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Proper waste management in India: Role of individuals, community and government

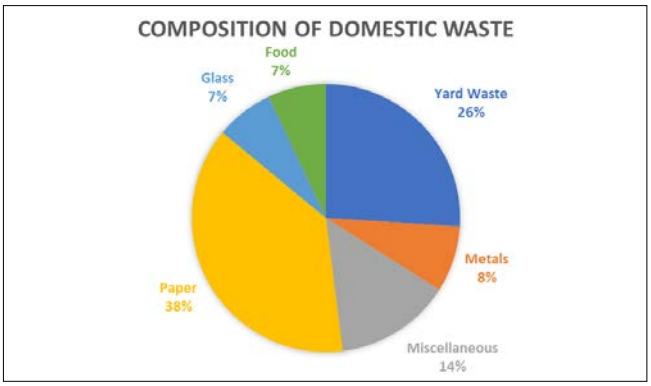
Dr. Saheblal Paswan
Department of Commerce and Business Administration, Lalit Narayan Mithila University, Darbhanga, Bihar, India

Abstract
Waste is slowly poisoning the earth. The waste especially in developing countries, which manufacture and consume more products and resources, is leading to a lot of hazards. Chemicals, metals, pesticides, domestic waste, sewage and agricultural wastes are dumped into the environment. Solid and liquid wastes are dumped in the landfills and released into rivers and seas. Bhopal gas tragedy is one of the world's most disastrous environmental tragedies. In fact, between 1980 and 1990, about 15 gas releases took place in the USA which were more toxic and acute than Bhopal gas. Since none of them were in a densely populated area, like Bhopal, they did not cause as much death and loss. However, the chances for disaster are always there.
There is need to identify the hazards of waste and understand the nuances of proper waste management, it is important to identify how waste is generated and the various sources of waste. Research shows that in India waste generation is expected to increase to a mammoth figure of 300 million by 2047 i.e., from the present 500 grams to 945 grams per capita. The estimated land requirement for disposal of such huge quantum of waste would be 169.6 sq. kms. as compared to 20.2 sq. kms. in 1997. This reveals a shocking scenario. Against this background, we need to understand the role, of the individual, community as well as government and private bodies in the process of waste management. The three R's concept in the management of waste must be implemented.

Keywords: Collective actions, individual accountability, polluter pays, sustainable development, waste management

Introduction

Since waste is something which is of no use to us, we seldom have the time to define it or think about it. However, modern day living with its 'use and throw tendency' is producing waste in such a large amount, that waste management itself is becoming an area of study.
We all produce waste in nearly everything and every activity we do. Waste quantum differs from city to city and town to town. The more developed a country is, the more waste it will produce. Let's us take the example of United States. US alone produces more than 11 billion tons of solid waste every year. If we take an average, a single human being generates 300 to 500 kg of waste every year. In fact in Europe and US, this figure goes above 700 kgs. In developing countries like India, the average waste production varies from 300-400 kg per person every year. Now, multiply this with the total population of India!



Generation of waste

The term waste can be described as the steady flow of varied wastes that we all produce, from domestic garbage to industrial, commercial, agricultural and construction waste. Waste can be in any form be it paper, food leftovers, glass, broken materials, plastic, tin cans, old electronic goods or an old railway wagon.

Domestic waste/Municipal waste: The municipal waste is a combination of household and commercial garbage. This waste mainly consists of garbage (vegetable peels, food wastes, and rubbish), packaging wastes, old newspapers, metals, broken furniture pieces, glass and plastic bottles.

Agricultural waste: Animal manure, organic and chemical fertilizers, insecticides, pesticides, fungicides and rodenticides are the main sources of agricultural waste. Though, the crop residences and animal manures are generally recycled into the soil in the farms where they are produced. The chemical fertilizers are not bio-degradable and they leave their residual effect in the soil. This waste further pollutes water bodies.

Industrial waste: A lot of waste is produced from industries and factories. Different wastes are produced from different industries. For example.

- Acids, ashes, dust is released from Iron and steel industry.
- Salon hair, blood, bones, etc. are the wastes produced from tanneries and slaughterhouses.
- Acids and liquid water molecules waste is produced from distilleries.
- Ashes, poisonous gases, smoke is released from thermal plants.
- Chemical waste, dyes, water etc. is released from textile industries.
- Bleaching powder, paper, liquid waste, screen dust, etc is released from paper and pulp industries.
- Brick, crushed stones, waste cement, steel, etc. is the waste generated from the construction and demolition sites.

It is notable that 80 percent of a car can be recycled. 40 percent of our municipal garbage is made up of kitchen and garden waste. The energy required to make one aluminium can from raw materials could be used to make 20 recycled cans. Recycling all of your home's waste newsprint, cardboard, glass and metal can reduce carbon dioxide emissions by 850 pounds a year. Polythene bags cause harm to the environment and block drains. They are also fatal to stray cattle. They may either get choked or poisoned.

Medical Waste: The waste that is generated from clinics, hospitals, nursing homes, dispensaries come under this category. Disposable needles, syringes, bandages, medicines, empty bottles, cotton, bags, etc. are a part of medical wastes. These wastes are infectious, so they should be disposed of properly.

E-waste: This is also referred to as electronic waste. The electronic items that are discarded e.g. computers, monitors, gadgets, television, wires, motors, refrigerators, DVD players, etc. These discarded wastes are simply crushed, thrown or dumped as wastes.

Common Solid wastes

- Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue, and waste from streets.
- The consumer market has grown rapidly. Products are being packed in cans, aluminium foils, plastics, and other such non-biodegradable items that cause great harm to the environment.
- Some household waste that can be categorized as hazardous waste are old batteries, paint cans and old medicines.
- In the industrial sector, the major generators of hazardous waste are metal, chemical, paper, pesticide, dye, and rubber industries.
- Hospital waste may include disposable syringes, empty bottles and soiled bandages. Industrial and hospital waste is considered hazardous as they may contain toxic substances.

In our country, most of the solid waste is just dumped on the outskirts of cities or else lies in heaps in and around villages.
Ghazipur subzimandi (Delhi) is one of the massive garbage and solid waste dump. Hundreds of rag pickers come here to pick plastic waste. Delhi alone has 1.5 lakh rag/waste pickers. An average rag picker picks between 50-60 kg of waste every day. So we can imagine the amount of waste produced there every day!

Common Liquid Wastes

- Waste water that runs from domestic use like bathing, washing clothes and cooking.
- Municipal waste water running in sewer systems.
- Liquid waste from textile industries, tanneries like dyes and other chemicals.
- Liquid chemicals in the form of fertilizers, pesticides and insecticides.
- Radioactive materials like uranium, thorium etc. are released during mining operations, processing of ores, power plants and weapon production.
- Oil spills in oceans.

Common Gaseous Wastes

- Poisonous fumes emitted from the burning of wood, coal, charcoal and cow dung which is used in the rural areas.
- The gases emitted from vehicles include carbon mono-oxide, carbon-dioxide, sulphur and nitrogen.
- Photo chemical oxidants and atmospheric acids emitted during chemical reactions in the factories and industries as well as automobiles.
- Chlorofluorocarbons that are released from deodorant sprays, refrigerators and air conditioners.
- Dust, fly ash and small particles that get mixed with the air from the power plant industries is another example of gaseous waste.

Proper Waste Management

It is also important to know how an individual and a community can play a role in the proper management of waste. Most of us do not realize that we as individuals are responsible towards waste management as we all contribute in its accumulation. Many of us also feel that it is the government's job to manage waste. Unless and until we change our perception, and reduce consumption and waste creation, no waste management programme can be operated effectively.
Let us discuss how individuals can contribute towards waste management. Also, we shall discuss about the role of collective action performed by societies, communities, the public sector and NGOs in this regard.

Individual Accountability

We are fully aware that we can never reduce our consumption levels to zero. However, as consumers, we can take sensible decisions regarding our purchases, consumption, and about reusing products. Remember, by buying less and conserving more we can reduce waste accumulation to a great extent.

1. **Avoid Disposable Items:** It's better to carry cloth bags while we go for shopping of fruits, vegetables and groceries. This is any day a better and more environmental friendly option rather than carrying the stuff in various polybags and later throwing half of them in the dustbin. Buy pens, razors, cameras and other products which have replaceable parts. Use washable plates, glasses and cloth napkins for picnics rather than throwing away the disposable crockery like paper plates and disposable glasses.

2. **Purchase Less:** Before buying anything, ask yourself, "Do I really need to buy this stuff?" Avoid getting tempted at a mall. Carry a list from home before you plan to shop from a store. Instead of buying every book, enrol yourself with a library membership and use the books on returnable basis.

3. **Recycle:** While packing gift items try to recycle wrapping paper and materials that you find lying in your house. Try out some innovative methods of packing the gifts using old papers.

4. **Conserve Energy:** Switch off lights and fans when not in use. Advocate car pools and use a common room for afternoon nap. Share television time rather than buying a set for every member. Use bicycle or else walk down to nearer destinations. Use public transport for destinations far away. Switch to CFL bulbs at home.

5. **Conserve Water:** Use water saving devices for instance you may get installed an alarm to tell when the overhead water tank is full and smaller flushing devices. Do not leave the water running while brushing teeth, washing hands, and dishes. Water lawns with sprinklers. Use taps more often than the showers. Do not leave the tap dripping, get it repaired immediately. Use front loading washing machines as they use 40% less water.

Managing Waste at Individual Level

We have a right to live in a clean, safe environment and in turn it is our responsibility to protect our surroundings, and to ensure that we do not generate or dispose waste in a manner that would create health problems for our neighbours. We can do so by:

- Keeping our backyards free of rubbish such as old car parts, piles of building material, food scraps, or garden waste.
- Securing rubbish bins against scavenging dogs, rats and other animals.
- Making the bins available for regular municipal council collection.
- Preventing our pet from wandering and soiling public areas or our neighbours' yards. As far as possible try to sell all the recyclable items that are not required to the Kabariwalas.
- Disposing excess household waste trough proper channels is important. Segregate the waste in the house, keep two garbage bins and see to it that the biodegradable and the non- biodegradable waste is put into separate bins and disposed off separately.
- Not illegally dumping waste, especially hazardous ones.

Collective Actions

Though a few exceptional individuals can work effectively in order to bring about positive changes, it can be even more productive when people work collectively as a community/society. The collective actions can be carried out in the form of NGOs, government or private sectors, or societies and small groups.

1. **Teaching Ecology/Environment Education:** The initiatives taken by the government and educational departments in making the future generation aware about current environmental issues are constructive and effective. Involving school and college children in active projects like cleaning up their localities, gardens and school grounds will teach them environmental ethics. In fact research shows that the most active and effective groups for monumental changes are secondary and college students.

2. **Residents Welfare Associations:** The Residents Welfare Associations are generally proactive and concerned about their. Communities / sectors. They work towards providing garbage disposal facilities, recycling facilities and carry responsibilities such as maintaining parks in the colonies and initiating rain water harvesting and other such facilities.

3. **Biogas Production:** In many villages, the families come together for making bio gas plants and the connectivity of gas pipeline is shared between them.

4. **Using Media to Influence Public Opinion:** The communities work together and host shows on local radio and TV stations. They create awareness by writing to the editors of the newspapers and appealing to the local agencies regarding various environmental issues of their locality. In fact media has become extremely proactive now-a-days especially in the environmental issues. This is certainly a very positive sign.

5. **Private Sector Addressing Environmental Issues:** Many private companies are seriously working towards issues like treatment of wastes, company pick and drop for the entire staff (thus saving fuel and on a larger scale), outdoor environmental related drives like cleaning ponds, rivers, beautification, growing plants, maintaining gardens and so on.

6. **Municipal Corporations:** Municipal Committees or Municipal Corporations are the main role players in Solid Waste Management. A well-coordinated plan can lead to efficient segregation, removal and utilization of garbage. It will also reduce the workload of the agency and the amount of garbage to be sent to landfill sites. The municipal agencies have the responsibility to create awareness for which they can take the assistance of the media. Advertisements in local dailies and audio-visual publicity through radio and TV will help in bringing about attitudinal changes. They can also inform the citizens about their role.

7. **NGOs:** NGOs play a very crucial role in initiating community action. One of the most time tested method has been to tap the enthusiasm of children. When given responsibility and shown a direction, children have the ability to systematically initiate any such developmental programme. The NGO can make its presence prese felt by putting the system in place, monitor its progress and provide valuable guidance.

8. **Protect Natural Habitats:** There agencies empower, educate and involve local people to protect natural habitat and biodiversity.

Industrial Waste Management Practices

Industrial wastes are defined as waste materials that are by-products of industries like factories, chemical laboratories, nuclear plants and oil refineries. These may come in the form of solid, Liquid or gas. Solids include plastics, liquids are toxic poisons or gas would include smoke and other air pollutants.

Industrial revolution has swept the world and taken it by surprise. As industries spring up and start to churn out a myriad of goods, they end up generating toxic industrial waste. Thus, how to deal with this industrial waste in an efficient, environmentally acceptable and cost-effective way has become a major concern of the public, environment groups and the Government.

Ways to manage industrial waste:

- One way to manage waste is to generate less of it. For instance, if industries can control and minimize the use of toxic materials it would mean less disposal of such waste into the environment.

- Industrial solid waste is generally disposed off in landfills or incinerated. However, since industrial waste is often more toxic than other solid waste, care needs to be taken so that landfill disposal may not end up in polluting large areas of land and groundwater. So, landfills should be layered properly with earth and fly ash should be added to stop leakage. It is a cost effective method.

- Incineration is a disposal method that involves combustion of waste material. Incinerators convert waste materials into heat, gas, steam, and ash. It is a fast method and the heat produced can be utilised for other purposes also.

- Industrial waste water treatment is the treatment of used water released from industries. It is a multi-stage treatment process to eliminate or reduce the pollutants and toxins in wastewater to an acceptable level before the water can be safely discharged into the environment. Wastewater treatment may also include the recycling of waste water for re-use, primarily by industries. The particles in the waste water are removed by the screening and settling processes. This gives rise to primary sludge-suspended solids that settle in the process. Then micro-organisms are allowed to decompose the organic matter present in the waste water that has been screened. This stage gives rise to secondary sludge. Step three involves complicated chemical processes that help to remove metals and other harmful substances.

- Harmful gaseous waste generated by industries is disposed by making them pass through a device called scrubber. This device is equipped with screens or settling bins containing solvents or absorbers, which absorb the gaseous waste. Particles are removed from gaseous industrial waste by allowing them to settle in gravity settling chambers. Thus force of gravity is used to pull down particles. Electrostatic precipitator also helps to remove particles from gaseous waste. In it the particles are first charged and then passed into an electrically-charged chamber where they get attracted to the electrodes, and thus get separated from the gas.

Summing-up

Waste management can be described as the safe disposal of waste caused by domestic, commercial or industrial activities. The various stages of waste management include collection, transport, processing, recycling or disposal of waste materials. Waste management is also carried out to reduce its effect on the environment.

Waste management is India is taken care of by the Union Ministry of Environment, Forests, and Climate Change. In India, there are several prevailing rules regarding waste management, and these are based on the various ideas of “precaution”, “sustainable development”, and “polluter pays”.

The concept of waste management requires businesses and cities to take care of their immediate surroundings and environment, fixing all the potential harm they usually cause. Due to the tremendous growth of the economy in recent years, the amount of waste has considerably increased. So, there are laws that substantially regulate the ways of handling wastes of various forms under the Environment Protection Act of 1986. India can take care of waste treatment and disposal by integrated approach with effective role and participation of individuals, community, and government.

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