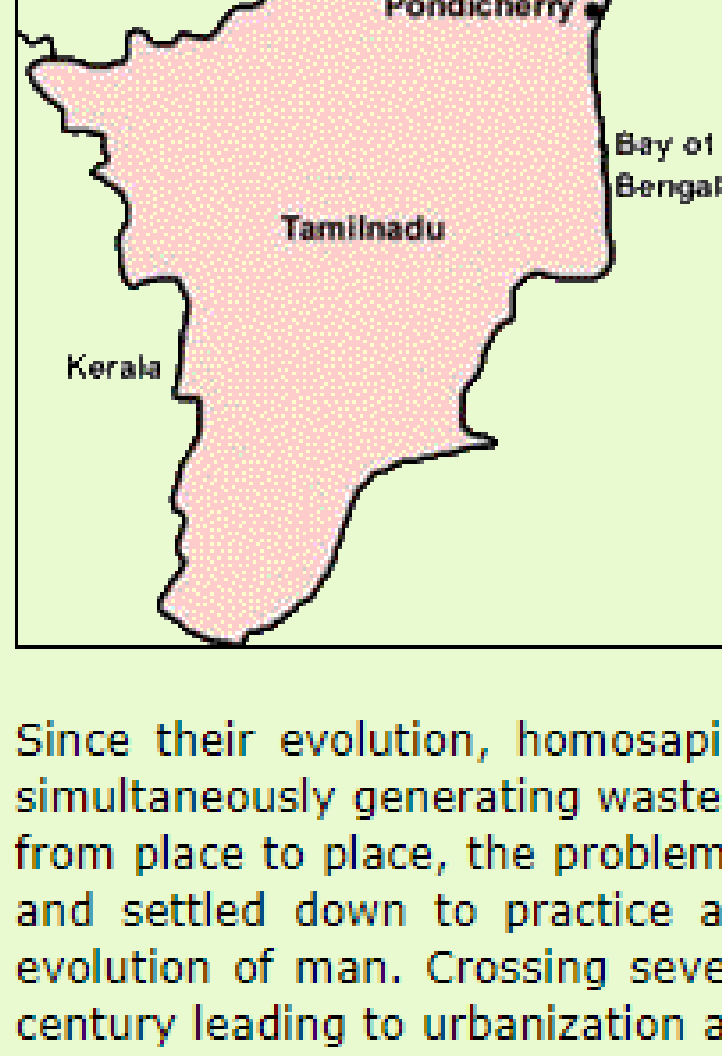


CLEANING MAMALLAPURAM



Since their evolution, hominids have been exploiting natural resources for their own material benefit, simultaneously generating wastes. The pre-historic man of the Paleolithic age was a nomad and as he traveled from place to place, the problem of waste disposal was his least consideration. Later he gave up nomadic life and settled down to practice agriculture (in the Neolithic age). This was a turning point in the cultural evolution of man. Crossing several millennia the industrial revolution occurred towards the end of the 19th century leading to urbanization and a rapid increase in the number of consumers. This, in turn, caused a rapid and steady rise in production of solid wastes. A parallel increase in population and the culture of use and dispose has aggravated the problem of solid wastes. Today, effective and efficient ways of collection, transportation and treatment of solid wastes has become one of the most urgent problems confronting local administrations all over the world.

The coastline of India is bounded by the Arabian Sea in the West, the Bay of Bengal in the East and by the Indian Ocean in the south. The eastern coast is wider and contains many prominent deltas extending from Kolkata to Kanyakumari, over a distance of about 3,000 km. This coastal belt has a wide range of ecosystems from sandy beaches to mangrove forests and coral reefs. These delicate and fragile ecosystems have been overexploited due to a general lack of understanding about their ecological importance.

Mamallapuram is a small town on the east coast of India and is 58 km away from Chennai. The total population in 2001 is 12,049. The floating population is estimated as 10,000 to 15,000 per year. Mamallapuram is the birthplace of south Indian architecture and sculpture. The monuments here are among the oldest in the north and belong to ancient Thondamandalam. They were created under the patronage of the Pallava Kings who ruled North Tamilnadu from their capital at Kanchipuram between 500 and 700 A.D. The five Rathas and the shore temple at Mamallapuram rank high among the best specimens of ancient Indian architecture. During that period, Mamallapuram was one of the main sea ports on the East Coast.

Vehicular Emissions

Tourists are attracted to the long sandy beaches and rock-cut art of Mamallapuram. It attracts a lot of vehicular traffic, thereby causing air pollution. Mamallapuram also adjoins the East Coast Road leading to the southern part of India. Lack of emission control devices in vehicles, use of low quality fuel and lubricants and limited road space give rise to pollution.

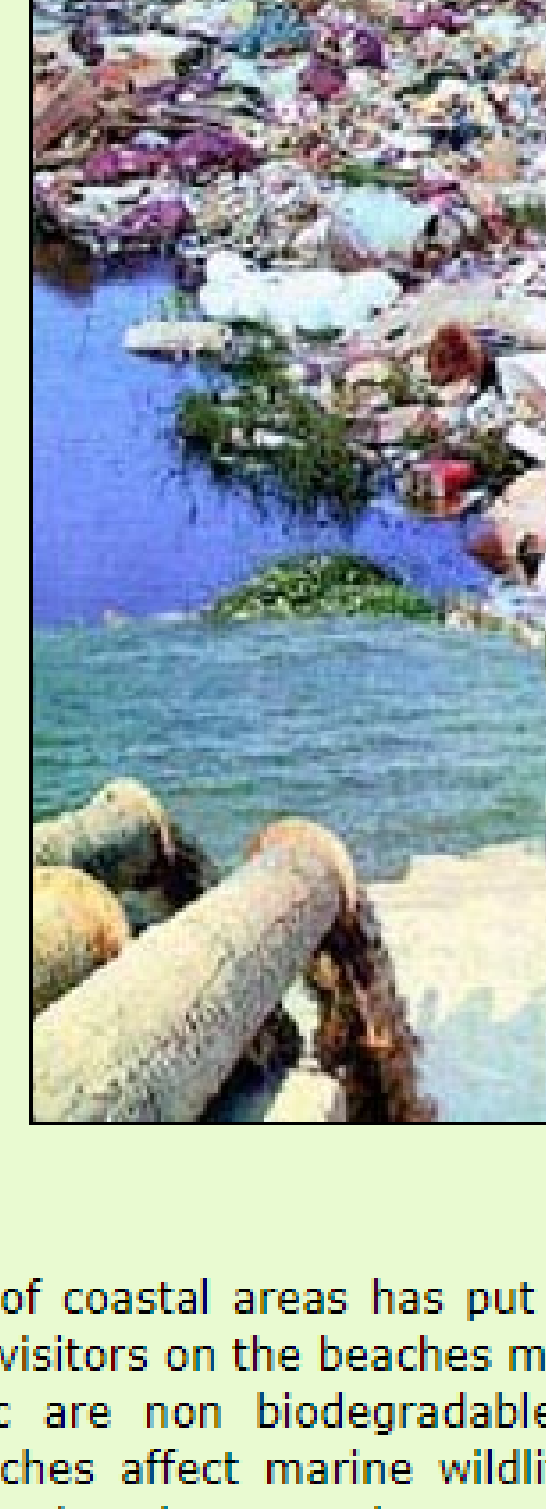
The level of Solid Particle Material (SPM) in Mamallapuram is as high as 386 mg /m³ of air which is much higher than the permissible limits of SPM in the residential and rural areas (200 mg / m³). Increase in SPM level will directly affect the respiratory and cardiovascular system.

Noise Pollution

In Mamallapuram increased number of buses, two wheelers and heavy trucks produces high levels of noise. Noise annoys, distracts and disturbs. Prolonged exposure to intense noise causes permanent hearing loss. The ambient noise level in Mamallapuram is about 67 - 75 dB in various locations, whereas the permissible ambient noise level in residential and commercial areas is 55 dB and 65 dB respectively, as per the Chennai Pollution Control Board standards. Noise level of 80 dB or more for more than 8 hours a day increases tension and changes in breathing patterns.

Water Pollution

Uncontrolled sewage runoff and disposal of garbage into the water bodies are the reasons for pollution of surface water. Irattaikuttai, Kuranattukkuttai, Konerikuttai and Podhigaikuttai of Mamallapuram have been transformed into dumping sites for garbage and sewage. Mamallapuram alone produces more than 4 lakh litres of waste water and 9 tonnes of garbage daily. Without any treatment they are directly discharged into land and water. This has led to the contamination of surface water and causes foul odour and breeding of mosquitoes in stagnant water. Water borne communicable diseases proliferate through contaminated water.



The East coast is under tremendous pressure by the development of commercial prawn farms and several new holiday resorts, all along the coastline with no consideration for the coastal environment and community. Overexploitation of the ground water has led to depletion of the water table. Salt water intrusion into aquifers has affected agriculture and drinking water sources.

Pollution of the beach

The development of economic activities and the subsequent urbanization of coastal areas has put immense pressure on the marine environment and eco systems. Garbage left by the visitors on the beaches make them unsuitable for recreation. Many of these wastes like glass and plastic are non biodegradable causing permanent pollution. The plastic and metallic garbage found on the beaches affect marine wildlife in two ways. The creatures either get entangled in them or get choked by swallowing them. Turtles especially are badly affected by plastic pollution.

What can you do?

- Put your litter in the bins provided on the beach
- Pick up any plastic litter you may see on the beach or road
- Encourage children and others to do likewise and set an example to them
- India generates nearly 25 million tonnes of municipal solid waste annually
- Delhi produces 7,000 tonnes of solid waste every day
- Chennai produces 3,000 tonnes of solid waste everyday
- Mamallapuram produces 9 tonnes (9000kg) of solid waste everyday



Solid wastes are classified as

- Biodegradable wastes - wastes that can be degraded by micro-organisms like bacteria, fungi, etc. (vegetable and fruit residues, food wastes, etc.)
- Non-biodegradable wastes - wastes which cannot be degraded by micro-organisms (plastic bags, batteries, etc.)

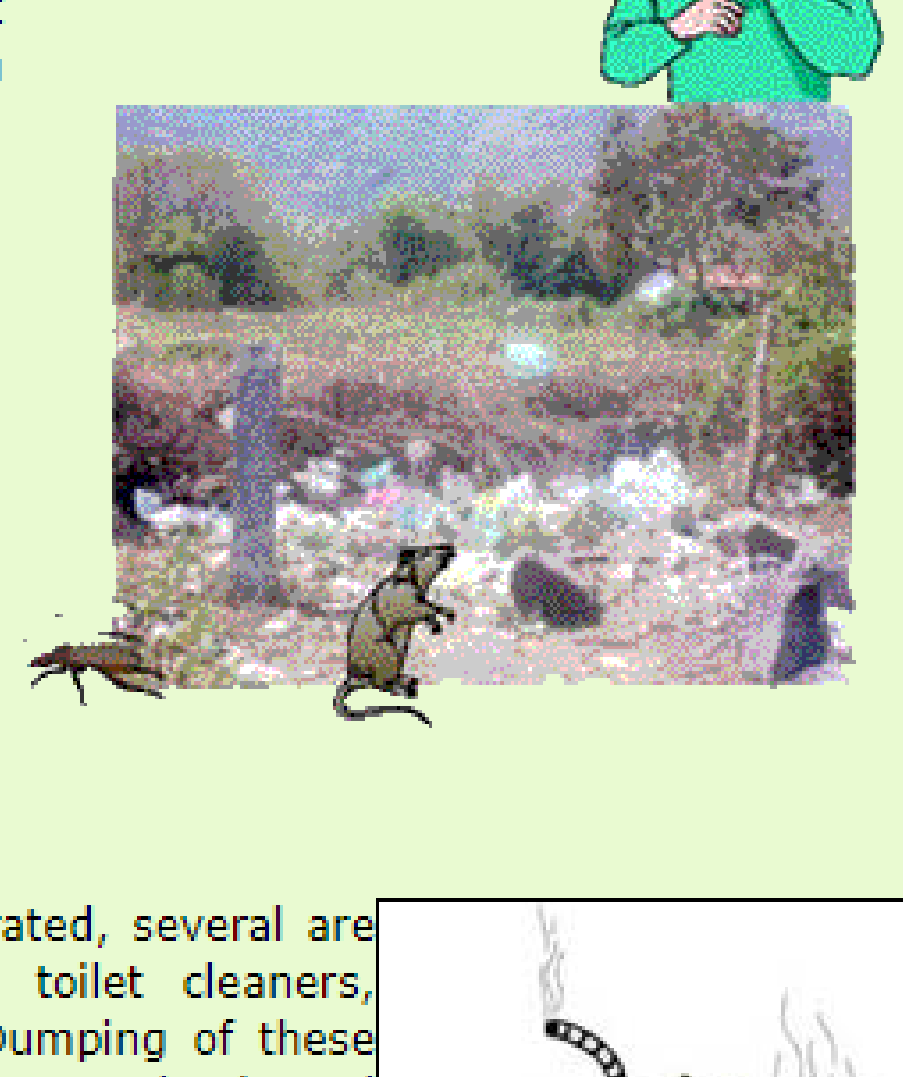
Sources and types of solid wastes

Activity	Waste generators	Types of solid wastes
Residential	Single and multi family dwellings	Food wastes, paper, cardboard, plastic textiles, rubber, leather, wood, garden trimmings, ashes, glass, tins, cans, construction wastes, household hazardous wastes, etc.
Commercial	Stores, restaurants, hotels, fast food centers, markets, official buildings, institutions like schools and hospitals, etc.	Food wastes, paper, cardboard, plastics, rubber wood, garden trimmings, ashes, glass, tins, cans, construction wastes, hazardous wastes, infectious soiled bandages, needles, surgical waste, etc.
Industrial	Manufacturing units, chemical plants, etc.	Toxic wastes, ashes, packing wastes, construction and demolishing wastes, broken machinery and tools.
Recreational	Streets, parks, beaches, playgrounds, etc.	Food wastes, garden trimmings, plastics, bottles, paper, cans, etc.
Agricultural	Dairies and farms	Rice husks, bagasse, straw, coconut and groundnut shells, agricultural wastes, etc.
Construction and demolition	New construction sites, renovation and demolishing sites	Wood, steel, iron, stones, dirt, bricks, electrical parts, etc.

Solid waste and health

Wastes themselves are not a potential threat to human health but improper collection and disposal can cause serious problems, such as

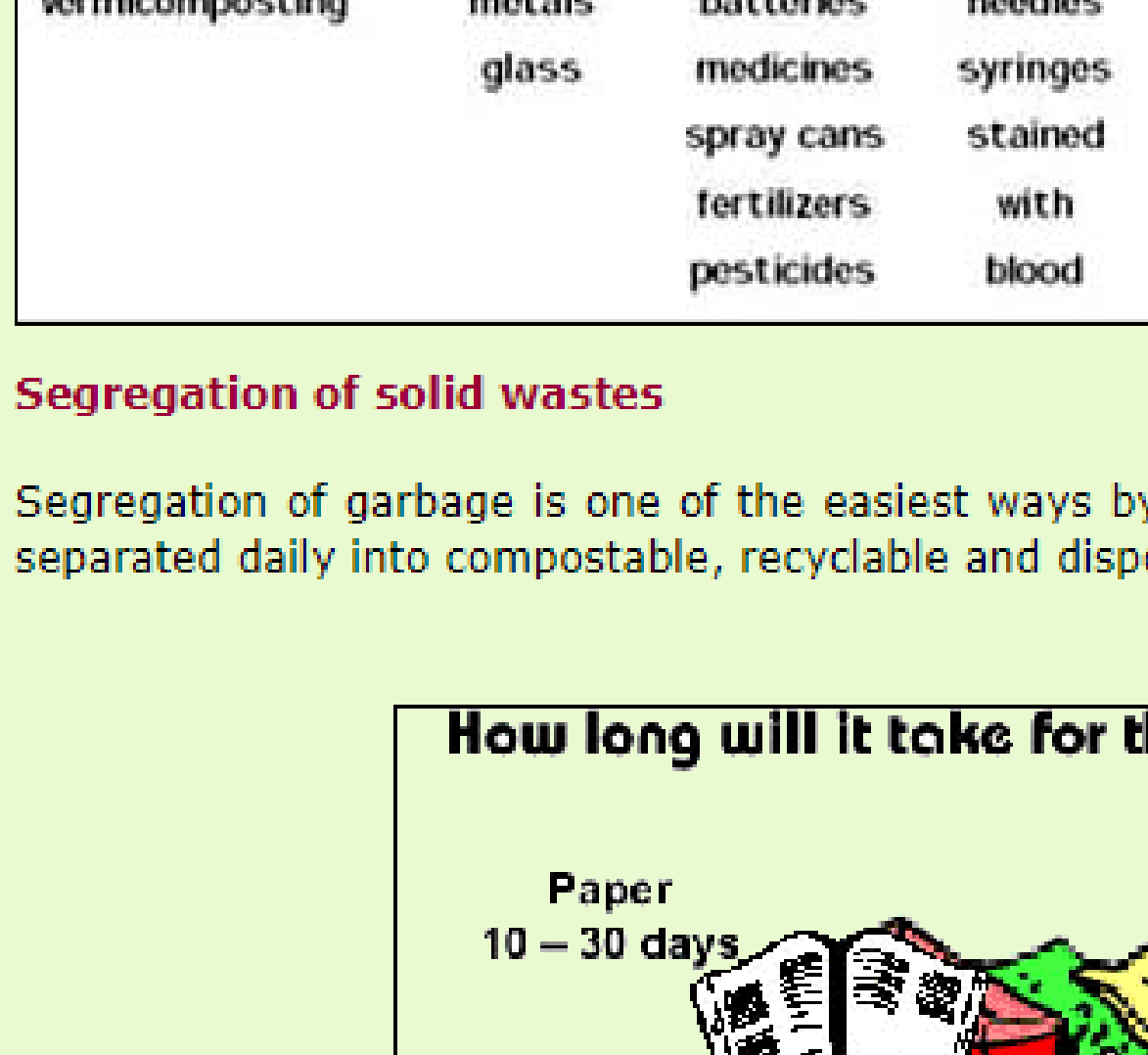
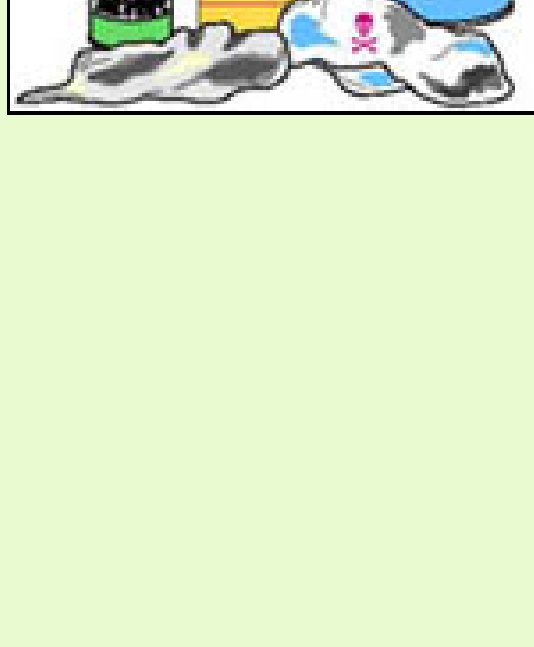
- Increased insect and rodent vectors that in turn spread diseases
- Air and water pollution
- Adverse effect on land values
- Public nuisance
- Chemical poisoning
- Accumulation of toxic substance in the food chain



Hazardous and toxic wastes



Among the various types of wastes generated, several are hazardous. paints, batteries, pesticides, toilet cleaners, toilet wastes, etc. fall in this category. Dumping of these wastes in low lying areas contributes to land and groundwater pollution. Handling, storing, transporting, treating and disposing of these wastes without special precautions can endanger life.



Segregation of solid wastes

Segregation of garbage is one of the easiest ways by which we can help the environment. Wastes should be separated daily into compostable, recyclable and disposable.



Disposal of solid waste

Open dumps

Areas that are used to dump and unsegregated waste are referred to as open dumps. Since it is uncared for, it serves as an ideal breeding ground for rodents and flies that spread diseases.

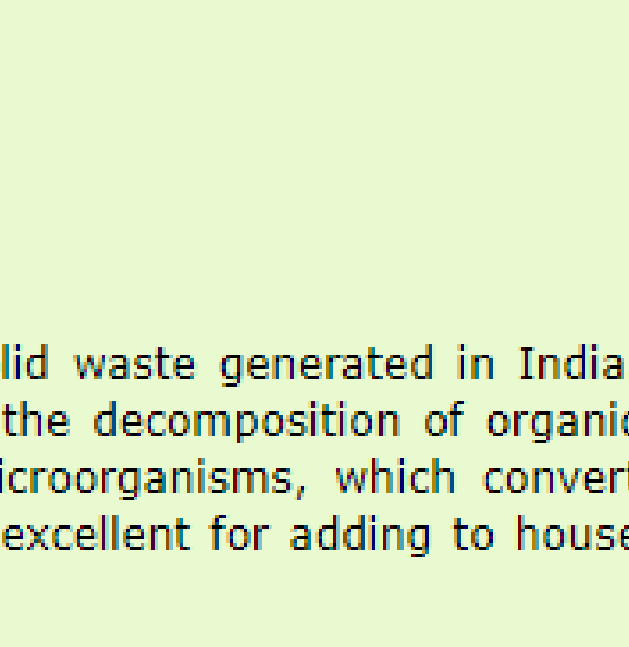
Landfill

Unlike an open dump, it is a pit that is dug in the ground. The waste is deposited and the pit is sealed to prevent the breeding of flies and rodents. At intervals, usually of one day, the waste is levelled, compressed with an earth moving equipment and then buried beneath soil. After the land is filled, the area is covered with a thick layer of mud and the site can thereafter be developed as a playing ground, parking lot or a green space.



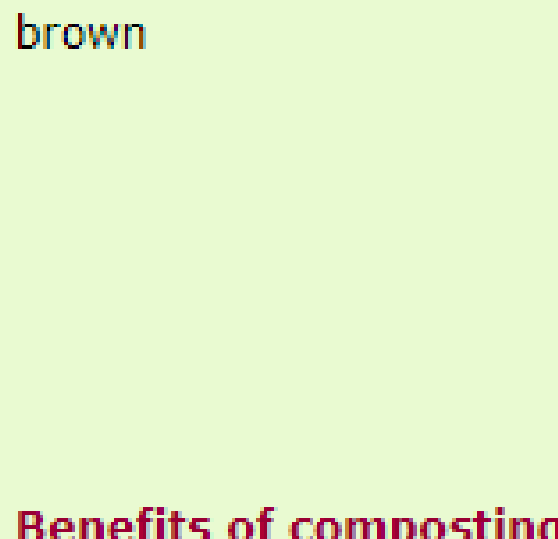
Incineration

Incineration has been used widely for waste disposal, including household, hazardous and medical waste. It is touted as an alternative to landfilling. One third of the weight of the waste incinerated ends up as toxic ashes contaminated with heavy metals and unburned chemicals. Disposal of toxic ash in an environmentally sound manner is problematic and expensive. During the combustion process, entirely new and highly toxic chemicals are formed. When chlorine-containing materials are burnt, dioxin with a wide range of health impacts including cancer, suppression of immune system, birth defects and hormones is released.



Burning waste in incinerators or disposing it in landfills is no longer the ideal solution for waste disposal. The most promising alternatives are waste reduction and recycling.

Composting



Organic matter constitutes 58% of the municipal solid waste generated in India. This can be recycled by composting. Composting is the decomposition of organic refuse by naturally occurring bacteria and other microorganisms, which convert them into a earthy, dark, crumbly substance that is excellent for adding to house plants or enriching garden soil.

Select the composting bed site in a shady place on an upland to prevent water stagnation during the rain. Fill as per the diagram up to the hay layer. Moisten the bed and keep damp for 30 days. The organic waste is added from the 31st day to a thickness of 5cms per day. Turn only the added refuse every few days along with moistening. 45 days after the last addition of refuse the compost is ready. It will be soft, sweet smelling and dark brown



Benefits of composting

- reduces the volume of garbage needlessly sent to landfills
- reduces the need for chemical fertilizers and pesticides
- enriches the soil with nutrients



WASTE MINIMIZATION - REDUCE, REUSE, RECYCLE

REFUSE plastic carry bags. Carry your own durable shopping bag

RETHINK what you buy

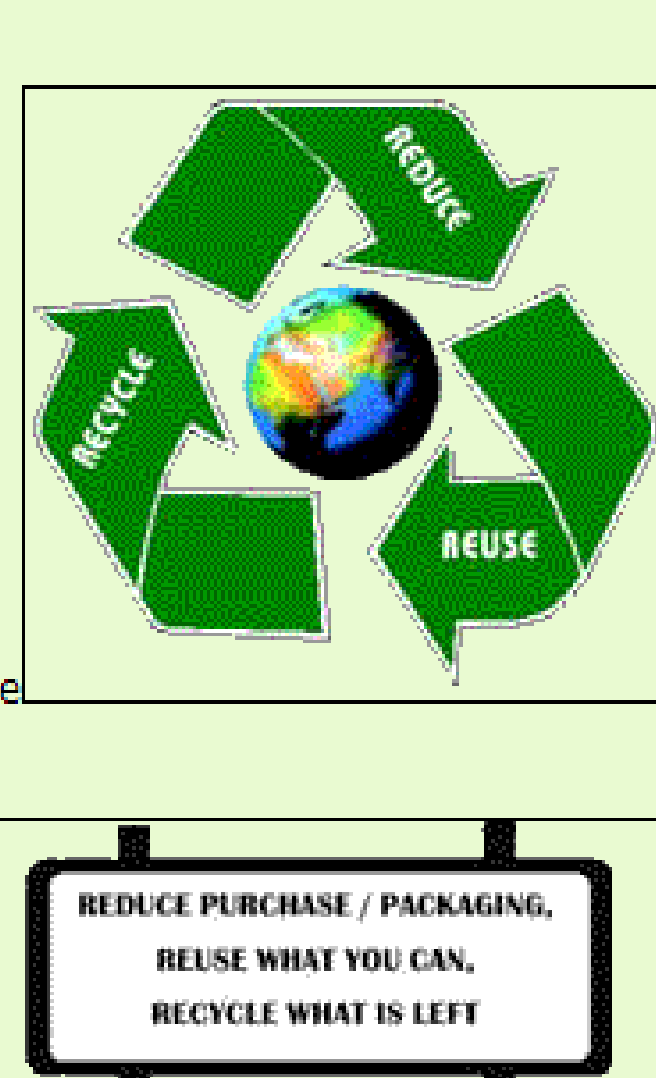
- Buy products that have less packaging
- Buy products with recyclable or biodegradable packing
- Buy recycled goods like paper, cloth, etc.

REDUCE your garbage by

- segregating into biodegradable and non-biodegradable items
- composting the biodegradable
- recycling the non-biodegradable

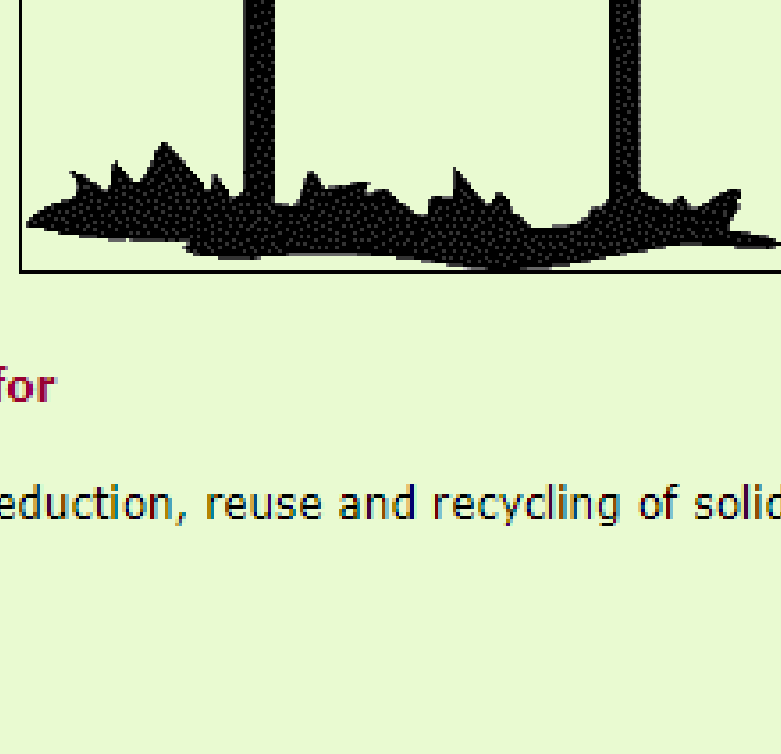
REUSE whatever you can

RECYCLE the items made of glass, metal, plastic, etc., Recycling turns waste into valuable.



Benefits of Reduce, Reuse, Recycle

- Conservation of raw materials and energy
- Reduction of garbage
- Keeps the local and global environment clean



To improve the management of urban solid waste there is a need for

- Awareness among the general public regarding the importance of reduction, reuse and recycling of solid waste
- Segregation of waste into recyclable, compostable and hazardous
- Implementing more efficient removal and storage method