

**P R GOVT COLLEGE (A), KAKINADA**

**DEPARTMENT OF HORTICULTURE**

**WASTE TO BEST ACTIVITY PROGRAMMe**

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## **Preparation of NADEP Compost**

NADEP method of making miracle compost was first invented by a farmer named Narayan Deotao Pandharipande (also popularly known as “Nadepkaka”) living in Maharashtra (India). NADEP method uses a permanently built tank of mud or clay bricks, or cement blockettes. This is good where moisture is limiting, and is the best way to make compost after the rains have finished and during the dry season

### **Introduction**

Composting began a comeback toward end of the last century with interest surging in recent years as economic and environmental factors have begun to change the way the world looks at crop production, environmental concerns chemical agriculture raises, and waste society generates. Compost is a way of returning safe, easily mineralised, organic matter, or humus, to the soil. Even though organic matter is a relatively small fraction of soil content, it can have a dynamic influence on the health of the soil as a whole. Compost is organic matter that has been broken down through the action of aerobic microbes and the heat they produce then subsequently built up into humus. Art and science of making compost for use as fertilizer has been around for centuries. Midwest Bio- Systems has combined this art with today’s science, specialized equipment and proprietary methodology that together produce compost that can help solve many of world’s agricultural and waste management problems.

### **NADEP Method of Composting**

NADEP method of making miracle compost was first invented by a farmer named Narayan Deotao Pandharipande (also popularly known as “Nadepkaka”) living in Maharashtra (India). This method becomes quite popular among the farmers in western India. In dryland conditions, organic manures play a great role as they not only supply balanced nutrients but also retain substantial amount of moisture. Traditionally, farmers used to apply farmyard manures to crops grown under rainfed condition. No scientific procedures are followed for preparing the manure and as a result the quality of the manure used to be very poor. Slowly over a period of time farmers have lost interest in farmyard manure and mainly depending on chemical fertilizers, which further deteriorated the soil health, infiltration and

water holding capacities compost can be prepared from wide range of organic materials including dead plant material such as crop residues, weeds, forest litter and kitchen waste. Compost making is an efficient way of converting all kinds biomass into high value fertilizer that serves as a good alternative to farmyard manure, especially for crop-growing households without livestock.

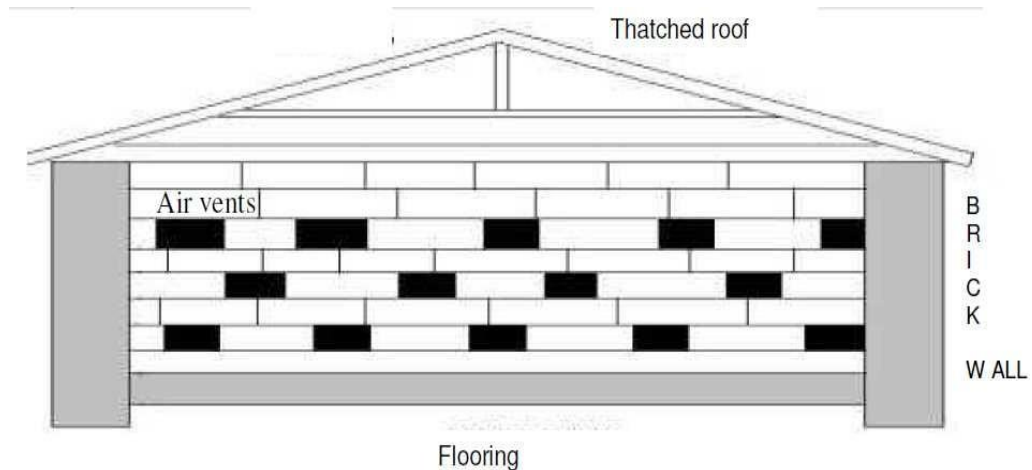
### **Selecting and Preparing the Site for NADEP Tank**

NADEP method uses a permanently built tank of mud or clay bricks, or cement blockettes. It is, therefore, important to choose the permanent site for the tank with care. This is good anytime of the year where moisture is limiting, and is the best way to make compost after the rains have finished and during the dry season.

- Prepare and dig the pit, or better still, a series of three pits, when land is moist and easier to dig, and/or when there is a gap between other farming activities.
- If possible, make compost immediately at the end of the rainy season while there are plenty of green and moist plant materials.
- In the dry season, make the pit near a place where water can be added, e.g. next to the home compound where waste water and urine can be thrown on the compost materials, or near a water point, e.g. a pond, or near a stream where animals come to drink.
- Mark place of the pit with a ring of stones or a small fence so people and animals do not fall into it accidentally.

### **Constriction of NADEP Tank**

1. The inside dimensions of the tank are as follows:
2. Length: 3 metres  
Width: 2 metres  
Height: 1 metre
3. This size of tank requires 120–150 blockettes or mud bricks, four 50-kg bags of cement, and two boxes of sand. Five iron rods can be used to strengthen the floor, but they are not essential.
4. The building should be done by a properly qualified mason, i.e. someone who knows how to build such a structure.
5. The floor of the tank is made of bricks or blockettes laid on the ground and covered with a layer of cement.
6. Each of the four walls has three rows of holes or gaps between the bricks or blockettes, as shown in Figure.
7. After the tank is built, the walls and floor are covered with a light plaster of fresh cow dung mixed with water, and then the plaster is left to dry.



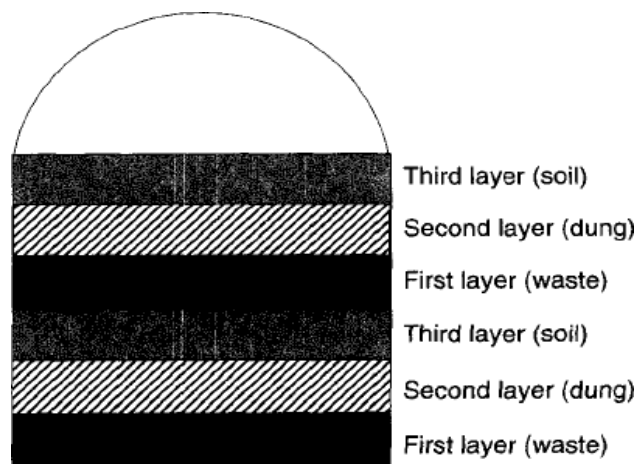
### Design of tank Filling the Tank

NADEP tank is filled in one or two days of hard work. It has to be done by a team. Before filling the tank, the following materials must be collected together:

1. Dry and green plant materials: 1400–1500 kg is needed. Grass, hay or straw that has collected from garden through weeding, or that has been damaged by rain, is very suitable.
2. Cow dung or partly dried bio slurry (the discharge from a biogas digester): 90–100 kg or 10 sacks.
3. Dried soil that has been collected from cattle pens, cleaning drains, paths, etc.: 1750 kg are needed. The soil should be sieved to remove old tins, plastic, glass, stones, etc.
4. Water: amount varies with the season and the proportion of dry to green plant materials available. However, usually an equivalent amount to plant materials is needed, i.e. 140–150 litres.
5. If urine from cattle and/or people is available, it should be diluted in the proportion of 1 part urine for 10 parts water (1 jug of urine put into 10 jugs of water in a bucket).
6. Before starting to fill the tank, sides and floor of the tank are thoroughly wetted with slurry made from fresh cow dung mixed into water.
7. The three layers used to fill the tank are as follows:
  - First layer:** use 100–150 kg of dry or mixed dry and green plant materials to make a layer 15–25 cm thick at the sides, and slightly thicker in the middle.
  - Second layer:** mix 4 kg of cow dung or 10 kg of fresh biogas slurry in 25–50 litres of water and sprinkle or scatter it over the plant materials so they get completely moistened.
  - Third layer:** cover the wet plant waste and cow dung or slurry layer with 50–60 kg of clean, sieved top soil.
8. Continue to fill the tank like a sandwich with these three layers put in sequence. Put more materials in the middle of the tank than around the sides. This will

give a dome shape to the filled tank with the centre 30–50 cm higher than the sides.

9. Cover the last layer of plant materials with a layer of soil 7–8 cm thick. Make a cow dung plaster and cover the soil so that there are no cracks showing. The top of the filled tank can also be covered with plastic, particularly to protect the compost making process during rainy seasons.
10. After the tank is filled, the progress of compost making can be tested by pushing a stick into the tank through the gaps in the wall. In a school or agricultural college, the students can monitor the changes in temperature by inserting a long thermometer, e.g. a soil thermometer.
11. As the materials decompose in the compost making process, the top of the filled



tank will shrink down below the sides of the tank.

### **Layers of Compost Tank Following up on the NADEP Compost Making Process**

It is important to keep the contents of the tank moist, i.e. with a moisture content of 15–20%.

1. Check the mud plaster seal on the top of the tank and fill any cracks that appear with cow dung plaster.
2. Pull out any weeds if they start to grow on the surface, as their root systems can damage the cover and take water out of the compost.
3. If the atmosphere gets very dry and hot, such as in the dry season, water can be sprayed through the gaps in the walls of the tank.

The decomposition process for compost to be made takes about three to four months in a warm climate. When it is mature, it is dark brown, moist, and with a pleasant earthy smell: little can be seen of the original materials that were put into the tank. This mature compost should not be allowed to dry out or it will lose a lot of its nitrogen. However, before the compost is mixed to make nursery soil, it should be sieved. The sieved compost is used in making the soil for the nursery beds, and the remainder is kept and added to a new compost-making process. One NADEP tank of the size described here can produce about 300 tonnes of high quality compost.

## **Following up on Conditions in the Compost Making Process**

When the compost pit has been filled or the piling of materials is complete, it should be checked regularly to make sure that there is enough but not too much moisture, and that it is getting hot, at least in the first two to three weeks.

### **For Compost Made By Piling Materials on the Ground**

- The stick can be inserted or pushed in horizontally between two layers about half way up the pit; or
- The stick can be pushed in vertically in the centre of the heap so it goes through all the layers. However, it is best if the stick or length of bamboo is placed in the centre after the foundation layer has been laid and then the layering process is completed with the stick remaining vertical.

### **For Compost Made in a Pit**

- The stick or length of bamboo is pushed in vertically through the whole layer, or put in place while the compost pit is being filled.
- The stick must be longer than the depth of the pit.

### **Checking Heat and Moisture**

One week after all the materials have been put in a heap or pit, and it has been covered, remove the inserted stick and immediately place it on the back of your hand.

1. If the stick feels warm or hot and the smell is good, the temperature is normal for the compost and good decomposition has started.
2. If the stick feels cool or cold and there is little smell, the temperature is too low for good composition. This usually means that the materials are too dry, and some water and/or urine should be added.
3. If the stick is warm and wet, and there is a bad smell like ammonia, this indicates that there is too little air and too much water in the compost. The materials will be rotting and not making good compost.

### **Correcting the Problems**

#### **If the materials are cool and dry**

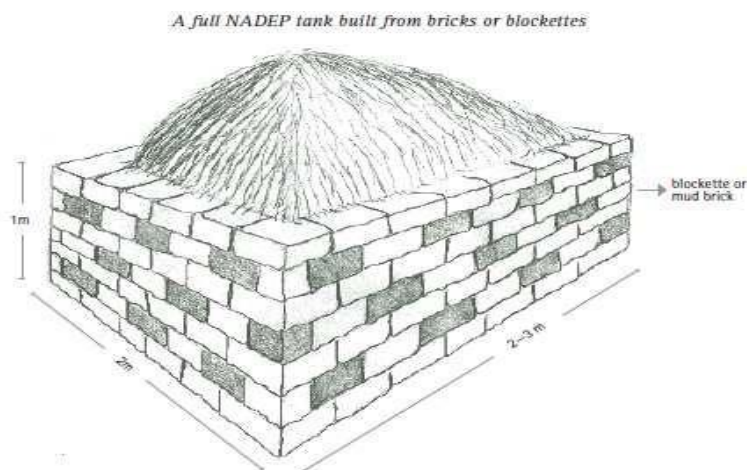
1. Lift up the top layers and put them to the side of the pit or heap.
2. Sprinkle water or cattle urine or cattle urine diluted with water on the material in the bottom.
3. Then put back the material in layers of about 25 cm each sprinkling water or a mixture of water and urine over each.
4. Replace the testing stick and cover the heap or top of the pit with soil, leaves, plastic etc., as described earlier.

#### **If the materials are too wet**

1. Collect some more dry plant materials and/or some old dry compost. Break up and mix the materials. If old dry compost is not available, use only the dry plant

materials. Lift off the top of the heap or take out the top half of the materials from the pit and put them to one side.

3. Mix the new dry materials with the wet compost materials in the bottom.
4. Put back the materials from the side of the heap or pit. If these materials are wet and decaying, put in alternate layers of new dry plant materials with the wet materials.
5. If the top materials are moist and brown showing compost making has started, put them back as they are.
6. Put back the vertical testing stick.
7. Do not seal the top but make a new test after a week. If the stick is warm or hot and the smell is good, good compost making has started and the heap or top of the pit can be sealed and covered. Testing for heat and moisture should be done every week to 10 days until mature compost is made.



### **Qualities and Use of Good Compost**

Although the quality of compost is best evaluated through the growth and productivity of the plants grown on soil treated with it, it is possible to evaluate compost quality through seeing, touching and smelling:

- Good quality compost is rich in plant nutrients and has a crumb-like structure, like broken up bread.
- It is black or dark brown and easily holds moisture, i.e. water stays in it, and it does not dry out fast.
- It has a good smell, like clean newly-ploughed soil, with a smell somewhat like that of lime or lemon.

### **Benefits**

- Reduced cash expenses on chemical fertilizer, improved soil fertility, increased yield
- Supports organic crop production, reduced dependence on outside inputs

- From each NADEP tank approximately 2.5 tons of compost is prepared within 90-120 days.
- The use of compost reduced the need for mineral fertilizer thus reducing production costs and outside dependence.

### **Problems in Using Compost**

- The product is weighty and bulky, making it expensive to transport.
- The nutrient value of compost is low compared with that of chemical fertilizers, and the rate of nutrient release is slow so that it cannot usually meet the nutrient requirement of crops in a short time, thus resulting in some nutrient deficiency
- The nutrient composition of compost is highly variable compared to chemical fertilizers.
- Agricultural users might have concerns regarding potential levels of heavy metals and other possible contaminants in compost, particularly mixed municipal solid wastes. The potential for contamination becomes an important issue when compost is used on food crops.
- Long-term and/or heavy application of composts to agricultural soils has been found to result in salt, nutrient, or heavy metal accumulation and may adversely affect plant growth, soil organisms, water quality, and animal and human health

### **Conclusion**

Compost has been considered as a valuable soil amendment for centuries. Most people are aware that using composts is an effective way to increase healthy plant production, help save money, reduce the use of chemical fertilizers, and conserve natural resources. Compost provides a stable organic matter that improves the physical, chemical, and biological properties of soils, thereby enhancing soil quality and crop production as well as farm productivity on sustainable basis. Among the solid organics, application of NADEP compost @ 5 t ha<sup>-1</sup> recorded significantly **higher plant height**, number of branches plant<sup>-1</sup>, green biomass, number of pods plant<sup>-1</sup>, number of seeds pod<sup>-1</sup>, test weight, protein content in seeds, seed and straw yield and was found statistically at par with application of vermicompost @ 2.5 t ha<sup>-1</sup>.













