

Chapter 18

Waste and its Management



18.1 Notion of Waste

We generate different types of wastes in our daily activities. What could these wastes be? You are given a table below, draw the same in your copy and extend it, if required.

Table 1

S.No.	Wastes generated at home
1.	Vegetable and fruit peels
2.	Plastic
3.	
4.	
5.	

Look at your list carefully.

- Select those things of your list that you can reuse.
- Also select those that others may reuse.

While doing this exercise you may have noticed that the things not useful for us can be of use for others. Take for example, old newspapers that are wastes for us, are raw materials for paper mills. Similarly, plastic and cardboards that we throw away are a source of earning for people who collect wastes. Thus the notion of wastes is directly related to whether something is useful or not.



Fig. 1 : sorting wastes

18.2 What waste and how much?

Let us find out how much waste we generate in a day.

Activity-1

Take a medium sized bucket. Collect most of the wastes generated at home. This is the quantity of waste generated by your family, per day. Now, you may make an estimate of the amount of waste generated by all the people in your locality, colony/city/village.

- Imagine what would happen if this amount of waste generated daily accumulates at a place?
- What are the different problems that would arise out of this?
- How would we resolve problems arising out of this waste or do away with the waste itself?

You may have observed that most of your household waste is composed of vegetable or fruit peels or any leftover food material.

- Do such types of wastes remain as such for a long period of time?

You must have noticed that these kinds of materials usually rot quickly. The process of rotting is mediated by microorganisms. Microorganisms convert complex organic molecules to simple ones. This process of conversion of complex organic molecules to simple ones mediated by microorganisms is called as decomposition. Wastes that can be decomposed in this manner are called biodegradable.

We also have several such materials in our household waste that do not rot or decompose even if left as such in nature for a long time. Take for example, materials made of plastic, metals, glass and electronic devices. Thus materials which are not decomposed by microorganisms are called non-biodegradable wastes.

- What do you think happens to such wastes?

Usually we either throw away such wastes or sell them to people who collect waste.

So far we have discussed about wastes generated at home. There are places other than our homes from where wastes are generated in large amounts daily. These are industrial centers, hospitals and other government or private organizations.

- The person who collects wastes, takes away wastes from our homes but what do you think happens to wastes generated from such organizations?
- What do you think the people who collect waste do with the waste they collect from our homes?



Fig. 2 : Pile of wastes

18.3 Waste Management

18.3.1 By composting

Wastes generated at home contain nearly 50% or even more amount of biodegradable wastes. Why not start managing such wastes at home itself? If we have a space around our homes, we could convert such wastes to useful manure. All we have to do is dig a small shallow hole where we may collect our kitchen wastes for some time. Then cover this hole with a layer of soil and leave the wastes to rot. Ensure to turn the wastes over every 2-3 days. This would turn to manure, called compost, due to the action of organisms. This could take from one month to some years depending upon the type and amount of waste. This type of manure increases water retention in soil and adds nutrients like nitrogen, phosphorus, potassium to the soil enabling proper growth of plants. Earthworms may also be used to convert leaves, rotten fruits and vegetables peels as well as other waste food materials to compost.

Do you know?

Composting with the help of earthworms - A shaded area is chosen for this and the following three layers are laid.

First layer from bottom - Nearly 15cm thick layer of soil

Second layer - Nearly 10cm thick layer of chopped grass

Third layer - Nearly 15cm thick layer of cow dung

Water is sprinkled regularly on this and a good breed of earthworms are added and allowed to grow. As the earthworms pass to the lower layers, the pile is covered with gunny bags which are kept wet by sprinkling water at regular intervals. After around 15 days this mixture is spread out over a larger area. Biodegradable wastes are now added and mixed with this. The area is covered by gunny bags once again and water is sprinkled for another 20 to 30 days. The process of producing compost with the help of earthworms is called vermicomposting.

- Can all wastes generated at home be converted to compost? Why, why not?

18.4 Efforts made towards waste management

18.4.1 Waste management in a city

Surat is one of the cleanest cities of India now. It is located in the state of Gujarat. Plague spread in this city in the year 1994. The disease caused by a bacterium spreads mainly through rats and rat fleas which are vectors of the disease. Rats and fleas multiplied in great numbers due to filthy conditions in the city. Widespread contamination of food, air etc. helped the disease to spread even faster and the whole city was

affected by the epidemic. People put the whole blame of this on the Municipal Corporation. It was said that filthy conditions in the city had caused the epidemic to spread at a fast pace. The municipal corporation accepted this and made working plans for cleaning the city and disposing off wastes. The city was divided into 6 zones and a commissioner was appointed for each of these. The department of solid waste disposal in each of these zones issued cards to the citizens. These citizens wrote their grievances and gave it to the department which took action of waste collection and disposal within 24 hours. The card was returned after due action was taken in the area. There was also a provision to levy a fine on people who spread dirt and filth. These actions helped to clean the city within just a period of 18 months.

18.4.2 Waste management in a locality

Three women of a small town named Domloor of Karnataka started a different kind of campaign for waste management. They started a door to door campaign ensuring that people classified and segregated wet and dry wastes at home. Wet wastes were given away to the people who collected wastes from homes, to be carried away for further treatment. The dry waste was further segregated once every week with the help of other members of the community into different classes and passed over to the respective recycling units. People involved in the campaign say that previously wastes were dumped in an area but now most of the wastes are disposed off from the area. All that remains in the area are mostly biodegradable.

18.4.3 Waste management initiated by an individual

Problem of waste management does not end in just cleaning up an area and dumping wastes elsewhere. It is related to several other aspects. In a proper system of waste management solutions to several problems are present. A proof of this has been laid down by Srinivas from Vellore district of Tamil Nadu. After graduating in mathematics, Srinivas was looking for a job. That was exactly when he noticed the increasing amount of waste in his locality, increase in wasteland and unemployment. He acquired an area near the old bus stand in his locality that was now a dump yard from the panchayat and district administration. Srinivas started categorizing wastes into 18-20 categories. Paper, cardboard, iron, aluminum, plastic etc. were sorted out and sold to the waste collectors. Rest of the waste that would largely decompose was also sorted out into groups. He started keeping animals and fed most of the waste that could be eaten by them.

A solution to disposal of waste this also provided rich manure in the form of dung. A part of this dung was used to produce fuel with the help of a gobar gas plant. Some of it was used directly as manure and the rest was mixed with the portion that animals did not eat and was converted to vermicompost using earthworms.

Those wastes that still remained unused were openly left to rot. Seeing the possibility that this could give rise to increase in population of flea, mosquito or other organisms, he took the help of hens, frogs, lizards etc. Water generated in all the processes that he carried out was passed into a small pond where he introduced fishes and ducks. He aerated the water of the pond and used it to irrigate croplands.

Dung cakes (upley) were also made and the ashes of them mixed with lemon and orange peels were used to produce soap.

Egg shells were ground to be used as fertilizer as they mainly contain calcium carbonate. Even bones were grinded and used in the same manner. Hair sorted out from waste was sold away to buyers.

According to the mentioned processes, Srinivas not only managed to recycle wastes and make the city of Vellore clean, his process has successfully eliminated wastes from 40 villages across 4 districts of the state. It is expected to spread to another 6 districts of the state soon.

- Among the mentioned efforts, which one did you like most? Why?
- What can you do to manage waste in your locality based on the given examples?

18.4.4 Waste Management - Our Initiatives

We have observed how waste can be managed in different ways after collection. If we could make an effort such that waste does not collect in large amounts, then it would be more helpful to address the problem of waste disposal.

- Can we make an attempt to reduce production of waste?

Come let us make a list of such materials that we throw away by using them just once while we could have used such materials in their place that could be used over and over again.

Table 2

S.No.	Materials that can be used once	Materials that can be used several times
1.	Plastic cup	Steel or glass cups

By following the alternatives suggested in the table, you could take a meaningful initiative towards waste management.

4 R's towards waste management

- Reduce - Reduce amount of waste production at its source. As for example ensure to use every page of your copy in writing, use your textbook with care and hand it over to your juniors in the forthcoming year.
- Refuse - As for example refuse to use plastic bags
- Reuse - As for example reuse plastic or glass bottles over again for different purposes.
- Recycle - Use vegetable and fruit peels as a feed for animals like cow, goat etc.

By using the 4 R's we can effectively contribute in reducing waste such that less amount of waste may go to landfills. Pollution of our environment and ground water resources can be reduced in this manner.



What we have learnt

- Waste is defined according to whether the material is useful or not.
- Categorizing wastes helps in its disposal.
- Those wastes that can be degraded by living organisms are called biodegradable and those that aren't are called non- biodegradable.
- Most of waste generated at home are biodegradable
- Some of the waste generated at home can be recycled
- Waste management at home is essential
- Manure produced by composting is very useful for agriculture
- We must mainly use 4 R's to deal with the problem due to generation of wastes-
R- reduce, R- refuse, R- recycle, R- reuse

Keywords

Biodegradable, non-biodegradable, compost/bio fertilizer, decomposition

Exercise

1. Choose the correct option -
 - (i) Which is the best level of sorting out wastes among the following?
 - (a) At source
 - (b) At community collection area
 - (c) At landfill
 - (d) sorting out not required
 - (ii) Which substances can be decomposed easily using microorganisms?
 - (a) Substances made of metal
 - (b) biodegradable substances
 - (c) electronic substances
 - (d) Plastics
 - (iii) Organism helpful for composting is
 - (a) Earthworm
 - (b) frog
 - (c) lizard
 - (d) hen
2. What is waste?
3. Write a note on the process of decomposition.
4. Why should sorting out of waste be done at the source itself?
5. Write about at least 3 problems that will arise due to collection of waste at an area.
6. Define recycling of wastes and write about its advantages.
7. What are the substances needed to prepare compost?
8. What all did you learn about the ways of waste management from the example of Srinivas from Vellore?