Solid waste management

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CSE IoT - I2

Solid waste refers here to all non-liquid waste. In general this does not include excreta. Solid waste can create significant health problems and very unpleasant living environment if not disposed safely and appropriately. If not correctly disposed, waste may provide breeding sites for insect-vectors, pests, snakes and vermin that increase the likelihood of disease transmission. It may also polute water sources and environment.

Sources of solid waste:

- Medical centers
- Food stores
- Feeding centres
- Food distribution points
- Slaughter areas
- Warehouses
- Agency premises
- Markets
- Domestic areas

Categories of solid waste:

Organic waste: Waste from preparation of food, marketplaces

and volume of collected waste must be estimated carefully

Transportation

This is the stage when solid waste is transported to the final disposal site. Types of transportation can be divided into three categories:

Human-powered: open hand-cart, wheelbarrow, tricycle

Animal-powered: donkey-drawn cart

Motorised: tractor and trailer, standard truck

Disposal

The final stage of solid waste management is safe disposal where associated risks are minimised. There are four main methods for the disposal of solid waste:

- Land application: burial or landfilling
- composting
- Burning or incineration
- Recycling (resource recovery)

Landfilling

Once solid waste is transported off-site it is normally taken to a landfill site. Here the waste is placed in a large excavation (pit or trench) in the ground, which is back-filled with excavated soil each day waste is tipped.

to get rid of them. Items which may be valueless to one individual may not necessarily be valueless to another

Storage

Storage is the system for keeping materials after they have been discarded and prior to collection and final disposal. Where on-site disposal systems are implemented, storage may not be necessary. In emergency situations, it is likely that the affected population will discard items directly into family pits, poorly defined heaps close to dwelling areas. If this is the case improved storage facilities should be provided fairly quickly. Improved storage facilities include:

- Small containers: household containers, plastic bins, etc
- Large containers: communal bins, oil drums, etc
- Shallow pits
- communal depots: walled or fenced-in areas

Collection

Collection simply refers to how waste is collected for transportation to final disposal site. Any collection system should be carefully planned to ensure that storage facilities do not become overloaded. Collection intervals

Combustible : Paper, wood, dried leaves, packing for relief items

Non-combustible: Metal, tin cans, bottles, stones, etc

Ashes / dust: Residue from fires used for cooking

Bulky waste: Tree branches, tyres

Dead animals: Carcasses of domestic animals and livestock

Hazardous waste: Oil, battery acid, medical waste

Construction waste: Roofing, rubble, broken concrete

Key components of solid waste management

Solid waste management can be divided into five key components:

- Generation
- Storage
- Collection
- Transportation
- Disposal

Generation

Generation of solid waste is the stage at which materials become valueless to the owner and since they have no use for them and require them no longer, they wish

Ideally about 0.5 m of soil should cover the deposited refuse at the end of each day to prevent animals from digging up the waste and flies from breeding

The location of landfill sites should be decided upon through consultation with the local authorities and the affected population. Sites should be preferably be fenced, and at least one kilometer downwindow of the nearest dwellings

Advantages: A sanitary disposal method if managed effectively

Constraints: A reasonably large area is required

Incineration

Although burning or incineration is often used for the disposal of combustible waste, this should generally only take place off-site or a considerable distance downtown of dwellings. Burning refuse within dwelling areas may create a significant smoke or fire hazard, especialey if several fires are lit simultaneously. Burning may be used to reduce the volume of waste and maybe appropriate where there is limited space for burial or landfill. Waste should be ignited within pits and covered with soil once incinerated.

Advantages: Burning reduces volume of combustible waste considerably; and it is appropriate in off-sit pits to reduce scavenging

Constraints: There can be smoke or fire hazards

Composting

Simple composting of vegetables and other organic waste can be applied in many situations. Where people have their own gardens or vegetable plots, organic waste can be dug into the soil to add humus and fibre. This makes the waste perfectly safe and also assits the growing process. This should be encouraged wherever possible particularly in the later stages of an emergency programme.

Properly managed composting requires careful monitoring of decomposing waste to control moisture and chemical levels and promote microbial activity. This is designed to produce compost which is safe to handle and which acts as a good fertilizer.

Advantages: composting is environmentally ~~fiel~~ friendly

and beneficial for crops

~~Advantages: Composting is environmentally~~

constraints: Intensive management and experienced personnel are required for large-scale operations

Recycling

Complex recycling systems are unlikely to be appropriate but the recycling of some waste items may be possible on occasions. Plastic bags, containers, tins and glass will often be automatically recycled since they are likely to be scarce commodities in many situations. In most developing country there exists a strong tradition of recycling leading to lower volumes of waste than in many more developed societies

Advantages: Recycling is environmentally friendly

Constraints: There is limited potential in most emergency situations; and it is expensive to set up.