

7 SOLID WASTE MANAGEMENT

SUMMARY:

- Solid waste management (SWM) refers to the safe and hygienic disposal of solid waste – otherwise known as refuse, garbage or rubbish.
- Unmanaged disposal is a major problem in urban areas:
 - visual blight
 - breeding grounds for disease-carrying vectors (e.g. rats, flies, mosquitoes etc.)
 - blocked drains and water courses
 - contact with waste exposes people to health risk.
- Effective SWM is based on implementing a chain from source to disposal:
 - Step 1 - source to local container
 - Step 2 - to local transfer station
 - Step 3 – to district transfer station
 - Step 4 – to sanitary landfill site
- The number and location of transfer stations need careful planning to ensure an efficient collection/transfer and to avoid nuisance to adjacent properties.
- The landfill site must be designed and managed in accordance with a detailed management plan to prevent environmental contamination.
- Efficient SWM chain can involve many different players working together:
 - households & community groups
 - NGOs assisting organisation of local SWM
 - private sector operators contracted to transport waste
 - Municipality/public utility company responsible for overall planning and management.

Introduction

7.1 This section discusses **solid waste management**: the safe and hygienic disposal of solid waste, sometimes called refuse, garbage or rubbish. Solid waste is distinguished from human waste and liquid wastes which are disposed of by other means.

7.2 It is one of the four main elements that need to be addressed to promote the environmental health agenda.

- ➔ 4 - Environmental Health
- ➔ 5 - Water Supply
- ➔ 6 - Sanitation
- ➔ 8 - Drainage

The problem

7.3 The unmanaged disposal of solid waste has a serious impact on the quality of life of urban residents:

- It creates a **visual blight**, with waste dumped carelessly in open space, in water course, roads-side verges and scattered in the wind.
- This creates **breeding grounds for disease carrying vectors**: vermin (e.g. rats), insects (e.g. flies, ticks, fleas, mosquitoes) and worms.
- Solid waste dumps are often used as **open public latrines**.
- Waste **blocks drain and water courses**, causing flooding.
- Scavengers searching for materials to recycle and children playing are **exposed to serious health risks**.

Waste generation

7.4 The major sources of urban waste are:

- domestic households
- commercial uses, especially markets
- Government offices

7.5 There is at present little waste generated from industrial and manufacturing operations - this is because these are not well developed at present. But they are likely to grow in the future and could have a very significant impact - so they must be factored into planning for waste management.

The collection>transfer>disposal chain

7.6 Efficient SWM (solid waste management) is based on a four-step chain that carried waste from the source to a landfill disposal site.

7.7 Figure 1 illustrates the steps in the chain:

- **Step 1 - Source to local container:** Waste is moved from the source to a local container - a simple receptacle to hold the waste from a community. The waste can be collected from individual houses by a waste collector, using a basket; or it can be deposited in the container by householders themselves.
- **Step 2 - to local transfer station:** Waste is moved from the local container to a neighbourhood transfer station - a larger container serving a neighbourhood. The waste is carried on simple wheeled carts.
- **Step 3 - to district transfer station:** Waste moved by tractor with trailer to a district transfer station. This may incorporate some separation of waste (e.g. into organic, plastic, glass & metal).
- **Step 4 - to landfill site:** Waste moved by large trailer or compactor truck to sanitary landfill site outside the town boundary. Here the waste is spread out by a bulldozer and covered with earth.

7.8 The number of steps and transfer stations, and the methods for transporting waste will depend on the size of the town and the volume of waste collected. In a small town, steps 2 and 3 can be combined.

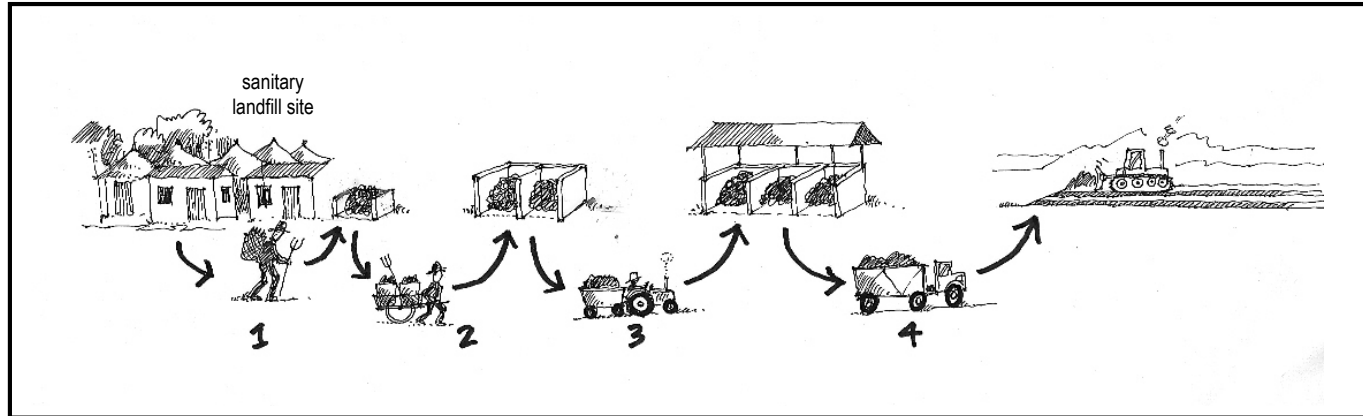
7.9 The number of transfer stations and their location must be planned to facilitate the efficient collection of waste. Care must be taken to avoid air pollution (fumes, dust, smoke etc), and also contamination of water courses through leaching of liquid waste from the stored waste.



Sanitary landfill

is then spread out in layers using standard earth-moving

7.10 Waste should not simply be dumped into a pit - this has three



environmental risks:

- Build-up of toxic and combustible gases within the mass of waste.
- Leaching of toxic liquid wastes into the ground leading to contamination of groundwater.
- Scattering of wind-blown waste across the surrounding landscape.

equipment and covered with earth.

- 7.11 The disposal site must be developed as a **sanitary landfill site** - this must conform to technical specifications relating to ground conditions and location, to ensure that it can be developed for the safe, sanitary and efficient storage of waste.
- 7.12 The site is constructed as an impermeable reservoir, typically built on clay or with a clay lining, to prevent leaching of liquid wastes into the groundwater.
- 7.13 Disposal of waste must be well controlled in accordance with a detailed management plan. On arrival at the dump, the waste can be sorted to remove materials for recycling. The remaining waste

	Generation	Primary collection	Secondary transport	Recycling	Cleaning	Disposal	Education	Monitoring	Planning/management
Community/households	Common	Common		Occasional	Occasional				
Other waste generators	Common			Occasional	Occasional				
Informal sector		Common	Occasional	Common		Occasional			
NGOs		Common		Occasional			Common	Common	
Private sector		Occasional	Common		Occasional	Occasional			
Municipality/Public utility company			Common	Occasional	Common	Common		Common	Common

Common role
 Occasional role

Figure 2: Who does what in SWM

After Jonathan Rouse, Planning for Sustainable Solid Waste Management, Practical Action UK, 2008

Organisation - who does what?

7.14 Efficient SWM can involve a different groups working together:

- **Communities** - who generate the waste and carry out primary disposal to local containers.
- **Informal sector** - involved in local/district collection and transport to transfer stations, sometimes contracted informally by individual households; also in primary sorting and recycling.
- **NGOs** - assisting communities to organise local disposal/collection facilities (Steps 1 and 2 in Figure 1).

- **Private sector** - contracted by Municipality or public utility agency to transport waste from transfer stations; also to manage the landfill site.
- **Municipality/Public utility company** - overall responsibility for planning and operation SWM; may undertake steps themselves or may contract out to other agencies.

7.15 Figure 2 summarises the roles of different participants in SWM.

A useful tool for employment creation

7.16 SWM is a very effective for creating jobs, in both formal and informal sectors of the local economy. Formal employees are recruited through the private sector or the Municipality/Public utility company. Informal sector jobs are created in collection/transfer/recycling (steps 1 & 2). In addition local small-scale manufacturers can produce shovels, forks, baskets, and simple handcarts.

Educating the public

7.17 It is important to educate the public about the potential hazards of poor waste disposal practice. Adults and children need to understand that they can play a major role in preventing the casual disposal of waste that blights the landscape and blocks drains and water courses - in this way they can help reduce resulting health hazards.

7.18 Government offices also have an important lesson to learn: they generate large amounts of waste (especially waste paper and plastic bottles) and need to set a good example to others by disposing of this in a sensible manner.