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Solid Waste Management – Not Just an Option, Essential for Our Survival

Reduce, Reuse, Recycle

Man is the only animal which generates synthetic waste! It is the result of our civilizational progress that we use more and more materials, often at the cost of the environment. And the more we consume, the more we throwaway; excess food, old clothes, worn out tyres, old furniture, old electronic and electrical gadgets (mobile phones, television, fridge) *etc.*

When we prepare food, we throw away the vegetable peels, the bones of poultry and goat, the scales of fish. And then after meals, the surplus food!

With the relentless advances in technology, we are using newer and newer gadgets; mobile phones, microwaves, laptops. When we buy a new phone, we throw away the old one; they are never disposed off safely.

Even a couple of decades back, many of the things people consumed, came in packaging which could be reused. Milk was supplied in glass bottles which were taken back the following day and reused, cold drinks also came in glass bottles which were taken back by the

neighbourhood paan shop for a small refund and again used by the company for packaging drink. Today, everything is disposable. And producers use a lot more packaging; the pizza comes in cardboard boxes, the potato chips come in plastic packets, the cold drinks come in PET bottles; all of these are thrown away after one use. They are not reused; often cannot be. When the consumer buys pizza or chips the next time, he buys the packaging once again!

With progress, we have learnt to use newer and newer things and more and more of them. But we have not learnt how to reduce our consumption, nor how to dispose them in a manner not injurious to the environment. Once the use of the items are over, they become wastes which rot, emit greenhouse gases and release toxic chemicals in the atmosphere, soil and water. Often the piles of wastes are also home to very harmful organisms which cause diseases.

On the one hand, we go on consuming and on the other hand we do not manage the wastes, that our consumption produces. All these wastes end up in huge dumps which

increase in height every day. These dumps are unsightly, they emanate foul smell and are huge health hazards. The rain water percolate through these huge dumps and toxic materials contaminate the soil and ground water. These toxic chemicals find their way into our diet through the vegetables we consume and the water we drink. We are therefore, also, poisoning ourselves! These waste dumps are also excellent breeding grounds for harmful organisms which spread diseases among humans and livestock.

Plastics are wonder materials; since their

development they have profoundly modified the way we consume, the way we live. Unfortunately, in spite of the usefulness of plastics, they have become the greatest challenge to the protection of our environment. The reason is that while plastics are comparatively easy to produce, they are very very difficult to destroy; 450 years to forever, that is how long plastic endures in the environment! Since the year 1950, 8.3 to 9 billion metric tonnes of plastics have been produced globally- equivalent to four Mt. Everests of waste. About 44% of all plastic ever manufactured have been made since the year 2000. India generates about 25940 metric tonnes of plastic waste daily – that is the weight of 9000 Asian elephants!

Approximately 5000000000000 (5 trillion) plastic bags are used worldwide every year, according to the United Nations Environment Programme (UNEP). These bags are extremely harmful to the environment – they can clog waterways, endanger animal, birds, marine life and provide a breeding ground for mosquitoes. When dumped in landfills, they can take centuries to decompose. Much of the plastic

waste find their way into oceans killing marine life and often collecting together to form great islands of plastic waste. The largest such collection of marine debris called the Great Pacific Garbage Patch in the north Pacific ocean – it is three times the size of France!

There is, therefore, a need for all of us to work together to reduce the amount of waste generated and keep mother earth free from wastes as much as possible. This can be achieved if we follow the mantra of **Reduce, Reuse** and **Recycle.**

Reduce implies that we need to reduce our consumption. One way to do that is by reducing our needs. Can we manage with use of less of material goods; less paper, less metals, less plastics? Can we save paper by not printing documents which may be read from the mobile or computer and by using both sides of paper for printing? Can we reduce the use of clothes by using them for longer time? Can we reduce packaging? Most items today are over packed. Slices of cake is packed in a small plastic tray which is wrapped in a plastic sheet, placed in a paper box which is delivered in a plastic bag! Surely, so much of packaging can be avoided!

Reuse refers to multiple uses of the same material. A couple of decades back, the head of the family would go to the bazaar with two jute bags. He would place the vegetables in one, and the wet items such as fish and meat in the other. And then the jute bags would again be used the following day and for months on end till they were completely worn out. Today, one goes to the bazaar and the shopkeeper delivers the vegetables in separate new plastic bags. The fishmonger packs the fish

in plastic bags and the butcher delivers the meat in yet another plastic bag. All these plastic bags are thrown away at home and the following day, another set comes from the market. Similarly, the PET bottles in which cold drinks are sold or the polyethylene bags in which milk is packed, are thrown away after single use. Can packaging be used several times? If cold drinks and milk are sold in glass bottles, these bottles can be reused multiple times. Even the plastic bottles may be used for storage of cooking oils, sauces and other items in kitchen. A paper printed on one side may be used for writing or printing on the other side. All of these are instances of reuse. And each such change of behaviour is going to reduce the amount of wastes that is generated.

Recycle means that the item which has been used may be processed for recovery of the material from which it is made. For example, glass bottles used once may be crushed, melted and blown into new bottles. Used paper may be converted into paper pulp and used for manufacture of paper. Old iron scraps may be melted together with pig iron to produce steel. All of these refer to

conversion of the item to produce something of use.

The first aim of today's consumers, would, therefore, be to Reduce his consumption, Reuse the objects and Recycle the materials.

With adoption of the mantra of Reduce, Reuse and Recycle, man can reduce the generation of waste but not eliminate the generation of waste altogether. Then there would be a need to manage the waste in an environmentally friendly and economically sustainable way.

Segregation

Our next objective should be to segregate the waste products. There are many types of waste that are generated in a household or other establishment. A normal household would be throwing away a host of dry (also called non-biodegradable or recyclable) wastes such as glass bottles, plastic bags and bottles, wood, paper, metal items *etc.* and wet (also called kitchen or biodegradable) waste such as leftover cooked food, peels and seeds of vegetables

and fruits, bones and rejects from meat and fish.

If we are to reuse and recycle the dry waste, we have to first segregate them from wet waste. If they get mixed in the waste bins or during handling, the useful materials such as glass, paper, plastic cannot be easily and safely recovered for reuse or recycle. Also, the wet waste which has plastics and glass *etc.* mixed with it may not be easy to process for composting or biogas generation.

In our country, the ragpickers perform the important function of recovering useful materials like glass and plastics from

the waste in the waste dumps and sell them to recyclers. It is their source of livelihood. If wet and dry wastes are mixed, it would be difficult for these workers to extract the recyclable parts from the waste and much of the recyclable wastes will not be recovered. This mixed waste will land up in dumpsites where they would accumulate over years and degrade the environment.

In many countries, the local municipalities provide several bins to each household to store the waste temporarily till they are

collected by the municipality. In England, the norm is to segregate the waste into three bins. In some countries, there are separate bins even for white glass, green glass and brown glass items. In Copenhagen, at the household level, waste is segregated into as many as nine bins! In our state, two bins is the norm as of now. The blue bin is for the recyclable or dry waste and the green is for the kitchen or wet waste.

Some municipalities may provide the bins, sometimes for a small charge. In other cases, the citizen is expected to procure two bins on his own as per specifications. Whether the local municipality provides or not, every household must procure two bins for storing their household waste.

Segregation is every citizen's responsibility under the rules. If we do not, apart from contributing to damaging the environment, we also expose ourselves to penalty and risks.

If a household does not segregate the waste into dry and wet portions, the municipality may refuse to collect the mixed waste from their bins and also impose penalty.

Collection

It is the duty of the local municipality under the law to collect the wastes from each residence. It may do so through their own conservancy staff. They may even engage agencies including NGOs to collect the waste from each residence. Some municipalities engage Self Help Groups (SHGs) for collection of wastes.

However, households have to store the wastes in the two bins; blue for dry waste and green for wet waste. If the wastes are mixed, the staff who come to collect the wastes may refuse to do so. They may insist that they segregate the waste before they collect them.

Different municipalities may set up different time tables for collecting the waste. In India, due to the warm weather, the wet waste cannot be retained for long; they rot quickly and emanate foul odour. Generally, the wet waste would be collected daily at a fixed time from every household on every street. The dry waste may be collected once every five, six or seven days depending on the volume of the waste generated. The municipality would notify

the time of collection of wastes based on a route chart they would prepare.

The municipal staff responsible for collection of wastes, would operate different types of vehicles to carry away the waste; tricycles, trolleys, fuel or battery operated tippers, depending on the width of the street and their micro plan.

Municipalities may charge a small monthly fee for collection of waste and disposing it on our behalf. In some municipalities, the SHGs or NGOs employed may collect a small fee for the services provided by them. We must remember that these persons undertake this hazardous job for their income and we should support them to the extent possible.

If we are bulk generators of waste, that is we produce 100 kg of waste or more in day, then it is our responsibility to dispose them according to the rules. Restaurants, hotels, hospitals and nursing homes, shopping malls and housing estates may fall in this category. Here too, the wastes are to be segregated. The dry waste may be handed over to the SHGs or ragpickers for recycling. The kitchen waste may be

processed in machines to convert them into compost or soil conditioners. There are a large number of models available in the market and the municipality would help us choose a machine which would be suitable for our use. These machines use electric power to pulverize the wet waste and then convert them into compost or soil conditioners. The product is a harmless coarse brown or blackish powder rich in organic compounds which may be used in gardens and lawns and even spread on the grounds. The compost enriches the soil and increases their productivity.

Intermediate Transfer Stations

Every municipality would have one or more Intermediate Transfer Station for temporary storage of the waste they have collected from each household.

The Transfer station would be a small piece of land in which the wet and dry waste would be stacked separately so that they do not get mixed. A Material Recovery Facility may also be located at these stations.

The municipality would have identified the

traditional ragpickers and trained them. These ragpickers and SHG members would be equipped with some safety clothing such as gloves, aprons, masks *etc.* by the municipality. They would rummage through the dry waste and recover anything which are of value and may be recycled. They would segregate items like paper, boards, glass, plastic bottles and packets *etc.* and sell them to authorized recyclers who in turn would sell these to the factories which utilize these items.

The ragpickers and SHGs would earn

money from the sale of these items.

The remaining dry waste which are not picked up for recycling and the wet waste would be carried by the municipality to the Waste Processing Facility, taking care that they do not get mixed.

Waste Processing Facility

The Waste Processing Facility (WPF) is a facility which typically would have facilities for processing of wet and dry wastes separately. These would be run by professional agencies through their own manpower.

In most cases, these facilities would be set up by the agencies themselves.

There are many technologies available today for processing of waste. The agencies selected through Request for Proposal would use the technology of their choice. The municipality would pay them against the amount of waste they process and convert.

The WPF would have plant for processing of the residual dry waste. Plastic and other materials which are not picked up for recycling at the Transfer stations may be

converted into Refuse Derived Fuel (RDF) which may be used in cement plants for generation of heat or burnt for generating electricity.

The wet waste may be converted into compost rich in plant nutrients, which may then be sold to farmers either directly or through fertilizer companies. The wet waste may also be converted into biogas which may be packed and sold as fuel or may be used for generation of power.

Many viable technologies exist and the appropriate one would be chosen based on the composition of the waste, its calorific value, quantity available and other parameters.

The material which cannot be converted into compost or gas or RDF or the residue from the different processes would be dumped into a sanitary landfill site.

The sanitary landfill site is a specially designed site where protective layers of polymer sheets and filter beds prevent the waste from mixing with the soil. The sites are so designed that the water percolating through the residual waste, often with high concentrations of toxic materials are not

allowed to permeate into the soil and contaminate the ground water. This solution, called the leachate, contains toxic materials and is separately processed and made safe before the water is allowed to drain into channels.

The safe management of waste depends on the cooperation of residents. It would be clear from the process described that without the fullest participation of the households, waste would not be correctly processed and rendered harmless. Even if there is one person who does not comply with the rules, he may be putting the lives of all others at risk; a risk which would not be immediately visible but could irreversibly affect the health of the citizen over a period. Let us, therefore, all join hands, to remove this risk effectively!

On busy mornings time is in a flurry,
To reach office timely, all are in a hurry
The poor gent is rushing and the situation is precarious,
A load of garbage landed on his head and made it totally hilarious

This is a scene not to be seen
Security of the future is a must
through scientific waste management.

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