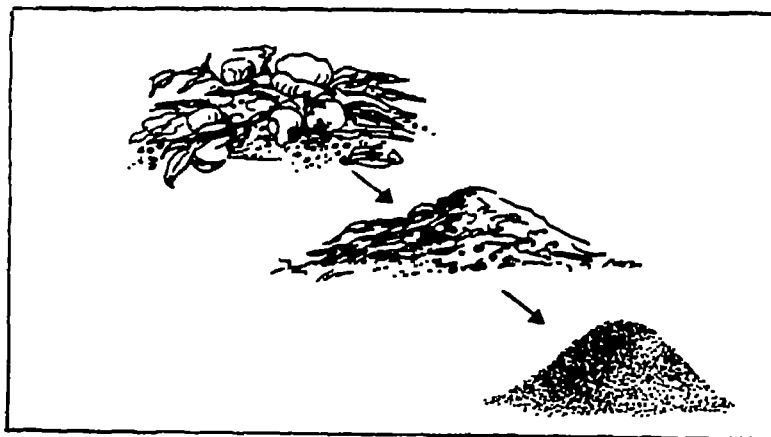


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# Solid Waste Management



Centre for Prosperity Infrastructure (CeProIn)



Published with the assistance of  
Urban Development Through Local Efforts (*udle*)



### Steps to be Taken to Lessen this Wastes

- (a) To use your own bag as far as possible when you go to buy things of daily use or other goods, and not to bring home any item packed unnecessarily in any paper or plastic
- (b) Not to throw away any edible parts unnecessarily when culling and cleaning any green vegetables.
- (c) To abandon the habit of bringing home or carrying any materials packed up in any paper, box, plastic, etc. more than necessary merely for show.
- (d) To separate the decayable and the undecayable ones when collecting the waste materials, and keep them into two separate containers, to make compost manure in any container or plastic bag in the compound, if available, and if not, in a terrace or verandah, by mixing the decayable wastes and dust together and use it for the plants.
- (e) Not to throw away any thing of plastic or paper anywhere you like, and to collect and make them into plastic pillows, *chakati*, cushions and paper boxes or decorative materials, To give away plastic things, paper, bottle, tin boxes, etc. to those who reuse them for any industrial purposes, if you do not have time or aptitude to make as such.
- (f) To pay adequate attention for its care, keeping in mind that the waste is also a potential income generating raw material.
- (g) To bear individual and collective responsibility of lessening, recycling and disposing of, in an organized way, the waste and to be active in its implementation.

# Solid Waste Management

**Centre for Prosperity Infrastructure (CeProIn)**

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## Background

Due to increasing pressure of the growth of population and uncontrolled generation of the waste, the main roads, alleys, and courtyards in the Kathmandu Valley have been growing dirtier every day. The waste materials cast off heedlessly have ever been polluting the atmosphere here. This problem has affected not only the city dwellers but also the tourists from abroad. Various measures are indeed taken by the government as well as the non-governmental organizations in an effort to manage the waste, but no symptom is there at sight of the solution with this problem seriously in mind. The CeProIn has, since the last year, been conducting the following programme under the guiding principle of "Let us reduce waste, let us recycle the waste, and let us manage the local waste at the local level itself."

- *To collect waste materials daily from every household.*
- *To recycle/cause to recycle materials of paper, plastic and glass, forming parts of the domestic waste.*
- *To make compost/fertilizer out of decayable waste.*
- *To motivate people to use compost fertilizer in their fields/gardens.*
- *To give training on domestic waste management.*

- *To teach desirous house owners to make compost out of their domestic waste.*
- *To provide waste-management service to the complex buildings and offices*
- *To produce training materials related to waste management.*

How the solid waste can be managed in every house, locality and community in simple ways is discussed in this booklet. It is hoped this booklet will prove helpful for every individual, office and community in managing the waste in an orderly way.

**If to throw away the wastes is our right,  
To manage it properly is also our responsibility.**

**Thanks !**

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### **Five Ways to Reduce Wastes**

1. Not to produce waste as far as possible.
2. To make compost fertilizer out of decayable waste.
3. To reuse inorganic waste materials by yourself.
4. Not to throw out on roads the waste materials you do not want to use or that are unusable, and to give them away to one who wants to use them.
5. To dump the remaining waste materials properly at a place fixed for the purpose



**Recycling the Solid Waste  
Is Tantamount to Enjoying a Clean Life**

Do you know that benefits can be obtained from the use of solid waste or that it can be recycled?

The solid waste which we are used to throw away thinking it to be useless is a resource of great value. Neither you nor me have yet been able to know its value full well. Let us now talk about it for a while and put it into use by knowing full well.

- Do you want to live healthy and active in and around clean environment by keeping your house, compound and neighborhood all clean?
- Do you like to reduce the production of solid waste?
- Do you want to gain profits by recycling the solid waste?

If you earnestly wish to gain all these benefits, dispose of the waste produced in your house in your own house compound and obtain economic and social benefits out of it while living at the same time a healthy life in and around clean environment.

Let us now discuss about the solid waste.

Let us dispose of the local waste at the local level itself.

## What is Solid Waste?

We eat different kinds of food and enjoy different kinds of things. Sweet is flesh of the mango, and for this sweetness we buy and take home mangoes from the market. But a mango has not only flesh but also skin and kernel which are required to be thrown away. So, after eating the mango we throw away the remaining inedible skin and seed. We buy and eat biscuits and throw away the paper that is used to pack them. Likewise, after taking medicines, we cannot help without throwing away the packing paper, plastics and glass-bottles. In this way, unusable unnecessary things are taken home along with almost all necessary things we buy at the market. Everyday we bring home one or other thing by making purchases at the market. After the things are used we use to throw away the things that are unusable or useless.



We never think about the utility of those unnecessary things. Instead, we are used only to throw them away. After having used or consumed the things at home we are always used to throw away in greater or less quantity everything unusable including paper, edibles, dirt, pots, vessels, etc., These unused organic and inorganic materials

are commonly known as rubbish or residues. When these waste stuffs are taken out of the house to be thrown at the courtyard or crossroads, the sweepers collect and take them to one or other streams, river banks, ponds, to be simply dumped there. The heaps of things thus thrown heedlessly give out filthy smell and disease carrying germs that spread out along with the air. Consequently, the atmosphere around us gets contaminated and makes us sick. This condition is known as Environmental Pollution.

### **Relation Between Solid Waste and Environmental Pollution**

Pollution is a state when the contaminated air carrying disease causing germs spreads around you and me and makes us sick. Pollution is closely related with dirt and filth. In this earth where you and me are living, there are not only you and me, in other words, not only mankind, there are also living organisms of very small size, not visible to the naked eyes in a far greater number than the human beings. If some of these living things are such as can be seen with the use of a microscope, some cannot be seen even with the use of the same. These micro-organisms are called bacteria, virus and fungus.



**Let us dispose of the local waste at the local level itself.**

These organisms feed upon the vegetables, food, fish, meat and other organic matters which we throw out, and make them go on gradually rotting, decaying and decomposing. In course of the organic things going disintegrated owing to the actions of the micro-organisms, various kinds of stench comes out. Disgusting and nauseous is the sight of such rotten, decomposed and decayed state of things. The stench coming out of such a state contaminates the atmosphere. Due to this, germs of communicable and infectious diseases like typhoid, diarrhea, dysentery, etc., spread over the air and cause epidemic by attacking us. Finally, the germs produced by such pollution or stench directly attack our body and make us unhealthy, sick and physically weak. So, the main reason behind the environmental pollution is the lack of management or irresponsible way of throwing waste materials. Thus, it is clear that there is a close connection between the solid waste and environmental pollution.

### **Solid Waste is Like a Ball**

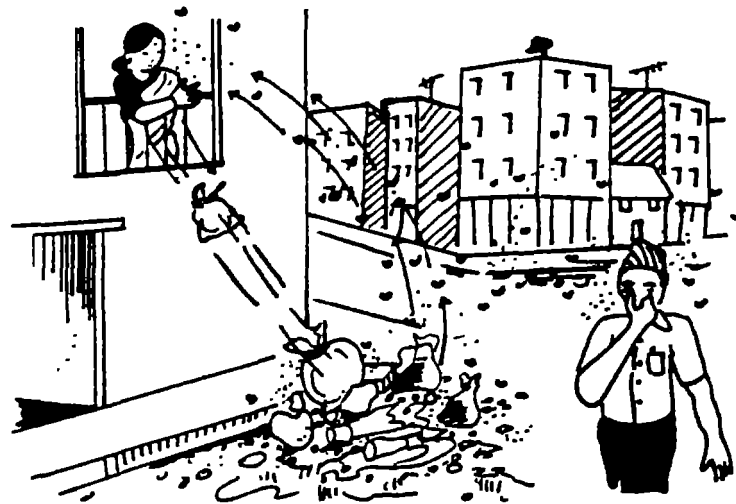
**Who might then be the person responsible for having brought this environmental pollution in our society?**

**Is it that it has come by itself or your and our negligence has invited it?**

**Let us think for a while.**

Today we are forced to live under polluted environment. Organic matters like stale food, vegetables and fruit-skins, etc., and inorganic matters like old clothes, bottles, glass pieces, tin boxes, iron pieces, papers, plastic things, etc. thrown away by ourselves as useless, are heaped up in and around the courtyards, alleys, cross-roads, streams, and rivers. This heap does not always remain simply as a heap. On its part it continues throwing some or other harmful micro-organisms always back to us. Just as a ball thrown against a wall bounces back to ourselves, so also the waste materials thrown away by us are always used to blow environmental pollution back to

ourselves. We cannot deny that the situation is growing gradually horrible owing to the lack, on our part, of knowledge about the tendency of the solid waste we throw away to have harmful effect on ourselves. Let us think now whether we are ourselves playing this very 'Game of Ball'? Is it not because of irresponsibly handling this 'game of ball' that we are being forced to suffer this serious sort of environmental pollution?



It is as much easy to throw away waste materials without any care, as it is difficult to bear the consequences. Our environment is growing degraded and polluted day by day as a result of this kind of the 'Game of Ball'. In order to protect our family and community from this serious state, let us not throw away waste wherever we like. The responsibility of keeping environment clean by keeping our house and neighborhood clean has now come upon our shoulders. Come forward, and let us respond to this call of acting unitedly? Let us add one brick more to this effort to make the environment clean.

**Let us stop the game of ball.**

Let us dispose of the local waste at the local level itself.

## **If so, What Should be Done With the Waste?**

### **To Manage it Properly !!**

Proper management of the solid waste generated in course of daily life lies in the capability to achieve benefits by properly handling it. If we can only develop in ourselves a habit of not throwing away anywhere we like the waste produced in our houses, by making less the production of the waste, obtaining benefits by reusing the waste and managing the locally produced waste at the local level itself, it will not be difficult for us to save ourselves from the vicious circle of the waste. We can easily save ourselves from the pollution emanating from the waste. We shall certainly be successful in the effort to clean the polluted environment around us, if we can take this practice, in the form of a campaign, to every house and neighborhood to be followed by them.

Let us now move toward deliberating how the waste materials can scientifically be handled or properly managed.

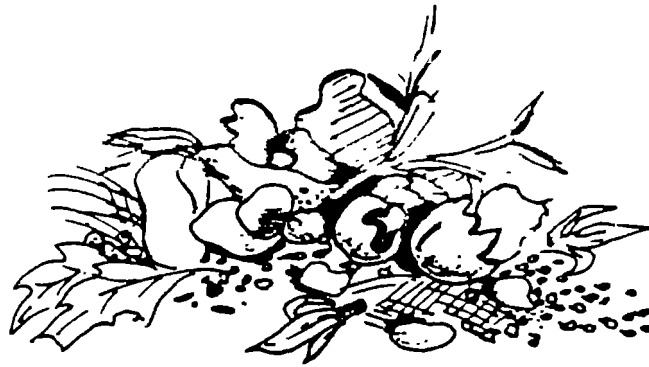
### **Classification of Wastes**

Wastes usually generated in houses are generally of two kinds:

- a) Organic waste
- b) Inorganic waste

Decayable and decomposable matters like leave-outs, stale food, vegetables, grass, dirt, fruit-skins, paper, old clothes, etc. are all organic wastes.

Glass pieces, bottles or their pieces, tin containers, metal products, iron pieces, plastic products, rubber, etc. that do not get decomposed or decayed are inorganic wastes.



**Organic Waste**



**Inorganic Waste**

Financial benefits can be obtained by properly managing these organic and inorganic wastes, and reusing 90 per cent of the same. The process of thus reusing the waste is known as Recycling.

Let us dispose of the local waste at the local level itself.

## Method of Sorting out Wastes

To keep in separate collecting containers these organic and inorganic wastes without throwing them away heedlessly. To prepare compost out of the decomposable wastes after the container is full. To sort out paper, glass pieces, metal and plastic products, rubber, etc., contained in the container of inorganic wastes and sell them to the *kawadis*. To take them wrapped or packed to a nearby public container to be dumped there, if the circumstance is such as does not admit taking them to the *kawadis*.

### Organic Waste



Vegetables



Fruits



Food



Grass and Leaves



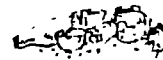
Wood or Rubbish



### Inorganic Waste



Papers



Glass Pieces



Rubber Goods



Plastic Products



Metal Products





## Management of Organic Waste

We can gain direct benefit out of the organic waste. Organic waste can properly be managed easily in one's own building compound, courtyard, or neighborhood. Compost fertilizer can be prepared by reusing organic waste, which is regarded as the best nutritious food for the plants. Nothing sort of school education, training or professional experience is required for preparing this fertilizer. Anybody who is aware of the value of cleanliness or clean environment can do this. The only thing required is awareness and enthusiasm. Our positive thinking and aptitude towards cleaning prove helpful to this. Compost fertilizer can be prepared easily in a corner in a house or even in a big field depending upon the quantity of the organic waste. To manage organic waste means to prepare compost or *prangarik* fertilizer by causing decomposition of the thrown - out stale foods, vegetables, and fruit skins, etc.

### What is Compost/Inorganic/Organic Fertilizer?

There is a proverb in Nepali –

"Brightly clear to those who see,  
but unclear to those who do not".

or

"Sandal-wood to those who know it,  
but a sickle-handle to those who do not".

Likewise, those who know and realize the value of the waste achieve benefit from it, whereas those who do not, invite pollution as well as disease.

Any organic matter like a dead body of human beings, animals, and insects, thrown-out foods, fruit-skins, vegetable skins, leaves, grasses and other trees and plants all rot, decompose, decay

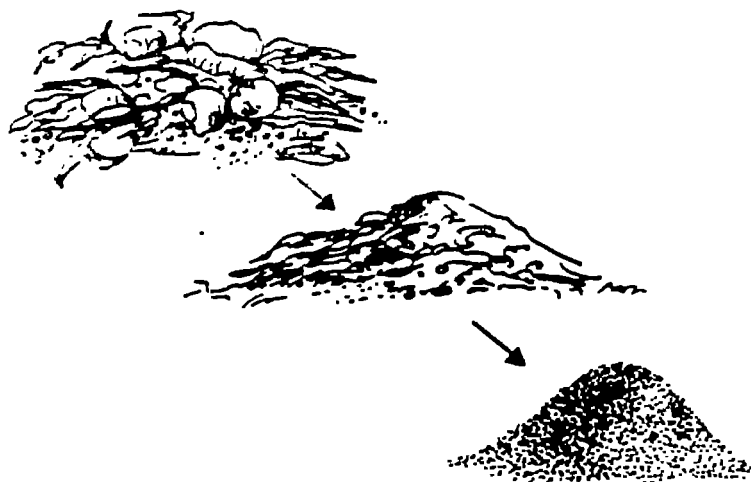
Let us dispose of the local waste at the local level itself.

and finally change into soil. It is a law of Nature. Although these things get rotten, the nutritious elements inherent in them do not get destroyed, but get mixed up with the same fertilizer form as earth. No chemical substance is necessary for this process. In this earth elements that come out of organic matters remain intact while no chemical element remains in it. This fertilizer is, therefore, called organic fertilizer as it is formed of the remnants or remaining portion of the organic matter which is full of nutritious elements left after they are decayed or decomposed. If in English it is called compost fertilizer, in Nepali it is called *prangarik* fertilizer. So, the black remains of the organic waste materials is *prangarik* or compost or organic fertilizer. Such a fertilizer is considered to be pollution free, reliably nutritious, and natural fertilizer purer than the chemical fertilizer. This fertilizer contains food elements necessary for the plants like nitrogen, phosphorous, potassium, magnesium, calcium, iron, manganese, copper and boron, etc. Fully decomposed and ripe compost fertilizer is black in color, loose and light in weight, odorless and when rubbed with hands easily loosens.

### What is a Starter?

A starter is an element essential for preparing curd. Curd can never be prepared without a starter. Likewise, the fertilizer starter is necessary for preparing compost fertilizer. A starter is nothing but a source of micro-organisms that decompose organic matters. The earth on the surface of the garden, ashes, cow-dung, chicken and goat's dung, etc. are used as a starter for making fertilizer, because they contain lots of bacteria that decompose organic matters. The organic matters that we collect do not contain any such bacteria. That is the reason why decomposing process is slow. To use a starter is to use decomposition causing bacteria.

## How Does the Organic Matter Decay?



Micro-organisms called bacteria are found abundantly in air and earth. These organisms are of two kinds:

- (a) Anaerobic bacteria
- (b) Aerobic bacteria

Anaerobic bacteria decay and decompose organic matters in the places where there is no oxygen, whereas the aerobic bacteria do so in the places where there is oxygen. These bacteria through chemical reactions fully disintegrate the organic matters and turn them into earth in a short time. For these organisms to be active and functioning appropriate temperature and humidity is necessary. So the time the organic matters take to be changed into fertilizer depends upon its temperature and humidity. Beside anaerobic and aerobic bacteria, fungus, nematodes and earthworms also help in decomposing the organic matters.

Let us dispose of the local waste at the local level itself.

## Methods of Making Compost/Organic Manure

Depending upon the amount of the organic waste, place and facilities, compost manure can be made by five different methods as follows. Each method is described in detail.

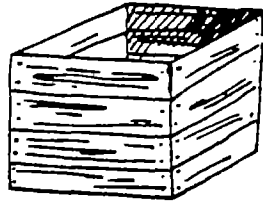
- a. Container Method
- b. Pit Method
- c. Heap up Method
- d. Mixed Method
- e. Earthworm Compost

### (a) Container Method:

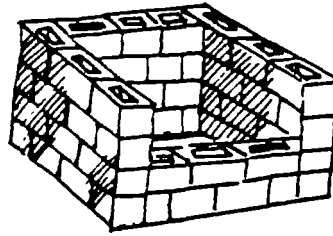
Where a homestead has no compound or garden or has a limited space the suitable method of preparing compost manure is the container method.

#### Materials Required:

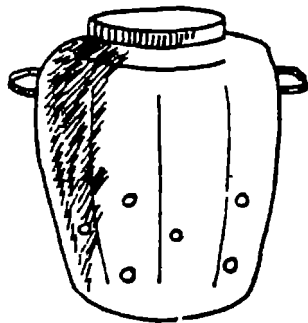
- a. a piece of wooden box/iron drum/plastic bag with holes at places or a vessel with its lower part cut open, etc.
- b. a shovel.
- c. water.
- d. starter (culture of bacteria used to start a particular fermentation).



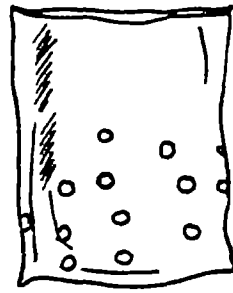
Wooden Box



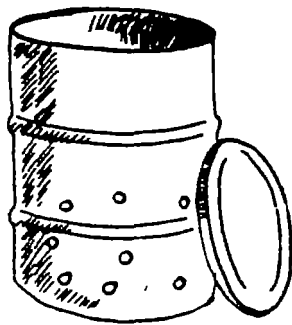
Brick & Cement Made Pit



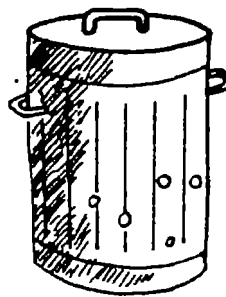
Plastic Drum



Plastic Bag



Iron Drum



Tin Drum

Let us dispose of the local waste at the local level itself.

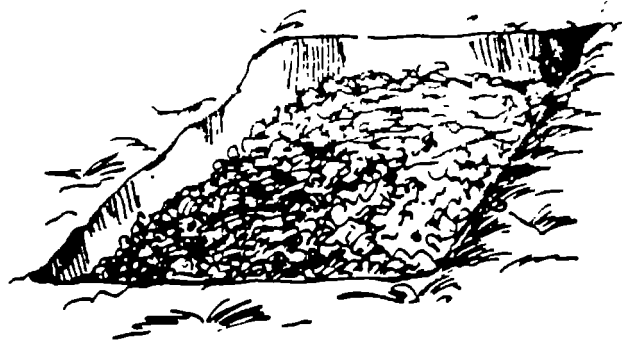
**Method:**

The first thing to do is to select a site, inside or outside the house fit for making the manure. The next is to make a choice of the above materials you think fit for your purpose and keep them at the said site. If there are organic and inorganic wastes both heaped up together at the one and the same place, they should be separated, daily or every alternate day or twice a week depending upon the quality of the waste. The organic materials should all be kept in a container meant for making the compost in. Once the waste is heaped up there about one foot high, earth and starter should be sprayed over it. For the purpose of starter, garden soil, ashes, cow-dung, chicken dung, complex manure (grey color granular manure) etc. can be used. It should then be covered with a lid or cover, sprayed over with water for keeping the organic material cool. In this way, one should go on filling up the container and stir it from time to time to ventilate it. When in the process the container becomes full, the organic objects are all poured out on the ground and then, with the use of a shovel they are again put into the container in the way the upper portion is kept downward and the lower portion upward. The compost is ready for use after it is thus formed upside down three times.

**Points to be Noted:**

1. If a container with its bottom cut open is used for the purpose of making the compost, the lower part of the container should go a bit deeper into the soil under the ground.
2. Every time the organic materials are turned over, the starter should be added to each layer of one foot height.
3. If among the organic matters there are some pieces of thick paper, they dissolve quickly if mixed after they are burnt into ashes.

**(B) Pit Method:**



**Materials Required:**

- a. Pick
- b. Spade
- c. Shovel
- d. Starter
- e. Water

**Method:**

For the purpose of making the compost the site should be fixed at any corner in the building compound, garden or farm land. Thereafter, a pit should be dug one metre deep and one metre long and one metre wide. After sorting out the main waste material as said above, the organic matters alone should be placed into the pit and watered with soil and starter sprayed over. Then it should be covered with a wooden, tin or straw cover. This process should be repeated until the pit is full. After the pit is filled to the brim, it should be covered all over with one inch thick wet mud as shown in the picture above. When it is thus covered, no air or water can enter into the pit. One month after, the contents of the pit should be shifted to another pit of the same size to be kept there, by turning it upside down. The compost will be ready for use in three months if the amount of water and starter used is up to the requirements. The

Let us dispose of the local waste at the local level itself.

compost so ready can immediately be used in the fields and gardens. If it is to be used for commercial purposes, it should be dried up a little bit and then sifted with a sieve, and the finer parts so sieved out should be set aside for sale with the coarse ones retained on the sieve, which may then be used as starter for preparing another lot of manure. In this method the anaerobic bacteria act to decompose the organic matters. This method is also known as the Bangalore method.

**Points to be Noted:**

1. The pit should be dug at a higher place where water does not get logged.
2. In order to make the micro-organic activity more intense inside the pit, it should be loosely fitted with organic matters mixed with the stems of corn plants and small pieces of wood but should not be pressed hard.
3. While turning over top to bottom, starter should be added after each layer of one foot.
4. A stick should be pushed down to see if dampness inside the pit is enough or not. If the stick so pushed into comes out free of any moist, holes should be made at several places of mud on the top, and water should continually be poured in so long as the organic matter does not get damp.

**(C) Heap Up Method:**

**Materials Required:**

- (a) Shovel      (b) Bamboo with holes      (c) Starter  
(d) Water      (e) Plastic Products

**Method:**

A suitable place for making compost by this method is a field or garden or a plain ground a little away from the residential





area. After the site is selected, bricks and timbers should be laid along for heaping up the waste. Then the organic waste matters should start being heaped up there. When the heap is one foot high, soil, water and starter should start being sprayed over it. It should then be covered on the top with a piece of jute bag, straw or plastic sheets. When the heap rises about one foot high above the ground, three bamboos with holes at different places should be laid down on the heap three on each side as shown in the illustration above. Similarly, in the process of heaping up the waste, other sets of bamboos with similar sorts of holes should be laid down after every height of one foot. In order to ventilate the inside part of this heap from above some other bamboos should also be inserted in it in a standing position. This heap may be raised to a height of one to one and a half meter. The length and breadth may be made according to need. One inch thick mud should be pasted on all sides to save it from rainfall.

As this method provides for sufficient ventilation, the *aerobic bacteria* are active enough for forming the compost. In this method the holes in the bamboos help fresh air enter into the innermost part of the heap. In this method also, the heap should be turned over up and down once in every fortnight or a month. Starter and water should also be added every now and then. In this method also if the process of turning over and adding starter and water is carried out regularly, the compost becomes ready for use in two to three months. The compost so ready may directly be used in the field or garden or only the finer part that comes out of the sieve when it is sieved can also be used. The remaining coarse parts can be reused as starter.

Let us dispose of the local waste at the local level itself.

**Points to the Noted:**

1. Length and breadth should not be less than one meter.
2. In order to protect the heap of organic matters from the excessive heat of the sun and incessant rainfall a shed should be built over it or it should be covered with a plastic sheet
3. As the process of decaying and decomposing of the organic matters occurs above the surface of the ground in this method, much more foul smell may spread out. Arrangements should therefore be made to cover it well
4. In case the foul smell spreads out excessively, it should be covered with increased amount of wood-dust, rice husks or soil.

**(D) Mixed Method:**

**Materials Required:**

- |                       |            |           |
|-----------------------|------------|-----------|
| a) Pick               | b) Spade   | c) Shovel |
| d) Bamboos with holes | e) Starter | f) Water  |

**Method:**

Of the methods described above, the method that combines the pit method and heap up method described in the "B" and "C" respectively above is known as the mixed method. For this, after selecting the waste, the pit method should be adopted for the first one month. Thereafter, for the next two months the heap up method should be adopted. In both these pit method and heap method, what should be done is exactly as described in "B" and "C".

Most of the hard fibrous elements do not get decomposed when making the compost by the heap up method alone. So, such materials remaining wet for one month in the pit method get a chance to soften. The half ready materials lying in the heap for two

months gets ventilation and the process of decaying and decomposing becomes faster. In this method both the anaerobic and aerobic bacteria remain active and change organic matters into compost manure. This mixed method has proved to be the best and appropriate method.

**Points to be Noted:**

1. The same points mentioned in case of the above "B" and "C" should be noted.

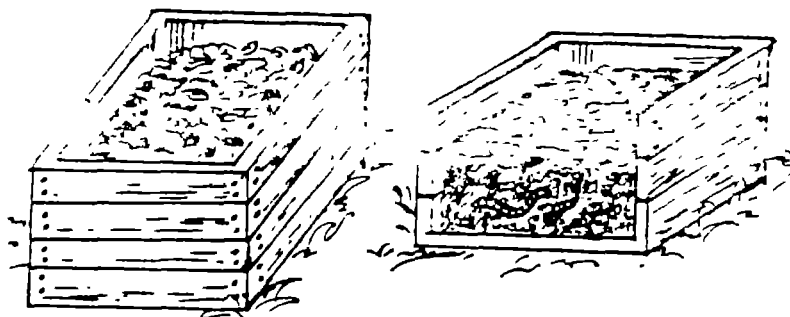
**(E) Earthworm - Compost / "Verme-Compost"**

We often see, specially in the rainy season, the earth worms coming out in the garden. The earthworms are long and round type of common worms of grey colour. These worms feed upon organic matters like weeds, leaves and dead insects lying in the soil. They eat up their food very quickly and excrete black, loose and soft substance. Their excretion acts as a very good nutritious manure for the plants, because it raises the quality of the soil and helps plants to grow. It being a natural manure produced by the earthworm, it has been named **earthworm-compost**. In Latin, the earthworms are known as **verme**, and hence the manure produced by the earthworms is known as **Verme-compost**. So good and nutritious compost can be produced by using earthworms as well.

**Materials Required:**

- (a) A 2 cubic feet wooden box
- (b) 100 to 200 number of healthy earthworms
- (c) Water
- (d) Organic waste

Let us dispose of the local waste at the local level itself.



**Method:**

The wooden box should be kept in any secure place you think appropriate in the ground floor, terrace, courtyard or garden. It should be filled with garden soil about one foot high. Then 100 to 200 earthworms should be left free in it. Then pieces of left-over green vegetables, food, and pieces of paper available in the house should be sprayed over the soil in the box. In every two or three days water should be sprinkled making the soil moist. The earthworms take the food kept thrown on the surface into the soil and feed upon it. The frequent movements of the earthworms up and down for carrying the food make the soil loose, making the air necessary for the soil easier to enter into it. The nutritious manure made of the excretion of the earthworms goes on becoming developed inside the box. Because of the substance excreted by the earthworms, the soil filled in the box also changes into compost. In other words, that soil also becomes fertile. The soil which has thus become fertile may be used directly in the flower garden or flower vase.

**Points to be Noted:**

1. In order to protect it from the scorching heat of the sun the box should be kept in a shady place or covered with a lid.
2. In order that the soil inside the box does not get dry, water should be regularly sprinkled over it.

### Advantages of the Compost

1. *It makes the hard soil loose, soft and powdery, and hardens the sandy soil.*
2. *It increases the water retaining capacity of the sandy soil.*
3. *Its use makes air and water have free play in the lumpy solid and soil.*
4. *Because of the nutrients remaining safe in it, it increases the fertility of the soil and augments agricultural production.*
5. *It increases the number of the micro-organisms very useful for the plants, which makes food materials available to the plants.*
6. *It prevents the water in the soil from getting evaporated, if it is laid 1-2 inch thick over the soil.*
7. *Unlike the chemical fertilizers, it does not harm the plants even if it happens to be used in excess quantity but instead proves good to it.*
8. *It helps keeping environment clean as the houses, courtyards, roads and the city as a whole remain clean, by virtue of the fact that compost can be made out of any kind of organic waste produced in the houses.*

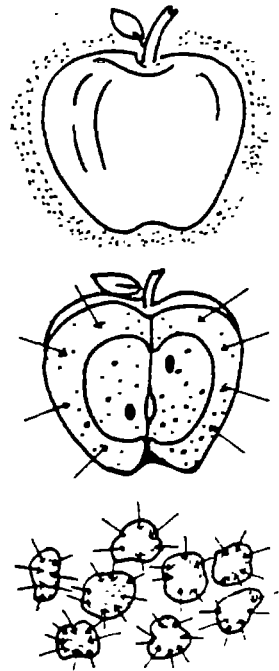
Let us dispose of the local waste at the local level itself.

## Method of Knowing if the Compost is Ready for Use

As it is difficult at the beginning to know whether the compost manure made by you is ready or not just by observing it, a simple method may be used to check it for a couple of times. For example, keep the ready compost in a vase, and make it moistened with a little quantity of water. Then scatter mustard or chilly seeds over it. If in a week of scattering the seeds, shoots begin to grow out and leaves appear, you will be sure the compost is ready for use. If even in the week the shoots do not grow out of the seeds, you should know that the compost has not grown ready for use. If so, it shows it is necessary to keep the compost back to the process of making it for some time more.

### If the Compost is to be Made Quickly

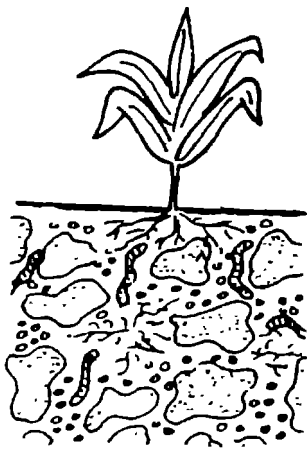
If the compost is to be made quickly, the organic matters should be placed after cutting it into small pieces, because bacteria take a long time to penetrate the hard outer skin of the organic matters so as to reach the tender part inside. Micro-organisms decompose the soft tissues quickly. Take an example that we all know, cut-fruits decay and decompose more quickly than the uncut ones, because the bacteria quickly disintegrate the cut soft tissues. The quicker the organic matters decompose, the quicker the compost gets ready. So, if you have to make the compost in a short span of time, you have to cut organic matters into smallest pieces possible and keep them together. When cut into small pieces, the soft surfacial part being many in number, disintegration occurs rapidly.



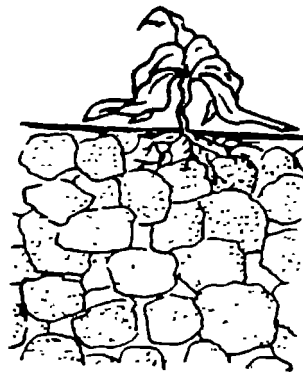
### Why the Compost Manure is Necessary for Fields and Gardens?

We have so many times referred above to the quality of the soil. Production or no production or augmentation or no augmentation at all of crop depends upon the quality of the soil. It is, therefore, very necessary for all of us who are interested in farming to learn about the quality of the soil.

The quality soil means the combined mixture of the molecules of inorganic matters and the living organisms. Besides the molecules themselves, the soil must also contain organisms such as bacteria, nematodes, earthworms and fungus as shown in the illustration. These organisms need food. The compost manure provides organic food materials to these organisms living in the soil and make them healthy and capable to make the soil fertile. The soil without organism becomes hard and of lower quality which is unsuitable for farming. So, for any kind of plants it is very essential that the soil contains living organisms.



Use of Compost Manure



Use of Chemical Fertilizer

Let us dispose of the local waste at the local level itself.

The chemical fertilizer used in the fields cannot provide necessary food materials to these living organisms like fungus, bacteria, etc. that keep up the quality of the soil, and goes on gradually killing the organisms in the soil. In this way, it diminishes the natural quality of the soil. The soil without living organisms cannot be soft and fertile. Instead of augmenting, it diminishes the agricultural produces. Only the compost manure can, by providing food, save these organisms that make the soil soft and fertile, and hence the necessity of the compost manure for the fields.

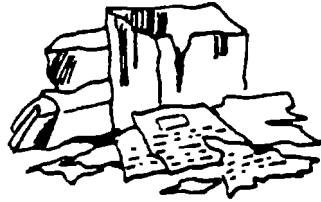
### **Management of the Inorganic Waste**

Inorganic waste cannot be reused in our own house or compound or locality. They can, however, be used as raw materials in the factories concerned. For example, plastic materials can be used by the plastic goods producing industries. Likewise, rubber comes in use in the rubber goods producing industries while the pieces of metal, iron, glass, etc. can be used as raw materials in the concerned industries. Since, at present, Nepal does not have any industries as such in sufficient number, such thrown-out materials reach different factories in India through the hands of *kawadis* which, on their part, use them as raw materials to produce concerned goods. This is the reason why we do not have to throw out even the inorganic waste now.

The process of producing new goods by using old, broken and useless things like these as raw materials by the factories that use such things, is known as the Recycling of the Inorganic Waste. Any person, who collects such reusable waste materials thrown out by us, from the containers or any place where they are thrown and deliver them to the *kawadis* are known as *khate*. This being a profitable job, many people have started adopting it as a profession.



Inorganic Waste

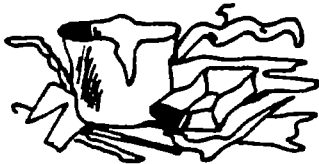


Paper  
→

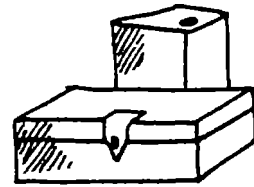
Re-produced Goods



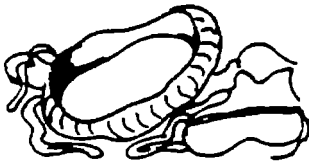
Plastic  
→



Metal Product  
→



Glass Pieces  
→



Rubber Goods  
→



Let us dispose of the local waste at the local level itself.

If we can recycle such inorganic waste which we are used to throw away, why should we throw them out and keep them in courtyards, alleys or roads causing environmental pollution? So, let us be up and managing these wastes inside our own houses. Let us develop the habit of collecting them separately and take them to the concerned place. Let us help to keep the environment clean.

### Conclusion

It takes about one or two days for germs to attack the organic waste and thus to cause environmental pollution. No filth will be there if the waste could be handled within this period. If the waste materials - whether organic or inorganic - are disposed of or managed in the way as described above, nothing of the dirty, disgusting and stinking form of theirs will come to our view, nor shall we have to suffer the ill effects of the polluted environment. If we could manage in time one and other things we throw away, all of them will turn out to be the raw materials pure and simple to be recycled. If these things could only be taken to a destined place, the volume of the waste materials could be brought to a minimum while recycling them. If we could develop a habit of managing the local wastes at the local level itself, environment in no time can be made pure and clean. This minor step taken to save the environment will prove itself to be a priceless contribution to ourselves as well as to the coming generation.

So please come forward.

Let us express our commitment to this great work right from today.

Let us keep the environment healthy for ourselves to remain healthy.

## Questions and Answers

1. What does the compost manure do?  
The compost manure makes soil nutritious, airy and water retainable or absorbable.
2. How much time is required for making the compost ready?  
It can be made within a period of one to three months if scientific methods could be applied with all the formalities completed.
3. Why is a container required for making the compost?  
The compost can be made also in an open space, but if a container is used no waste can get scattered, and the place also remains clean, and also the temperature and humidity remain maintained.
4. What should be done to reduce the fouling smell of the compost manure?  
It stinks if it contains wet green matters in greater quantity. In order to reduce the stinky smell it is advisable to mix any grey matter, earth, wood dust, husks, and so on in it.
5. What is the role of water compost?  
Bacteria and fungus that cause organic matters decompose cannot be active in dry condition. Dampness is essential for them to be active. So, whatever be the method used in making compost, important is the role of water.
6. What will be the harm to the compost if water is excessive?  
The matter to be decomposed is necessary to be soft and tender but it does not mean that it should remain wet under water. Where there is abundant water bacteria cannot intensively be active. There should, therefore, be not much, nor less water.

Let us dispose of the local waste at the local level itself.

- 7 What does it mean by the balance of carbon and nitrogen?

Carbon contents are great in grey colour matters like wood dust, straw, and dry leaves, whereas in green vegetables and grasses nitrogen contents are great. In order to make the organic waste decompose rapidly and well, it is essential that they are proportionately balanced.

8. Is air necessary to be present in the compost?

There are two kinds of bacteria that work to decompose the organic matters. One kind is such as needs air to get decomposed while the other kind does not. It depends upon the method being adopted.

9. Why it is necessary to frequently stir or turn over the compost?

Stirring or turning over facilitates much air and micro-organism to enter into the organic matters, causing them thereby to decompose more quickly, and thus compost is made faster.

10. What is it that is called starter?

There are micro-organisms in air but not in sufficient number. If they are mixed with the accumulation or accumulated matters, decomposition takes place quicker. They are used as starter.

11. What role does the soil play?

The soil in the garden or field contains sufficient number of bacteria, and hence it is compulsory to mix soil. The organic waste covered with soil gives out also less smell.

12. Why is it necessary to mix lime?

The lime while lessening the smell, destroys at the same time the harmful germs and causes balance maintained in the acidity of the earth.

13. What should be done with hard and large size things?  
The fibrous things should be kept under water for 2 or 3 days and the things of large size should be broken into small pieces. If the pieces are small, micro-organisms can take quick actions to attack and decompose them.
14. What is the reason behind using the dung?  
The nitrogen contents being higher, the dung, while increasing the temperature, also increases the nitrogen part of the manure.
15. Whose dung should be used for making the fertilizer?  
The dung/excrement of the herbivorous animals such as cow, buffalo, pig, pigeon, duck, chicken, etc. is considered good for use.
16. Whose excretion should not be used as fertilizer?  
The excretion of the meat eating animals must not be used as far as possible, because their excretion may contain many disease causing germs. These germs are such as do not die at the heat generated while compost is in the making.
17. Should paper be mixed or not?  
Small pieces can be mixed. In case of large size cardboard, however, it is better to burn it and mix the ashes thereof. Paper acts to increase the carbon part in the compost.
18. What is the action of carbon?  
Carbon provides energy to the organisms to decompose and rot the organic matters.
19. What does the rise in temperature indicate?  
The rise in temperature shows that the organisms are active in decomposing the organic matters.
20. What are the degrees of nitrogen, phosphorus and potassium contents required to be present in the fertilizer ready for use.

Let us dispose of the local waste at the local level itself.

Nitrogen- 0.6-1 %, Phosphorus- 0.8-1.5%, Potash- 1-3%.

21. What is the action of the ashes?  
The ashes by virtue of the greater amount of the potassium content provides energy to the compost.
22. What are the advantages of the pit method?  
When compost is made by the pit method, no smell comes out and no pet animals can tamper with and scatter it. The straw and hard objects like stem of the trees and plants also get chance to be properly wet.
23. What is the advantage of the heap-up method?  
In this method sufficient air is available, decomposition gets quicker.
24. What is the sense in smearing by mud?  
It prevents foul smell from spreading and nitrogen from escaping into air.
25. What is the reason of using complex fertilizer?  
Nitrogen and phosphorus are obtained from the complex fertilizer.
26. What are the things that are called starter?  
The matters that contain lots of carbon, nitrogen and bacteria are called starter.

★ ★ ★

## **"Recycling is the Demand of Time"**

- ☞ Is there any waste in your house ?
- ☞ Is there any vase or vegetable garden in your house ?
- ☞ Do you want to use compost in your garden ?
- ☞ Do you want to manage your waste by yourself ?

**If you want to get training on how to prepare compost out of the waste, participate in -**

## **"One day Compost Training Course"**

**Programme Schedule**

**(from 11 A.M. to 4 P.M.)**

Introduction	11:00 - 11:30
Theory class	11:00 - 12:30
Audio-visual class	12:00 - 1:30
Tea break	1:30 - 2:00
On-the-spot Study	2:00 - 3:00
Discussions	3:00 - 4:00

Contact: \_\_\_\_\_

**Centre for Prosperity Infrastructure (CeProIn)**

Milan Marg, Teku, Ward No. 12

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Ph. No. : 225851

**"Recycling Solid Waste  
Is Tantamount to Living Good Health"**



Contact point for the booklet:  
Urban Health and Environmental Education Programme (UHEEP)  
Urban Development Through Local Efforts (*udle*)  
New Baneswor (In front of Hotel Everest)  
P. Box. No. 1457 Kathmandu, Ph. No. 482378/482969

