# Pathways of pollution

We said earlier that pollution always has a source and a recipient. The **pathway** of pollution is the way the pollutant moves from the source, enters into the environment, and finally how it reaches the human body or other recipient. The pathway between source and recipient can take several different forms depending on the type of pollutant. Primary recipients for pollution are water, air, and soil. Pollutants usually reach humans through the consumption of contaminated and polluted water and food, and breathing polluted air.

Once released into the environment, the worst effects of many pollutants are reduced by one or more of the following processes:

1. Dispersion – smoke disperses into the air and is no longer noticeable away from the source.
2. Dilution – soluble pollutants are diluted in the water of a river or lake.
3. Deposition – some suspended solids carried in a river settle (are deposited) on the river bed.
4. Degradation – some substances break down (degrade) by natural processes into different, simpler substances that are not polluting.

In each case the effect is to reduce the concentration of the pollutant. **Concentration** is a measure of the amount of the substance in a known volume of water or air. The units used for water pollutants are usually milligrams per litre (mg/l, also written as mg l-1), although sometimes you may see **ppm** which stands for ‘parts per million’.

These processes do not apply to all pollutants. There are some **persistent pollutants** which remain intact when released into the environment because they do not break down by natural processes.

# Soil and land pollution

Soil pollution, also called land pollution, is linked to water pollution. Liquid wastes containing toxic chemicals or pathogenic micro-organisms on the surface of the land can seep slowly into the soil and may percolate down to contaminate groundwater, which can affect people using springs or wells in the area. Possible sources include open defecation, pit latrines or leaking storage containers for industrial chemicals and wastes.

Solid waste can cause soil pollution. A collection of solid wastes in one place or scattered around is unsightly and might smell bad to you as you pass by (Figure 1). Household waste typically consists mostly of food waste that will gradually decompose. This produces a bad odour and attracts insects and rats, both of which contribute to the transmission of disease. As the waste decomposes it produces a liquid called **leachate** which trickles down into the soil. Leachate is a highly concentrated liquid pollutant that may contain toxic chemicals and pathogenic micro-organisms as well as high levels of organic compounds. Rainwater falling on, and washing through, solid waste adds to the problem.



Figure 1: Urban solid waste contains a mixture of many different types of waste and can pollute soil and water if it is not contained and managed correctly.

# Summary of Session

In Study Session, you have learned that:

1. Environmental pollution is the result of human activity and development that occurs when physical, biological and chemical agents are released to the environment in such quantities that the pollution adversely affects human health and damages the environment.
2. Pollution can be classified by its physical nature, by its source, by its recipient, by the sector affected or by its effects.
3. Pollution may be in the form of a gas, liquid, solid or energy.
4. Sources of pollution may be point sources, which are easily identified, or non-point sources, where the pollution comes from diffuse sources that are not easy to pinpoint.
5. There are different types of pollution: water pollution, air pollution, solid waste pollution and noise pollution. All of these can be found in urban areas.
6. The main sources of pollution are household activities, factories, agriculture and transport.
7. Once they have been released into the environment, the concentration of some pollutants is reduced by dispersion, dilution, deposition or degradation.
8. Water can be contaminated by physical pollutants (solid material), biological pollutants (such as bacteria that cause waterborne diseases), and many different chemical pollutants.
9. Air pollution can be caused by gases or solid particulates.
10. Soil pollution is linked to groundwater pollution. Solid waste can produce highly polluting leachate which contaminates soil groundwater.