



Decentralized solid waste management approach

Anselm Rosario, Director, Waste Wise, Bangalore, India.

BANGALORE LIKE MANY cities in the developing world has out grown its infrastructure. The Solid Waste Management an essential urban service, while consuming 40 to 50% of the municipal budget, does not adequately perform itself posing variety of economic and environmental problems. While the citizens remain indifferent blaming the municipal authorities, the backlog of waste remaining uncollected on the road sides also poses other problems. It attracts large number of waste pickers who retrieve recyclable waste. Waste picking tend to strew the waste around the bins and exposes the waste pickers to direct contact with decaying materials. Consequently public health and individual health of waste pickers suffer. The waste pickers emerge from low socio economic group and live in conditions of utter poverty and deprivation. They have no Institutional or State Support.

Waste Wise evolved out of a social concern to recognise the jobs of waste pickers, to render their working conditions less hazardous and to gain public recognition for their role in recycling and protecting the environment. It also emerged out of the ecological need to educate the people about their environment, the damage indiscriminate waste disposal behaviours can cause. Waste Wise aimed at creation of number of decentralised approaches in the city, where the citizen groups as well waste pickers can formally be involved in managing waste. It was believed, decentralisation would place onus on people to reduce waste, segregate at source and to facilitate recycling. It was also argued, decentralisation instead of competing or replacing the formal system of handling waste operated by the municipal bodies, would complement the process.

Waste Wise has more than a decade of experience working with waste pickers on number of issues related to their survival. One of the biggest problem Waste Wise has to constantly confront with was, the ever growing number of waste pickers every year. A close relationship was identified between waste picking activities and indiscriminate throw away garbage behaviour. While the recyclables found their own outlets, a large component of municipal garbage namely organic materials remained strewn around or uncollected on road sides. It is this portion of the garbage which poses variety of problems and incurs heavy expenditure for disposal.

In order to address the problem at its roots and to quantify hidden nuances in the formal system and waste picking trade, a research study was formulated during April 1990. The objectives of the research was to study formal and informal systems of waste handling and to

explore alternatives in collection, transportation and treatment of waste. Promoting community participation, Integration of waste pickers and finding out ways and means to improve the conditions of these people were also the considered one of the objectives of the study.

The Research which was completed during December 1990, resulted in phase I of a pilot programme at a predominantly middle income locality in Bangalore. Initially the households in the pilot area was sensitised to understand the hazards and the potential garbage. The sensitization done in various forms starting from discussing with people at the house hold level, identifying group of them who showed interest and bringing them together for meetings and planning. Leaflets explaining the need for segregation, what to segregate and how to store the waste was distributed among the 150 house holds which was selected for pilot scheme. The waste pickers in the area with whom Waste Wise had contact were brought into scheme in the form of exposure to house holds, training and sharing of information on the operation. A formal launch was done during April 1991 and door to door collection of segregated waste materials was initiated with the help of waste pickers.

One of the options emerged out of the research study was to convert the organic portion of the municipal garbage into compost, as closer to the source as possible, so has to reduce the transport costs. Utilisation of the earth worms to hasten the process of composting and also eliminate the malodour associated with decaying garbage through worm activity was considered appropriate for the pilot scheme. A complex interdisciplinary task was undertaken with experts from University of Agriculture, Bangalore (UAS), the Karnataka State Council for Science and Technology (KSCST), with experts in solid waste management and others related to urban planning.

A small piece of land for treatment of garbage on experimental level was obtained from the Bangalore City Corporation (Municipal Body) in a park near pilot area. Phase II of the project resulted in establishment of Vermi Compost Grove in the park area. The purpose was to evolve vermicompost technique suited to Bangalore and study the costs and benefits associated with the scheme.

Today the pilot project operates with 400 households in Jayanagar area. Approximately 250 to 300 kgs of wet organic waste and 20 - 25 kgs of dry waste are collected from the households every day, six days a week. Insanitary waste are collected once in a week and burned. The dry waste like paper, plastic, metals and glass are stored

for a week by the waste pickers and sold in bulk to the regular outlets. The wet garbage is transported from households to park area by hand driven trolleys and dumped in an open pit measuring 3m x 1.5m with a depth of 0.75 m. It is covered with dry leaves during fall or available materials stored for the purpose in the park area. It is then allowed to decompose for ten days with regular turning on every alternative days. After 10 days, partly decomposed organic matter is transferred to another closed pit with same dimension as the open pit. The second pit has a roof like structure made out of mild steel to prevent excess sunlight and water during rainy days. The pits are also covered with wire mesh to prevent stray dogs and cows which tend to chew from the pits and are prevalent on Indian streets. The cover prevents the entry of rodents into the pit.

The earth worms of special species cultured by UAS are introduced into the second pit and garbage is kept moist by adding water. It takes about 30 days for the worm activity to be completed with regular turning of the garbage every three days. At the end of four weeks the compost is ready consisting of worm castings as well as finely broken down particles of organic materials. It is then made into mounds and allowed to remain for about 24 hours. During this time the worms move to the bottom of the pit and the compost is skimmed from top. The compost is then sieved using 3mm mesh so has to remove juvenile worms, cocoons and other undigested compounds found in composting process. These are then stored in one part of the park to be used as the covering material for the fresh garbage collected every day. The sieved vermicompost is then packed in 1 or 50 kgs plastic bags and sold to nurseries, florist, landscapers, home gardeners and small farmers.

Economical/organisational information

Waste Wise utilises the services of 4 waste pickers for door to door collection. Each waste picker handles 100 households and is paid directly by them which works out to Rs.5/- per household, per month. The waste picker earns about Rs. 500/- per month (17 US\$) plus earnings from the dry waste sales. Two more waste pickers are employed at the site for the compost production @ Rs. 500/- per month plus 10% commission on total compost produced. Waste Wise also employs a community organiser who works in the neighbourhood and with the boys on the street @ Rs. 3000/- per month (100 US\$) and a project supervisor who looks after regularity of the collection and compost production @ Rs.1000/- per month (33 US\$).

The compost production per month amounts to 1.5 tonnes approximately which is sold at Rs. 2000/- per tonne (67 US\$). The salary of the community organiser is covered by the funding received from the KSCST and Terres des Hommes, Geneva, who jointly supported capi-

tal costs, purchase of equipments, pit construction and production of publicity materials. From the compost production two waste pickers who operate at the site and the supervisor are paid. The rest of the money from compost sale either gets accumulated or spent on operational cost like purchase/repair of equipments, laundry costs of uniforms, recreational and medical care activities aimed at other waste pickers who are in the neighbourhood.

Currently, Waste Wise is performing following functions viz, promoting decentralised experiments, identifying and training waste pickers, production/sale of vermicompost, promoting environmental sanitation and expansion programme in 8 other localities.

The results of the experiment show following benefits

- i) Among the citizen's the awareness on garbage issue and willingness to tackle it effectively are high. Other groups have emerged on their own or with support from NGO's.
- ii) Recognition is given to informal labour of the waste pickers, their earnings are better, they work in hygienic conditions and learned ways to convert organic portion into salable products.
- iii) Environmental benefits in terms ploughing back the recycled material into soil and subsequent reduction in transportation and disposal costs.
- iv) Since the scheme uses simple technology, indigenous materials and available labour, it could be replicated by residents group with minimum support.
- v) The scheme can sustain itself in terms of compost produced to cover the salaries and operational costs. However capital costs to start up is necessary.

The problems

- i) It is land intensive approach and therefore finding land with water facilities within urban set up are difficult.
- ii) Ensuring regularity in collection is essential for the success of the scheme. It takes lot of effort to train street boys who are habituated to free life style on the street.
- iii) Ensuring 100% segregation is difficult. Currently only 80% cooperation got from the community in terms of segregation and monthly fee payment.
- iv) Any decentralised approach has to some extent depend upon the municipal bodies for its operation. Eliciting cooperation from the municipal bodies in terms of getting land and other support is a mammoth task.