Community composting and vermiculture

Solid waste management is a problem that is plaguing urban authorities in both North and South. As loss of soil fertility is also a major problem, it makes sense to reduce waste by processing waste organic matter into compost. Mariëlle Snel describes a vermicomposting project in India that is trying to do just that.

HYDERABAD IS A MAJOR industrial city with a population that has grown from about one million at the time of independence in 1947 to over three million today, making it the sixth largest city in India. Wider Hyderabad includes another four million people. As a result, current quantities of solid waste generated per day in Hyderabad are estimated to be between 1300 and 1500 metric tonnes, based on the assumption that an average-middle class Indian household throws away 350 grams of waste daily.

The Municipal Corporation of Hyderabad (MCH) is unable to clear all of this waste because of numerous administrative and organizational problems and financial deficits. So although all waste is supposed to be collected every other day, a daily backlog of between 100 to 500 metric tonnes remains. Some of this backlog is burned by residents or collected by scavengers, but some remains piled on unused pieces of land, often close to or within residential quarters, causing a permanent threat to health.

Composting in India

According to Nath[1] 40 to 50 per cent of Indian city refuse has suitable physical and chemical characteristics to be made into a high-grade compost.

Two methods of composting are common in India:

- pre-treatment or post-treatment 'windowing' (using mechanical, semi-mechanical, or manual means), usually by large city corporations; and
- the Bangalore or Indore method.[1,2]

In the Fifth Five-Year Plan (1974-9), recommendations were made for the mechanization of compost production. As a result, a major pilot project was launched to set up mechanical compost plants in eight Indian cities: Ahmedabad, Baroda, Bombay, Bangalore, Calcutta, Delhi, Jaipur, and Kanpur. Despite government subsidies and grants for infrastructure, however, the high costs of production and distribution, and a lack of demand for compost from consumers made the project unviable.[3,4] The root cause of failure, according to Nath,[2] was the lack of appropriate technology. He notes the '...lack of effort in the past to develop optimal techniques appropriate to the climate, the waste characteristics, the economic and urban structures of the metropolitan areas, and the socio-economic status and cultural habits of the people'.[2]

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Watering the compost pile.

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This community in Kenya is making compost not only to process agricultural waste, but also to improve their crop yields.

Heidur Netocny/Panos Pictures

Not only practical waste management — it is an employment and education opportunity too.

In more recent times, however, a new model has emerged which uses simple methods such as vermiculture, the use of earthworms to degrade organic waste. This labour-intensive method of composting is presently being practised by local governments in Deonar (near Bombay), Bangalore, Madras, and Hyderabad.

History of composting in Hyderabad

By the late 1950s around 4000 compost trenching grounds produced compost from dry refuse and night soil.[5] By the end of the 1960s much of the compost was left unsold due to high prices and transportation problems; only 60 per cent of the compost was being sold[5] -- the remaining compost was disposed of.

In 1977 the Engineering Department was building a 200-tonne-a-day mechanical compost plant in Mansurabad, under a project initiative by NEERI. The plant cost Rs.56 billion with 33 per cent of the cost shared by the state government.[5] (Although sanitation was under the authority of the Health Department, the new mechanical composting plant came under the administrative control of the Engineering Department.)

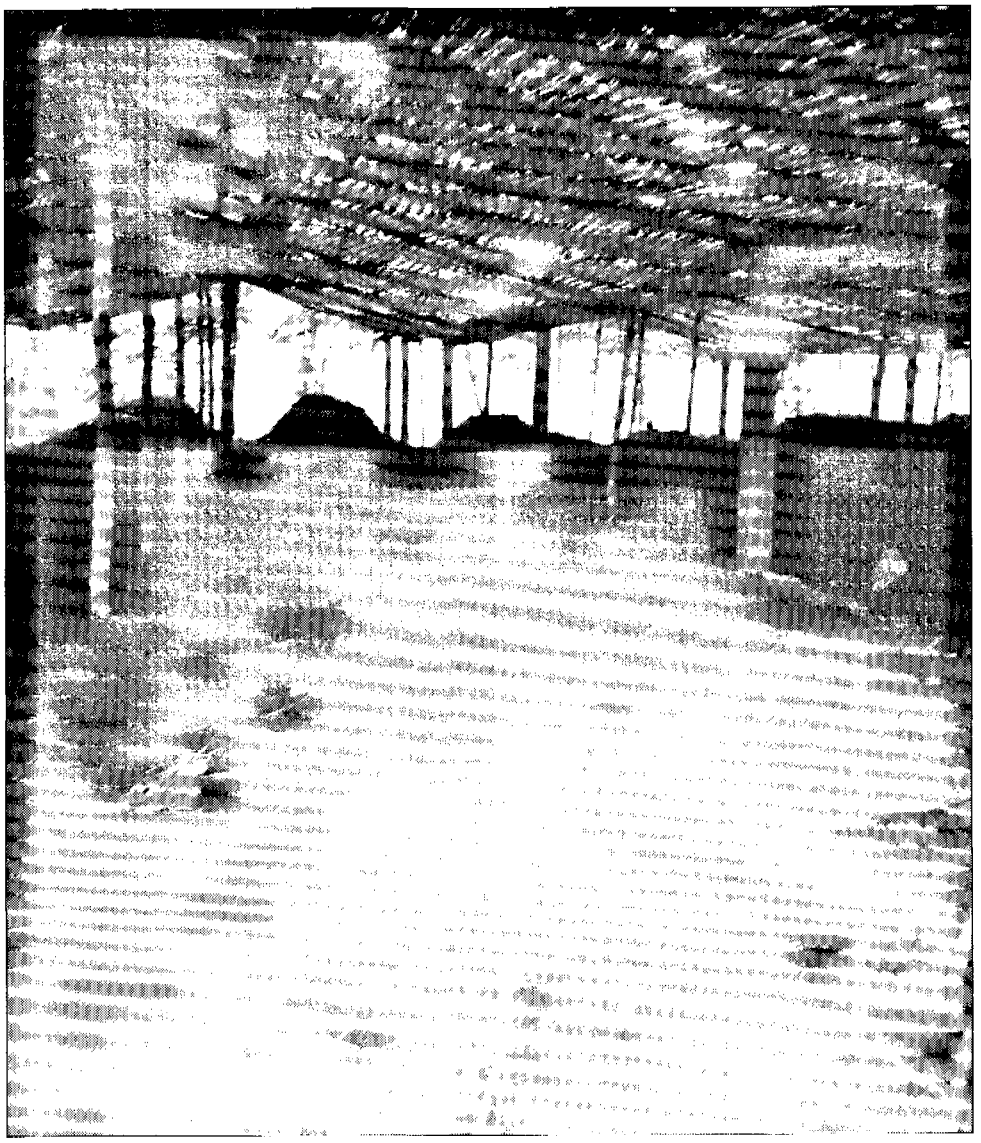
In 1984 the plant was leased out because of financial difficulties, but by 1986 the firm was no longer able to compete with the trade in cow dung, which was sold door to door, direct to consumers and was cheaper.

The MCH currently receives only a relatively small revenue from composting its waste. The Corporation therefore made plans in the mid-1980's to make compost production more competitive by means of larger scale production. For many years MCH has been seeking a location for both a large mechanical compacting plant and a site for a manual compost area, where at least half of the biodegradable material could be converted into fertilizer using different methods, including vermiculture. The present proposal includes the acquisition of 50 acres of land at Nagaram village (in Survey No.571) in Kisaragutta Mandal for the disposal and regeneration of waste within the Secunderabad division. The Corporation is presently in the process of negotiating for land for this project. In addition the MCH is also considering small-scale compost production as a viable option. At present, more decentralized manual compost plants which are based on vermiculture are being constructed. These plants are an integral part of a voluntary waste disposal scheme which the MCH is experimenting with, helped by NGOs and CBOs.

Community-based waste collection

Meanwhile, in 1992 a community-based voluntary waste collection scheme -- the first of its kind in India — was launched in Hyderabad by an urban civic body with the help of NGOs and CBOs. The project is funded by the MCH, UNICEF, and the UK Department for International Development (DFID), but the work depends on the co-operation of local NGOs, CBOs, and citizens.

The purpose of the scheme is to keep neighbourhoods (or colonies, as they are often called locally) clean, as well as to make the lifting operations of waste quicker and more effective with the help of employees of neighbourhood and



The site has 20 'wormibeds' which are 80 feet long by 5 feet wide, and are piled to about three feet high.

The secret of success: earthworms will convert the waste — free of charge!

community-based organizations. The scheme has created a healthier environment and cleared away the backlog of uncollected waste. The scheme also involves the waste pickers who collect waste in the schemes, and thereby develops a favourable social climate to educate citizens on the importance and economic value of waste.

The economic objectives are to:

- make waste management more effective by establishing a house-to-house collection scheme with the help of waste pickers and others in the informal recycling sector; and
- recycle biodegradable waste through vermiculture composting.

The second objective is valuable in itself, as it has simultaneously strengthened the link with the informal recycling activities. Therefore its success has increased the chances of the overall pilot scheme being effective in improving waste management. Since nearly 80 per cent of all waste is biodegradable, according to the Deccan Development Society, composting represents an important aspect in the study.[6]

Involving waste pickers links the formal and informal sectors. They can collect from each household where the MCH trucks cannot reach, and can separate and transport the recyclable materials.

This scheme produced around 660 tonnes of vermicompost in 1994. This has happened despite MCH's difficulties in securing land for the vermicompost process in certain neighbourhoods. Social objectives include the rehabilitation of between 10 000 to 20 000 of the approximately 35 000 waste pickers in Hyderabad.

The scheme began in June 1993, and is managed by community- or neighbourhood-based organizations (NBOs) within middle- and upper-income areas; about 200 colonies with around 100 000 households are involved. The first phase of the scheme took place in 217 slum areas (190 000 households), many of which are managed by DFID. (The scheme has not been financed by DFID since 1997, although it is still running in some slum areas based on initiatives by the communities themselves.) In addition to the colonies and the slums involved in the scheme, some fruit and vegetable markets with biodegradable waste have been selected to take part.

The waste collection scheme usually employs one or two youths (or adults) from each residential area who are not already active as waste pickers. Residents segregate their waste into two containers, one for non-biodegradable and one for biodegradable waste. Every day between 6:00 and 9:00a.m., the 'waste collector' collects the waste from homes in the scheme and puts it into a 200kg tin box fitted onto an adult-sized tricycle (the scheme is often called the tricycle scheme). The non-biodegradable waste is then dumped in one of the MCH bins or at one of the 'garbage houses' — small cement houses two metres wide and three metres high. The waste is then cleared by MCH staff each day. The biodegradable waste is taken to a half-acre residential plot to produce compost.

To encourage the residents to join the pilot study, the MCH pays a subsidy of Rs5 per household per month to the CBO or NBO for maintaining daily operations. Each household is charged a monthly membership fee of about Rs10 and a one-off enrolment fee of about Rs5. This gives the CBO or NBO an income of Rs0.50 per day from each participating household. Households in the slum areas where DFID is working are not subsidized or covered by the MCH, and must pay an additional fee of about Rs5 per household. (Officials say that this is because these areas do not pay property tax and that enough additional money is already being funnelled into the slum areas.)

In 1994 301 people in the MCH areas were collecting waste from households using tricycles. MCH estimated that the

The compost is sold to help support the project.

collectors and the subsidy scheme save about Rs8.04 million each year because fewer trucks and municipal workers were required. In the DFID slum area 217 people were employed and Rs13.63 million was saved each year.[5]

Future developments

Three issues in particular have hindered the development of the vermicomposting programme around the city of Hyderabad:

Lack of facilities This refers to the lack of facilities to actually practice the planned compost techniques at the community level. Surveys from 1993-4 clearly demonstrated that most participating households are recycling their waste, but support for this aspect decreased during the survey period, because of problems in finding land for vermiculture composting. The citizens are motivated, but without adequate equipment this part of the project cannot be enhanced by the NGOs and CBOs. This hindrance is political rather than logistical, as land is available for composting — the political situation has just slowed down the process of obtaining it.

Lack of preparation for the vermiculture part of the pilot study Some organizations had been unable to start their vermiculture programme because necessities such as earthworms or pits (to be placed in the municipal parks in neighborhoods) were not available. The situation had not improved noticeably by 1994, as the MCH had not yet finalized arrangements for the compost facilities. Although the situation has improved since then, a number of neighborhoods are still struggling to obtain earthworms or pits.

Employment of waste pickers Prejudice towards individuals working with waste is a particular and well-known problem in India. One of the most important issues of concern in the scheme was, and to some degree still remains, the social discrimination towards waste pickers who represent a vital link with the informal recycling sector.

Kothapet fruit market pilot study

Another aspect of the pilot study is a year-old vermiculture project at Gaddiannaram, at the Kothapet Fruit Market, which provides know-how and guidance for any neighbourhood in Hyderabad which may want to start a small vermicomposting plot in their area.

Vermiculture, an environment-friendly technique, yields rich organic compost with 0.72 per cent nitrogen, 0.25 per cent phosphorus and 2.74 per cent potash. Chemical analysis of worm castings shows that they contain up to twice as much available magnesium, five times as much available nitrogen, seven times as much available phosphorus, and 11 times as much as available potassium as the surrounding soil. By using worms in vermibeds, the soil is rendered a neutral pH, and the chemical make-up is improved.

Every 60 days the vermicomposting pilot study at Kothapet fruit market produces about 750kg of vermicompost from each of six pits which are two metres long, one metre wide, and one metre deep — a total of about 4500kg. It is sold to residents of Hyderabad and farmers.

Paul Smith/Panos Pictures

Even rural communities, such as this one in Octopeque, Honduras, want the benefits of both reduced waste and valuable compost.

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