syringes and tubing are made are highly valued by recyclers, and the handling of these items by recycling workers poses another serious risk. The presence of an incinerator for burning such wastes does not solve the problem, unless there is very strict supervision, because the

valuable wastes are sold to recyclers before they reach the incinerator. Reuse of needles can be prevented by using equipment that destroys the needles at the point of use by heat or cutting.



In many low- and middle-income countries there are shocking cases of negligence regarding the disposal of wastes from hospitals and other healthcare establishments. The example shown in this photograph – children in bare feet next to discarded needles – is totally unacceptable.

[Rouse, Paper 19]



This box is an acceptable way of storing sharps. The thick walls are waterproof and difficult to pierce with a needle. The box is used only once, and is disposed or incinerated with the needles still inside it.

Malaria is transmitted by the Anopheles mosquito and **yellow fever** and **dengue fever** are transmitted by the Aedes aegypti mosquito. These mosquitoes breed in rainwater that collects in discarded containers, tyres, coconut shells etc. Such items, whether around houses or on waste disposal sites, should be covered or prevented from collecting water. **Filariasis** is spread by the Culex pipiens fatigans mosquito which breeds in stagnant polluted water. The practices of dropping wastes in drains and sweeping waste into drains cause blockages which provide ideal breeding grounds for such mosquitoes. Good solid waste management helps to prevent these major diseases.

➔ **What could be done (Goal 6)**

- Inform the public about the risks and methods of transmission of these diseases and assist them to take action to minimise these risks.
- Develop safe methods for managing infectious wastes in hospitals and clinics, train the staff intensively in their responsibilities and supervise carefully to ensure that healthcare staff and the general public are no longer at risk from these wastes.
- Deny mosquitoes their breeding locations (stagnant water) to cut down the incidence of mosquito-borne diseases. Keep solid waste out of drains; prevent the collection of rainwater in discarded containers and tyres that are left in the open.

Goal 7	Ensure environmental sustainability
Target 9	Integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources
Target 10	Halve by 2015 the proportion of people without sustainable access to safe drinking water
Target 11	By 2020 to have achieved a significant improvement in the lives of at least 100 million slum dwellers.

“Environmental sustainability” is a very broad term. The various Targets and Indicators of the MDGs focus on more specific aspects. Some of the ways in which solid waste management can contribute towards progress in this field are discussed briefly below.

Forests Paper and other fibres that are recycled to make paper reduce the demand for virgin pulp. Anaerobic digestion of biodegradable solid wastes produces biogas which reduces the demand for firewood for cooking. Compost made from solid wastes has been shown to increase the survival rate of seedlings in tree planting campaigns.

Energy efficiency The use of recycled materials in some production processes requires much less energy than if raw materials are used. This is especially true of glass and aluminium, when long transport distances are not involved (which would themselves consume energy). Recycling and decentralised composting save on the energy used for transporting waste to landfills, which can be significant where disposal sites are at a considerable distance.

Carbon dioxide emissions The main concern with regard to carbon dioxide is the greenhouse effect which is resulting in global warming. Methane, which is produced by the decomposition of biodegradable wastes in the absence of oxygen, is much more harmful than carbon dioxide, being 21 times more effective in causing the greenhouse effect. Consequently, converting methane to carbon dioxide is equivalent in its impact on global warming to the removing of 20 times the amount of carbon dioxide. Measures that convert methane to carbon dioxide in sanitary landfills and that promote composting processes that do not produce methane are therefore having the same effect as reducing carbon dioxide emissions, and this is why the Clean Development Mechanism promotes such measures.

Target 10: Access to drinking water Whilst the demand for drinking water is relentlessly increasing, the available supply is reducing, partly because some water resources are becoming polluted and unfit for use. Waste that is dumped into channels and water bodies may make the water unfit for use, and water that comes from large uncontrolled disposal sites and finds its way into underground and surface resources can cause serious pollution. Good solid waste management can help to prevent the loss of water sources.



Waste dumped into water bodies causes pollution.

[Whiteman et al., Paper 74]



Water coming out of waste disposal sites is very polluting.

Improvement in living conditions in slums Slums (areas of unplanned or substandard housing) tend to be ignored by conventional waste collection systems for three reasons:

- if the dwellings do not have official authorisation and the residents do not pay local taxes, waste collection and sweeping services may be denied by the municipality as a matter of policy;
- if the access ways to the houses are narrow, tortuous or unpaved, municipal vehicles may not be able to reach most of the houses and there is no room for large containers;
- because the waste is likely to have less value for recycling and so the collection crews prefer to go to parts of the city where they can get higher value waste and additional payments from the residents.

In addition to these problems, lack of tenure discourages residents from investing in sanitation improvements, including toilets and drains, solid waste services and paving of alleys. The lack of space for treatment or even storage of waste results in very unpleasant conditions; often waste is dumped into drains, causing flooding and other serious threats to health. There are clear opportunities for unconventional waste collection services, either provided by the informal sector or small formal enterprises, by NGOs or by community organisation. Solid waste collection services can be provided for a relatively low capital outlay, and may have some positive impacts that reach beyond the removal of waste. Success with waste collection, as well as providing jobs for local people (as waste collectors or in recycling), may also encourage further community action, leading to other improvements, and persuade municipal authorities, NGOs or donors that the particular area has an active community that merits further support.

Improved sanitation Sanitation concerns the protection of health and works by the removal and safe disposal of all kinds of wastes. The word "sanitation" is often used to refer only to excreta disposal, but this alone, without the removal of surface water and solid waste, will not create a healthy and clean environment. Drains that are designed to remove wastewater and standing water quickly become ineffective if blocked with solid waste. It is not enough to provide drains – steps must be taken to ensure that solid waste does not soon block these drains. Piles of waste encourage open defecation; if there are no piles of waste there is more chance that people will look for a more sanitary place to use as a toilet. If houseflies have easy access to faeces because of the lack of good toilets, it is even more important to reduce the breeding of flies through good solid waste management. In addition to the reduction of disease, improved sanitation also affects the way that people feel about themselves and their community.



In this slum area, most of the solid waste seems to end up in the drain

Slum dwellers are generally regarded as polluters of the city environment. It is true that the whole of a city can suffer if one part is polluted, since insects and other vectors can carry disease over a considerable range. For this reason alone (even if one is not concerned for their health and quality of life), slum dwellers should be assisted to keep their surroundings clean. Given the opportunity, the inhabitants of slums often demonstrate that they are concerned to maintain a clean and liveable environment [Yousuf and Ali, paper 27].

➔ What could be done (Goal 7)

- Access to a sanitary landfill should be obtained. It is often possible for a sanitary landfill to be used by a number of neighbouring communities. If operated well, sanitary landfills are effective in minimising pollution and nuisance.
- Waste collection services should be provided to all parts of each city. The same type of service may not be provided in all areas – in some areas manual methods organised by a microenterprise or community group may be suitable, whilst in prosperous, planned areas large vehicles may be appropriate. Particular attention should be paid to keeping drains clear.
- Methods of resource recovery should be investigated in order to generate employment and protect natural resources. Whenever possible, they should be started on a pilot scale and allowed to evolve and expand according to experience and local conditions.

Goal 8 Develop a Global Partnership for Development

Target 16 In cooperation with developing countries, develop and implement strategies for decent and productive work for youth.

Partnership The word “partnership” is an important one. It suggests a sharing of a burden or task, and a common goal. Too often there is exploitation instead of partnership – a small contractor is exploited when a client delays or reduces payment while ignoring contract conditions, or a low-income country is exploited by a company from an industrialised country which pressures it to accept technology which is not suitable and cannot be afforded. Partnership implies listening and a two-way exchange of ideas. The agency from the industrialised world should not impose its own ideas or its own standards without being ready to discuss and compromise. Partnership also implies honesty and trust. A local government agency that is being assisted by a consultant should not hide relevant information or provide inaccurate information to its consultant, for whatever reason. Partnership should also involve a degree of loyalty – one side should not criticise the other in public, at least without first discussing its grievances with the other in private. In a partnership, both sides need to work on making the relationship successful. Better partnerships would result in more progress.

Partnership is essential for achieving improvements in solid waste management. Though the technology is, in many cases, very simple, the challenge of maintaining regular solid waste services at a good standard is great, and few succeed. We need help from each other, in the form of ideas, information and experience. This means being prepared to pass on information about failures and difficulties, as well as about successes. The CWG is a forum where such exchanges take place, and CWG workshops are meeting places where informal networks are formed.

When global partners are discussing solid waste management issues, broader understandings emerge of the situation in which the other is operating, and a general awareness of concerns and constraints is shared. Such friendships and appreciations of the other’s work situation are the bedrock of sustainable partnerships.

Decent and productive work The opportunities for creating employment within solid waste management have already been discussed in connection with Goal 1, and an example of the promotion of clean and decent recycling work was given in the section on Goal 3.

It is appropriate at this point to discuss the words “decent” and “productive”. Many would react immediately to the suggestion that any work in solid waste management can be decent. However, the work of a waste collector pushing a cart from house to house can indeed be described as decent. With a well-designed cart that does not require skin contact with the wastes, provided with a uniform, with a steady income and having personal contact with residents, the work is decent. Such jobs are increasingly being provided by community-based collection systems, private companies and municipal authorities. The work can be productive too. Recycling creates employment and turns waste, which is regarded by many as a liability, into an economic good – materials that can be traded and used to make saleable products. Cleaning waste off the streets and vacant lots and providing a regular waste collection service can increase the value of the houses in that area, encouraging tourism and business. Good solid waste management can generate decent and productive work.

It must be said, however, that in many places much could be done to make the work more decent and more productive. Experiences in Brazil [Dias, Paper 11] have demonstrated what can be done to improve the image and social status of waste workers. Uniforms and suitable equipment can also help to make the work both more decent and more productive.



With a clean uniform and good equipment, this is decent and productive work

➔ **What could be done (Goal 8)**

- In our communications with international partners, we should not be concerned with protecting our secrets and creating a good impression, but rather share our experiences – whether successful or challenging – in a spirit of partnership. We should be concerned to listen and to take every opportunity to broaden our understanding.
- We should be more aware of the importance of social status and public perceptions, and strive to design tasks and working conditions that allow work to be done with dignity and with pride in a job well done.
- We should respect the energy and idealism of youth, enabling them to see the value of employment in solid waste management, for protecting health, improving living conditions and conserving our environment. We should look for labour-intensive approaches that maximise employment opportunities, but we should ensure that each employee has work to do and has the opportunity of taking pride in his/her work and achievement. We should not teach young employees to be idle.

3. Some general conclusions

Solid waste management was not mentioned explicitly in the initial presentation of the Millennium Development Goals, and their Targets and Indicators. However this booklet shows that there are very clear and important links between solid waste management and the MDGs,

Solid waste management has a significant impact on the lives, health and surroundings of all urban dwellers, a fact that we often do not realise until we are deprived of a waste collection service. The more subtle effects of solid waste collection on appreciation of our environment, on our public behaviour and on tourism and business, should not be ignored.

Significant proportions of the populations of many large cities depend on solid waste management for their livelihood, whether employed by the formal public or private sectors for street sweeping and waste collection, employed by informal organisations or associations, or self-employed, working in family units. In many cities, there are opportunities for still more to earn a living from waste, as services are extended to cover rapidly-growing populations and as new opportunities for recycling are seized.

Solid waste management can play an important part in achieving some of the Millennium Development Goals. Solid waste management can generate employment. The Goals relating to improvement in public health and protection of the environment cannot be achieved without devoting attention to solid waste management as one part of the solution.

In the cases of the other Goals, particularly in connection with education, gender balance and maternal health, the particular situations of those working in waste management should be considered in order that the Goals might fully be achieved.

There are clear links between solid waste management and the Millennium Development Goals – links that call for more human and financial resources in order to achieve higher standards and wider coverage, and links that give direction and clarity to strategies and programmes.

4. References for further reading

4.1 Workshop papers referred to

The following papers are among those that were presented at the CWG-WASH workshop on Solid Waste, Health and the MDGs in Kolkata, India in 2006. They can be downloaded from the CWG website www.cwgnet.net.

- 11 'Waste and Citizenship Forums – achievements and limitations', by Sonia Maria Dias, Brazil
- 19 'Embracing not displacing: Involving the informal sector in improved solid waste management', Jonathan Rouse
- 27 'Sustainable composting: some realities – experiences from Bangladesh', Tariq bin Yousuf and Mansoor Ali
- 34 'Forgotten amidst the waste?: Health hazards linked to informal recycling in Argentina and efforts to eradicate child and migrant labour with waste'; Jessica Koehs; Argentina
- 47 'Alternative service delivery models to transform citywide municipal waste services: the case of the Municipal Corporation of Delhi'; Rakesh Mehta and Shubhagato Dasgupta; India
- 74 'Solid waste management as a catalyst for governance reform: micro-licensing for private sector participation in Nigeria', Andy Whiteman, Dr. Lynne Barratt, Dr. Ken Westlake

Additional Paper 'Electronic Waste Management – Issues and Strategies', Kurian Joseph, Shobbana Ramesh

Summary of the CWG-WASH workshop: The summary report of the workshop is entitled "Solid Waste, Health and the Millennium Development Goals" and can also be downloaded from the CWG website.

4.2 Other references

- A Addressing the exploitation of children in scavenging: a thematic evaluation of action on child labour
ILO; http://www.ilo.org/iloroot/docstore/ipeccprod/eng/2004_eval_scavenging_en.pdf#search=%22addressing%20the%20exploitaton%20of%20children%20in%20scavenging%22
- B Gender and Urban Waste Management
by Maria Muller and Anne Scheinberg
http://www.gdrc.org/u_em/waste/swm-gender.html
- C Solid waste collection that benefits the urban poor
Report of CWG Workshop 2003 in Dar es Salaam
<http://www.cwg.net>
- D Mokattam Garbage Village
by Laila R Iskandar Kamel, 1994; Cairo, Egypt; ISBN 977-00-7479-9
- E Waste collection and diarrhoea in young Brazilian children
Federal University of Bahia, Salvador, Brazil
<http://www.id21.org/id21ext/h9rfr1g1.html>
- F Hazardous Waste Sites and Human Health
in: Health Effects Review of Great Lakes Center for Occupational Safety and Health, vol. 3, issue 3, 1999

4.3 Other booklets in this series

- No 1: Solid waste collection that benefits the urban poor
- No 2: Private sector involvement in solid waste management
– Avoiding problems and building on successes.

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5. Terminology

Solid waste management draws on many disciplines, and the vocabulary used by one discipline may be unfamiliar to readers from a different background. In addition, terms that are commonly used in one country may be unknown or used differently in another. Therefore this list is provided to explain how words and abbreviations have been used in this booklet.

composting	Composting is a natural process in which bacteria feed on biodegradable wastes (largely food residues and vegetation), converting them into a material that does not smell and looks and feels like rich soil, and which is beneficial to soil and encourages plant growth. By carefully controlling the process, the nuisance of odour can be reduced and the process itself can be accelerated. The product, known as compost, is not a fertiliser and should be seen as complementary to artificial fertilisers, not as a substitute.
CWG	The Collaborative Working Group on Solid Waste Management in Low- and Middle-Income Countries (CWG) is an international network which encourages interaction between partners on key solid waste management issues. It covers the wide range of aspects that affect solid waste management, including institutional, social, financial and technical aspects.
disposal	In this booklet, disposal is defined as all actions concerned with placing waste and residues in their final resting place. Disposal in many countries generally means crude or open dumping, but this method of disposal is unsatisfactory because of the pollution of air, water and land that it causes. Satisfactory methods of disposal are known as sanitary landfilling.
dump	An area of land where waste is deposited without taking care to prevent air and water pollution, and with no concern for the final condition of the site. Usually there is negligible planning and operational control, and wastes are allowed to burn continuously.
Goal	One of the eight Millennium Development Goals
incineration	Incineration is the high-temperature burning of wastes in controlled conditions in an enclosed chamber, such that air pollution is minimal.

Indicator	For each of the Targets in the MDGs, there is one or more Indicator which is used to show the current status and the progress that has been made in the achievement of the particular Target. There is usually more than one Indicator for each Target.
MDG	Millennium Development Goals. Eight goals related to sustainable development that have been adopted by the international community. Box 1 gives more information.
needlestick injury	The accidental puncturing of the skin by a used hypodermic needle or other sharp object that has been used in medical treatment.
picker	In this context, a waste picker is someone who sorts through discarded items and material to collect items or material that can be reused or sold in order to earn money. Pickers may look for desired items or materials on the street, in street dumps or street containers, or at disposal sites. In some countries they are called scavengers.
recycling	In this booklet, recycling means the returning to the economy of items or materials that someone else has discarded. The stages involved in recycling may include picking, transporting, trading, sorting, cleaning and processing. In some cases manufacturing may also be included. Reuse of items for the same purpose as that for which they were originally used (such as soft drink bottles) is also included.
resource recovery	Resource recovery includes all activities that aim to get some value out of waste. It includes recycling, composting and the recovery of energy from waste.
sanitary landfilling	A sanitary landfill is a facility that has been prepared so that it is possible to dispose of solid waste in a way that causes minimal pollution of air or water. When all operations at the site cease, the site should be returned to a condition that is similar or better than the surroundings. Sanitary landfilling is the operation of the facility in such a way that these objectives are realised. Unfortunately some sanitary landfills are not operated correctly and soon become similar to open dumps.

solid waste	There are many complex legal definitions of solid waste. For the purposes of this booklet, solid waste is defined as any item or material that is discarded by its owner and that is not discharged in gaseous form to the atmosphere, to a pit or via a pipe or channel. Solid waste may include gases and liquids in containers.
SWM	Solid waste management includes all measures that are needed to minimise inconvenience, nuisance, pollution and environmental hazards associated with solid waste. It includes all or most of the following stages: minimisation, generation, storage, collection, transfer, transport, processing, recycling and disposal.
Target	For each of the Millennium Development Goals there is at least one Target which defines more precisely the situation that is to be achieved by the year 2015. Goals 1 and 6 have two Targets, Goal 7 has three and Goal 8 has seven. The remaining Goals have one Target each.
WASH	The WASH (Water Sanitation and Hygiene for All) campaign was launched in Bonn, Germany in 2001. It is a concerted advocacy campaign with hygiene in the centre. It contributed to the inclusion of sanitation as a target in the MDGs, and aims to mobilise political awareness, support and action towards achieving the MDGs.

Solid waste management and the Millennium Development Goals

Links that inspire action

How important is solid waste management?

Clearly it is important to keep our streets clean and to get rid of unpleasant waste. There are also clear environmental benefits from recycling. But among all the competing demands for scarce resources in low- and middle-income countries, where should we rank the need to get rid of our garbage? Is this a luxury for those who wish to pay for it, or is it a priority for all?

In order to provide focus and clarity in the formulation of their development programmes, 189 heads of state at the United Nations Millennium Summit in September 2000 ratified the Millennium Development Goals. There are eight broad goals, with 18 specific targets and 48 indicators, and together they give direction to the collective commitment to progress in improving lives and living conditions. The goals are concerned with poverty, hunger, health, education, equal opportunities, the environment and international partnerships.

This booklet, which is based on deliberations at an international CWG-WASH workshop held in Kolkata, India in 2006, explains why the Millennium Development Goals demand urgent action to improve the standards and coverage of solid waste management services.



CWG

Collaborative Working Group
on Solid Waste Management in
Low- and Middle-income Countries

This booklet is the third in a series published by the CWG (the Collaborative Working Group on Solid Waste Management in Low- and Middle-income Countries). The CWG is concerned to spread information that will help to improve standards of solid waste management, using publications, workshops and other means. The CWG is a thematic group of the Water Supply and Sanitation Collaborative Council (WSSCC).

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