

Municipal Solid Waste (MSW) has now become a major issue in Sri Lanka. A large amount of solid waste is collected near roadsides and in many public places, constituting a deplorable blot on the landscape. Dumping of waste is carried out continuously without any concern for the adverse effects on the environment. This problem has worsened by the poor waste management practices currently available in the country.

Generated sources of MSW are many. They can be residential, commercial, industrial, institutional, or even hospital solid waste. This waste consists of both biodegradable and non-biodegradable matter. The major reasons for the waste management problem are many.

- The production and consumption pattern of commodities available in the market

- Variety of commercial activities and lifestyles of communities in the local authority limits as well as the floating population

- The continuous increase in the global population

According to statistical data provided by the Ministry of Environment and Natural Resources, January 2005 in the publication titled "Database of Municipal Solid Waste in Sri Lanka — January 2005" the non-biodegradable plastic waste is not of a significant quantity. This can be substantiated by the following information provided in it. According to the data, the non biodegradable matter such as plastics contribute around 5.91% of the total solid waste of all the Provincial Councils in Sri Lanka while it's around 5.44% in Municipal Councils, around 5% in Urban Councils and 7.37% in "Paradeshiya Sabha" or Local Governments.

The total biodegradable solid waste (both short term and long term) collected in Sri Lanka is around 62.5%. The rest (around 2%) consist of other non-biodegradable materials. It is therefore apparent that the solid waste problem is not merely a problem of non-degradability but one looming much larger in proportion, being a problem of not having an integrated waste management system as a whole.

Consequences

Most of the municipal solid waste is used in land filling in Sri Lanka. The marshy lands and other barren lands are filled using MSW and construction is carried out on these filled lands. However, one problem faced is the long period of time taken for filling, and during the filling process several adverse effects to the environment are experienced. In addition to this, even after the land is filled other problems arise.

While filling the land many toxic materials are generated from the MSW due to chemical reactions and through burning, and they can leach out, consequently polluting the soil. IN the rainy season this leachate mixes with rainwater and pollutes both surface water as well as the ground water system.

Filling of land also has other detrimental effects on the environment, as some of the filled lands were earlier marshy lands used to control the water cycle during the rainy seasons. The excess water was absorbed into these marshy lands and gradually released to the ground water system. The lack of marshy lands to absorb excess water from the rain causes an increase in flooding and rainwater stagnancy. The non biodegradable plastic wastes which could be present beneath the filled lands could also cause an inhibition of plant growth due to the inability of the roots to spread easily and this ultimately causes barren lands. These lands were also considered as the habitats of migratory birds and many amphibians. Due to land filling they lose their habitats and many endemic animal species may be lost through this. The other effect on the animal life is caused by indiscriminate dumping of garbage when animals like cows,

goats, and stray dogs feeding on garbage, prove to be fatal.

Other than land filling, the open burning of solid waste is carried out in many dumping sites. The adverse effects of burning are that it produces particulate matter and many toxic gases such as Carbon monoxide, Carbon dioxide, Oxides of Nitrogen, Oxides of Sulfur and others which are catalyzed by sunlight, microbes and other natural causes. In addition to these emissions Persistent Organic Pollutants (POP's) like dioxine, furan and many other short chain hydrocarbon volatile material are released to the atmosphere from certain waste materials, such

destroyed by high temperature applications and not allowed to mix with municipal solid waste.

Although electronic wastes was not a significant waste product in Sri Lanka, it is gradually emerging as one, as many broken electronic equipment are dumped as waste. This amount of electronic waste is expected to increase further in the years to come, with the increase in electronic industries.

What we should do

The main concept to prevent and mitigate the solid waste problem consist six steps. They are Avoidance, Reduction, Reuse, Recover, Recycling and Disposal.

uct for the return of packaging materials. Many environmentalists have also launched promotion campaigns in this direction and are making some headway.

Recycling

The principle in recycling is to use the waste to produce the same product or a similar product. Therefore the same material can be used several times. Even though recycling is carried out in Sri Lanka, it is a small-scale industry due to poor waste management systems. Collectors of waste find difficulties in separation and changing processes especially when it comes to plastics. Differentiation of the plastic numbers are hardly found in

very frequently in this process to generate heat from steam boilers. The main advantage of this method is its ability to generate energy without adding to MSW.

The new concept in solid waste management is one person's waste could be a useful raw material for another person. One major problem in Sri Lanka was the poor coordination and the miscommunication between these two parties. This is the rationale behind setting up the MATEX or Materials Exchange Database. This database is jointly managed by ITI and SMED, with financial assistance of USAID, which enables this exchange. For instance a company producing wooden furniture pro-

Solid waste a major problem



as PVC. When the temperature of the combustion reaches 300-400 °C. these toxic gas emissions increase significantly due to the burning of solid waste from time to time.

Beneath the piles of dumped wastes many exothermic or hear releasing anaerobic reactions take place. Due to this phenomena an instantaneous burning of the waste is possible in dumping sites.

The most common method of dumping garbage is through filling into garbage disposal bags or by covering with polythene. The biodegradable matter within these bags decomposes anaerobically though the action of microorganisms and volatile gases are released to the environment causing foul odours, once the bags are damaged. This waste also provides a promising substrates for pathogenic bacteria and other microorganisms and constitutes yet another threat. The collection of water in plastic cups, bags and tyres also becomes breeding places for mosquitoes and they become carriers for some dangerous diseases like dengue, malaria and filarial fever.

Hospital waste is another waste category we should consider with concern. These wastes, emanating from hospitals and clinics, may contain many pathogenic microorganisms if they are not properly discharged. Some of the hospital waste is

Prevention is better than cure

In avoidance, non-biodegradable and hazardous waste generating materials are removed from the manufacturing processes. They are replaced by more environmentally healthy, bio-degradable or partially biodegradable materials. Avoiding heavy metals in many materials can be seen today as these metals can cause health problems by depositing in the animal body.

The reduction of plastic waste production by both the manufacturer and the consumer is essential in this case. Several programmes are underway for this purpose. The promotion of traditional material like paper and other natural biodegradable materials when applicable also reduces the waste production and many manufacturers have already commenced the production of paper-based bags. Reduction of the amount of raw material used in the manufacturing process without affecting the properties of the final product is also done in some occasions.

Reusing

The same material can be used more than once. Paper, glass, wooden pallets, fertilizer packages and metals are reused for the same purpose or in other applications. Some manufacturing companies promote reusing by reducing the cost of their product.

some cases.

Though there are many ways and means to mitigate the solid waste problem, any single method listed above cannot be used individually to solve the problem. Hence integrated waste management systems are used all over the world to overcome this issue. The first step in these systems is the collection and segregation of waste into different categories such as biodegradables, metals, glass, and different types of plastics. Today this step usually takes place at the dumping sites. But it would be efficient and effective if this could be done at the source or the place of origin, as the volume of waste to be segregated is less than in the dumping sites.

The second step includes the rescue and recycling of different type of materials, which are separated, whenever possible. The waste materials, which cannot be used in any application, can be incinerated by complete combustion at a very high temperature. This must be done under controlled conditions to prevent toxic and hazardous gases being released to the environment.

In some industries, some sources of the waste are lined to their power generation processes and this is referred to as "Energy recycling". The biodegradable matter like rice husk and sawdust is used

duces large quantities of saw dust as a waste and most of the time it is burnt in open air. But this "waste" can be used in the bakery industry for heat generation. Another example is that in many industries plastic films are used for raw material packaging and this can be used in plastic recycling industries. The matching of the waste produce and waste buyer, can be done through the MATEX database.

MSW itself is not a waste, but a valuable resource that could generate money while saving most of the natural resource and environment for future generations. It is time therefore those powers be given the mandate to preserve the environment, along with the public, and put into operation an efficient and effective waste management programme, to organize and manage our waste not just as waste, but also as another resource to develop this country. Suitable legislation is also necessary, and it is welcome news that new laws are in the pipeline to bring to book local authorities that default in their garbage disposal duties, and also indulge in unsafe land filling. The sooner these laws are put into operation, the better it would be for the country.

-ITI Release