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Nadep method of compost manufacture

1. GENERAL INFORMATION

1.1 Title of practice or experience

Nadep method of compost manufacture

1.2 Category of practice/experience and brief description

The Nadep method of making miracle compost was first invented by a farmer named N.D. Pandharipande (also popularly known as "Nadepkaka") living in Maharashtra (India). The method, which has become quite popular among the farmers in Western India, now bears his name.

The Nadep method of making compost **is** unique not because it is successful in making good compost, which other methods can also lay claim to; its real secret lies in the large quantities of compost the process can deliver with a minimum of human effort within a specific period of time.

The process basically involves placing select layers of different types of compostible materials in a simple, mud-sealed structure designed with brick and mud water. The system permits conversion of approximately 1 kg of animal dung into 40 kg of rich compost which can then be applied directly to the field.

The multiplication factor is significant in view of the fact that in the tropics, there **is** rapid decomposition of organic materials in the soil.

This organic matter must be replaced and replenished if agricultural fertility is not to go on declining. The problem is there is a scarcity of compostible materials, particularly animal dung, prevailing within the country. **(A** good proportion of animal dung is dried and used as fuel in many rural areas.) Thus, even if all available organic materials, including dung, were religiously and scrupulously collected, they would still not be sufficient to replace the organic constituents of the vast quantities of India's fast-degrading soils.

The Nadep method of composting actually enables the farmer to get around

the difficulty of generation of mass and to increase the quantity of compost rapidly within a given frame of time and without any significant additional expense.

***1.3** Name of person or institution responsible for the practice or experience*

Dr. Kumarappa Gowardhan Kendra

1.4 Name and position of key or relevant persons or officials involved

N.D. Pandharipande

1.5 Details of institution

(a) Address: Pusad 445 204, Yavatmal District, Maharashtra, India
(b) Telephone: ++ (91) 184

1.6 Name of person and/or institution conducting the research

Claude Alvares, Editor, Other India Press

1.7 Details of research person/institution

(a) Address: Above Mapusa Clinic, Mapusa 403 507, Goa, India
(b) Telephone: ++ (91) (832) 263 306,256 479
(c) Fax: ++ (91) (832) 263 305
(d) E-Mail: oibs@bom2.vsnl.net.in

2. THE PROBLEM OR SITUATION BEING ADDRESSED BY THE PRACTICE/INNOVATIVE EXPERIENCE

In contrast to temperate soils, tropical soils are known to routinely lose their organic-matter constituents when exposed to either extreme sun, wind or rain. The problem of erosion is exacerbated when tree cover has been removed and the soil no longer has the protection of any vegetative cover.

It is generally acknowledged that thousands of tonnes of precious topsoil (which contains soil humus) are lost every year due to erosion caused by different agents. **As** the organic content of the soil thus declines, the soil becomes inhospitable to the soil fauna, especially earthworms, and, in many cases, turns dead, unable to produce even shrubs or grass. Such losses of soil organic constituents, if they occur in farmers' fields, will lead to gradual but

inevitable losses in agricultural productivity, compelling the farmer to depend more and more on expensive synthetic fertilisers and other nutrients even if he recognises that such inputs further damage the soil.

The deficiency in the organic component of the soil (or soil humus) can be rapidly made up through the addition of artificial organic manure (like castor seed cake or neem cake) or compost. The former is expensive and must be purchased from the market for a price. Compost, on the other hand, can be made in one's own backyard.

The problem that has been routinely posed with regard to compost, however, is whether it can be made on the scale required. Agricultural scientists have claimed that there is not enough compostible or biodegradable material available within the country for producing the massive quantities of organic compost the country's tired soils need. They have often used this as an argument to continue supporting the use of synthetic fertilisers even though they concede that the use of such chemicals in the absence of organic matter has led to the creation of more and more infertile and sick soils. The argument has also proven to be a major damper to efforts, both public and private, to stimulate and train farmers to manufacture compost for their fields.

Pandharipande invented his Nadep method of composting precisely to counter the argument that farmers can never produce the quantities of organic compost the soil actually requires. His method can not only be used by farmers to fertilise and improve their own fields dramatically, it can be operated as an independent production unit which unemployed village youth can adopt as a sound business proposition. This is because there is perennial demand for large quantities of compost in tropical countries and the traditional methods for producing it have proved singularly inappropriate and inadequate for the requirements at hand.

3. DESCRIPTION OF THE PRACTICE/INNOVATIVE EXPERIENCE AND ITS MAIN FEATURES

The Nadep method of making compost involves the construction of a simple, inexpensive rectangular brick tank with enough spaces maintained between the bricks (partial honeycomb pattern) to provide for necessary aeration.

The recommended size of the tank is of the order of 10 ft (length) **x** 6 ft (breadth) x *3* ft (height). If more material is available for composting, then the length should be increased. However, the breadth should never exceed six feet.

The tank can be erected with bricks and with the use of mud mortar. Cement may also be used throughout but this is not necessary.

However, the last two (topmost) layers of brick ought to be done in cement so that the structure has stability and is not damaged during actual operations of filling and emptying the tank. Bricks used may be either sun-dried or kiln-fired. The total number of bricks required for a tank of this size is approximately 1,500.The location of the tank is of paramount importance. If possible, the tank should be located on a level that is slightly higher than the ground level of the area. Places where water collects should be avoided. **As** wind may be a problem, the length of the tank should be squared to the predominant wind direction. It is also important to locate the tank under a tree and close to a source of water since some water is required to maintain the humidity of the compost.

Since the compost is destined for agricultural fields, it would also be appropriate to keep in mind that the closer the tank is to the fields, the less time would be required to transport it once it is ready. The bottom of the tank or the tank bed should also be covered as far as possible with an impervious layer or sealed to prevent the possibility of seepage of any liquid waste into the soil below. The tank bed can in fact also be laid with bricks provided the ground is level.

The honeycomb wall should be approximately nine inches thick. The best way to create the honeycomb effect is to leave out the alternate brick when one reaches the third row from below. Thereafter, the alternative pattern should be followed after every two additional rows.

Though it is possible to use other containers for the production of Nadep compost, the kind of compost produced in such containers would not be of as good quality.

If there is no possibility of constructing a walled tank as recommended above, Nadep compost could also be generated in dug pits. The length, breadth and height of the pit would be the same as those obtaining for the tank constructed above ground. However, if the depth of the tank goes below three feet, organisms will die and the compost will not mature. The pit method is also ineffective in areas where the water table is very high as the nutrients in the compost will dissolve in the water and leach into the soil.

Once the tank is completed, there comes the important task of placing the layers of organic material within the structure. The quantities required are as follows:

(a) 1,500**kg** of plant and farm waste, including dried husk, twigs, stalks, roots, leaves, etc. from which all plastic, glass and stones have been removed. Other compostible materials which can be used include the waste of all crop plants (available after the grain has been removed), other organic materials like waste hair from barber shops, spent sugarcane stalks after sugarcane juice has been extracted, leather meal,

bone meal, waste fish, factory waste, rags, shredded paper, ash dumps near big hotels using firewood, non-edible oil cake, human faeces, silt from tanks and drain water from towns and cities.

(b) 90-100 kg **of** cowdung. In place of this, the slurry from biogas plants can also be used.

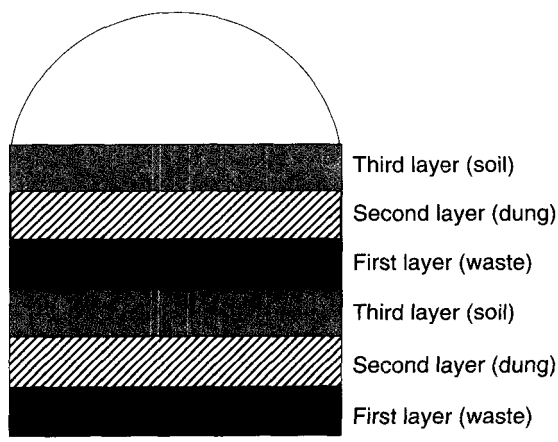
(c) Dried, filtered soil (from the fields and channels) from which again all materials like glass, stones and plastic have been removed. Soil mixed with urine from cattlesheds is especially productive.

(d) Water requirements will vary from season to season, but generally, the quantity will be the same as the weight of the organic waste being fed to the tank. Every bit of urine from cattle should be collected and used, in addition to ordinary water.

The important technique in the manufacture of Nadep compost is that the entire tank should be filled in one *go.* Filling should be completed within 24 hours and should never *go* beyond **48** hours, as this would affect the quality of the compost.

Before charging the tank with the materials, it is advisable to wet the inner walls and the tank bed with cowdung dissolved in water.

Thereafter, one commences charging the tank with the first layer as follows:



First layer: Plant waste is filled up to a height of six inches. This will take up at least 100 to 120 **kg of** the material.

Second layer: 4 **kg** of cowdung should now be mixed well in 125 to 150 litres of water and sprinkled on the plant waste in such a way that the material is completely wet with it. More water will be required in summer for the wetting.

Third layer: The wet cowdung-sprinkled waste is covered with another

60 kg of clean, filtered soil and water is sprinkled on it again.

Thereafter, the tank continues to be filled with this series of three layers in the same sequence up to one and a half feet above the rim of the tank in the shape of a cone.

Usually, the standard tank can take 11 or 12 series of layers. Then, once the filling is completed, comes the job of having the tank sealed. This is easily done by covering the top with a three-inch layer of soil all around. The soil layer is then plastered with liquid cowdung slurry carefully **so** that no cracks emerge. After a period of 15 to 20 days, due to microbial activity that has already commenced, the material above the rim of the tank will shrink to below the tank rim.

The tank should be opened and filled again with the same sequence of layers up to a height of one and a half feet above the tank rim. Once again, the material should be covered in three inches of soil and sealed with liquid cowdung slurry.

Thereafter, in order to maintain the moisture level (which should be about 15% to 20%) and also to prevent cracking, cowdung mixed with water is sprinkled on the compost heap. Water may also be sprayed through the holes on the tank sides. The entire tank is covered with a thatched roof to prevent excessive evaporation of moisture. At no point of time should the compost be allowed to become *dry.* Under no circumstances should any cracks be allowed to develop. If they do, they should be promptly filled up with slurry. Grass that sprouts should be removed.

Depending on the way in which the preparations have been done, the compost will take between 90 and 120 days to be completely ready for removal and use. When the tank is opened, the compost will be a deep brown colour with a pleasant smell. It should be removed and sieved through a grill. The filtered fertiliser should be used and the remains placed back into the tank for the next cornposting process.

Each large tank can be harvested three times in one year. The expertise required for erection of the tank is available in every village and **so** are the other materials required, including dung, soil and organic waste like straw, hay, etc.

4. DESCRIPTION OF THE INSTITUTION RESPONSIBLE AND ITS ORGANISATIONALASPECTS

N.D. Pandharipande worked for 25 years at the Dr. Kumarappa Gowardhan Kendra at Pusad to perfect the Nadep cornposting technique. The Kendra now routinely propagates the method through farm demonstrations in farmers' fields and through training courses.

5. PROBLEMS OR OBSTACLES ENCOUNTERED AND HOW THEY WERE OVERCOME

There have been no problems encountered in relation to acceptance of this practice. The Nadep method of composting has been readily accepted by the farming community and by progressive farmers. **A** large number of rural development institutions have also adopted it for intensive propagation in their areas. Government-owned financial institutions, including banks, readily give loans to farmers and farmers' associations for the purpose of setting up Nadep compost tanks.

6. EFFECTS OF THE PRACTICE/INNOVATIVE EXPERIENCE

Large quantities of organic manure or compost are made available through the Nadep process. The compost, worked into the soil prior to the planting of seeds, has a remarkable impact on the growth of the plants, improves the condition of the soil and increases the ambient environment to enable proliferation of soil micro-organisms, including earthworms. The Nadep method is particularly useful in those areas where soils are eroded and where it is difficult for farmers to purchase plant nutrients from the market.

The compost method is also fairly successful among those farmers who have eschewed the use of chemical fertilisers due to various problems faced in the use of such chemical inputs.

7. SUITABILITY AND POSSIBILITY FOR UPSCALING

The present size of the tank was arrived at after 25 years of experience with various sizes. From the point of view of labour requirements, smaller tanks would require far greater attention from farmers and the quantity of compost available will be correspondingly reduced. Upscaling to even bigger sizes is not advisable. The size recommended by the inventor is the optimum size. If at any time a bigger tank is to be constructed, the breadth should be maintained at six feet, whatever the length.

8. SIGNIFICANCE FOR (AND IMPACT ON) POLICY-MAKING

Agriculture departments can cooperate with rural development departments and organisations to organise production of Nadep compost on a large scale as the system makes available to the farmer a fairly large amount of compost on a sustainable basis without requiring continuous financial inputs. In contrast, the manufacture of chemical fertilisers and nutrients entails large

outflows of foreign exchange since it is based on imported feedstock and generally leads to pollution. The use of chemical fertilisers is known to eventually weaken the soil.

The Nadep method of compost manufacture can also provide the basis of a rural development scheme which will not only employ idle labour in the manufacture of a socially useful product but would also enhance incomes as the compost produced has a ready demand among farmers. In India, a large number of agencies have adopted the Nadep method for funding and propagation. These include the Gandhigram Rural University based in Madurai, Tamil Nadu, which has adopted a Nadep village under its extension programme. NABARD, a major funding institution for rural development, is financing the multiplication of Nadep schemes. Institutions like the Goraksha Samiti, based in Akola (Maharashtra), are manufacturing Nadep compost and selling the product to farmers. The Centre for Science for Villages based in Wardha organises regular training courses in Nadep composting.

9. POSSIBILITY AND SCOPE OF TRANSFERRING TO OTHER COMMUNITIES OR COUNTRIES

The Nadep method of making compost is a simple technology which can be disseminated to other communities and countries through a well-designed manual of not more than **4-5** pages. The Dr Kumarappa Gowardhan Kendra itself (address provided in Section 1), which has spent considerable time perfecting this technique, also provides training courses for persons who are interested in mastering the technique for further propagation elsewhere.

10. OTHER COMMENTS

An illustrated booklet titled ***The Miracle*** *Called* ***Compost*** which describes the Nadep process in detail has been published by the Other India Press, Mapusa, Goa, India.