



Taking a closer look at decentralised composting schemes– Lessons from India

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All around India, various small-scale decentralised composting schemes are operating with various levels of success. Initiated and operated either by Non-Governmental Organisations (NGO), Community-Based Organisations (CBO), or motivated residents. The great amount of know-how and experiences which have accumulated - if disseminated - can be used to avoid making the same mistakes over and over again. This short article summarizes some results of a study that assessed existing decentralised composting schemes in the cities of Bangalore, Chennai, Pune and Mumbai and collected information on their technical, operational, organisational, financial and social set up. The schemes were analysed systematically and lessons learned shall be further disseminated among interested stakeholders and especially among the responsible officers at the local government level.

Decentralised organisational structures include neighbourhood and community initiatives (Community-Based Organisations), company and institution initiatives for internal waste management, and private enterprise initiatives. All decentralized options initiated by organisations or individuals do not relieve the municipal authorities of their duties, although a well established partnership can significantly reduce the municipalities' operational efforts. It is still the authorities who are responsible for solid waste management and in charge of implementing solutions for improved organic - "wet" - solid waste management, in order to comply with the new Indian Municipal Solid Waste Rules. Setting a framework to support, involve and enter into partnerships with third parties operating composting schemes can be a first step in facing the organic waste challenge.

Introduction

The garbage problem – a mess

Indian municipalities have the overall responsibility for solid waste management in their cities, however are currently unable to fulfil their duties in ensuring environmentally sound and sustainable ways of dealing with waste generation, collection, transport, treatment and disposal. This failing service of the Urban Local Bodies (ULB) in India results in serious health problems and environmental degradation. Combined with the rapid urbanisation and unplanned development, the expected magnitude of problems give significant reason to initiate immediate action for improvement of this appalling situation.

It was this desperate waste situation of Indian cities with little hope for alleviation in the near future, which gave cause to a public interest litigation filed in the Hon. Supreme Court of India. A committee constituted by the Hon. Supreme Court of India was then established to look into all aspects of SWM in the class I cities of India and submit appropriate recommendations. On the basis of these recommendations (Committee Constituted by the Hon. Supreme Court of India 1999) national legislation was adopted with the "Municipal Solid Waste (Management & Handling) Rules 2000" (Ministry of Environment and Forests 2000). One sec-

tion of the rules requires Urban Local Bodies to promote and implement waste segregation at source. *The segregated "wet" waste – the biodegradable organic fraction – has to be treated in an appropriate manner.* With the existing legal backing, members of the community now have means to force municipalities to take action. On the other hand the municipalities are still struggling with their day to day challenges and have little capacity to experiment with new approaches in waste management such as composting. Nevertheless, a multitude of initiatives exist, where the organic fraction is collected and treated. It is now at the time to analyse and learn from them, so the authorities can set up an institutional and organizational framework for organic waste management in order to promote and support approaches which have shown to be success stories.

Is decentralised composting a feasible treatment option?

In the 70s the interest for large-scale highly mechanised MSW composting plants for urban areas grew world-wide. Most of these composting plants turned out to be serious financial failures (Dulac 2001). A study carried out in India (UNDP/WB RWSG-SA 1991), analysed 11 heavily subsidised mechanical municipal compost plants constructed between 1975 - 1985 ranging from 150 to 300 tons refuse handling capacity per day. The study concluded that in 1991 only 3 were in operating condition and that these plants were operating at much lower capacities than their design capacities. The study recommended: *"Instead of setting up one single large mechanical compost plant, it will be beneficial to set up several small manual composting plants.*

In the 90ies many small-scale composting initiatives were initiated by NGOs, or community groups often receiving some international assistance and/or advice. Some of these exist to date; others have disappeared after a few project years. This article gives a brief overview of some results of an evaluation study of existing composting schemes from southern India, which was conducted to identify problems and constraints that need to be tackled by the various actors in order to allow wide dissemination and replication of such decentralised composting activities.

Conceptually, decentralised composting schemes of municipal solid waste can be seen as a promising management and treatment options for urban areas as they:

- can enhance environmental awareness in a community
- can create employment in the neighbourhood/community
- are more flexible in their management and operation and can adapt rapidly to changes in user needs
- are close to the residents allowing close quality surveillance of the service and product
- are mostly small-scale, based on labour-intensive technology and better adapted to the local socio-economic situation
- are easier to finance due to their low-cost technologies when confronted with limited capital availability
- can reduce waste management cost for the municipality as organic waste is diverted from the municipal waste stream thus reducing transportation and disposal costs
- when combined with primary collection services, can decrease dependency from malfunctioning municipal services.

Community-based decentralised composting schemes

The composting schemes assessed were categorised according to their organisational set-up into:

- Neighbourhood initiatives and community-based waste collection and composting schemes.
- Initiatives of companies and institutions composting on their premises.
- Medium scale private sector composting enterprises.
- Public private partnerships in large scale composting schemes.

The following article shall focus only on "Neighbourhood initiatives and community-based waste collection and composting schemes". Please contact the authors for information on further results.

Key common features of community-based schemes are their small scale of operation and the high degree of public participation. They have all been initiated by residents as a response to a crisis in local hygiene and poor waste management, often in areas of lacking or unavailable services. Thus the needs and priorities of the residents have set the framework of the scheme. House to house collection service is the core activity of the initiative for which residents can be motivated to pay fees, although in interviews with the voluntary core group members of the initiative or association, the collection of fees was mentioned to be a very tedious and time consuming task where educational and rhetorical skills are often required in order to convince people to pay. It is this financial contribution of the residents which often guarantees the financial viability of the whole scheme including the composting activities.



Figure 1 : Composting bins at Kalyana Nagar, Bangalore

In all schemes observed, composting was included as an activity to reduce waste amounts for further transport, a problem often persisting due to the unreliable secondary collection service of the municipal authorities.

All schemes observed rely on household segregated waste where the "wet" biodegradable fraction has been kept separate from other wastes. Thus the act of composting necessitates a high level of participation by the residents. As not all households in the collection area can be persuaded to segregate biodegradables, the waste collectors also sort mixed waste into different fraction during the collection process. Some schemes have even adapted their collection vehicle to facilitate this activity. Biodegradable waste is com-

posted mostly in bins (figure 1) or by vermi-composting.

It was observed that there is some confusion on the terminology concerning technological approaches as well as a general lack of scientific knowledge on the composting process. The term vermi-composting is very often used even when the amount of worms contributing to the process is minimal and the resulting process product does not consist of vermicastings.

Composting in bins consists of filling the biodegradable fraction into brick-built bins constructed with aeration structures. During the composting duration of approximately 2 months, turning and watering was not conducted as often as most probably necessary. Complaints by residents living nearby concerning the bad odour of the heaps are frequent. This "inadequate care" of the compost heap can be explained by a lack of know-how on the scientific processes of composting, and by the limited interest in composting itself, which, as was mentioned above, is often a rather "sideline activity" of a waste collection scheme.

Produced compost is sold in the neighbourhood, whereby marketing strategies are limited to mouth-to-mouth information by the collectors or core members of the associations. SHOW in Bangalore has been able to target companies for compost use in their gardens and parks. This has resulted in significant increase of compost sales. Compost prices are high, (up to Rs. 20 /kg in Mumbai) which also reflects the targeted users of middle and high income in which areas these schemes are often located.

Main challenges the schemes face are odour complaints of the residents living near to the composting site, and the lack of the municipal support and their formal acknowledgement. Municipal support is often only limited to informal agreements of land provision for composting.

Mumbai has been successful in supporting neighbourhood schemes called Advanced Locality Management (ALM). This involves technical as well as organisational support. However these support structures are still provisional and unfortunately are not yet institutionalised into the regular municipal functions. ALMs are formed streetwise or small area wise. Municipal support to these schemes is provided by a platform for exchange and communication for ALM representatives and municipal authorities. These meetings enable the residents to address their area-related problems such as waste collection, road repair, lighting, water supply or drainage problems in front of the municipal authorities. Waste collection and street sweeping are often considered the priority focus of ALMs. Composting activities usually follow at a later stage (often not without objections by the neighbouring residents). Although composting is not on the list of priorities for ALMs, it is important to recognise that the institutionally embedded structure of the ALM system sets the framework for such possible future activities.

Table 1: Overview of community based initiatives visited, sorted by the number of households serviced

Name of Site/ Company	Composting Technique	land space available m ²	no. of households serviced	amount of waste composted kg/day
Sandu Lane ALM, Mumbai	Bin-composting	16	120	?
Diamond Garden Residents Forum (DGRF ALM), Mumbai	Bin-composting	100	125	60
Scientific Handling of Waste Society (SHOW), Bangalore	Bin-composting with active aeration	190	180	50
Sindh Colony, Pune	shallow windrows	150	264	200
EXNORA Ramanathan, Chennai	Bin-composting	40	300	300
Shyam Nagar Slum, Mumbai	Pit -composting	60	350	350
Pammal, Chennai	Vermicomposting in bins	300	476	100
CEE Kalyana Nagar Residence Association, Bangalore	Bin-composting	500	980	122
Residents Initiative for a Save Environment (RISE), Bangalore	Bin-composting	290	1200	300

Conclusions

For large cities and towns, decentralised small scale composting seems to be one ideal option in an organic waste management strategy. For small towns it may even suffice to rely solely on decentralised composting schemes. Common challenges for all decentralised composting schemes were identified that constrain the replication of such activities on citywide level. A main common difficulty of all decentralised schemes is considered the lack of municipal acceptance and support.

Municipal support

With the exception of the ALM-strategy in Mumbai, municipal support for small, decentralised schemes was observed to be limited to the provision of land. However even these provided and earmarked sites are usually allocated in an informal manner and do not give the composting schemes any legal backing.

The authors recommend municipalities to ensure:

- Political will and continuity of policy. The Commissioner / Chief Officer and the Standing Committees should pass resolutions to promote decentralised composting and be willing to support it at all levels as needed, promptly.
- Development of strategies and action plans on how to ensure appropriate organic waste management (e.g. which system or combination of systems is appropriate for the city, timeframe for implementation, etc.)
- Household segregation of wet and dry waste and separate collection to keep debris, road dust, drain silt, and commercial waste out of the biodegradable waste stream. This can be organised with the help of NGOs working with waste-pickers and waste-buyers (kabadiwalas).
- Waste streams consisting predominantly of biodegradable waste are not mixed with other waste streams (park and garden waste, market waste, hotels, eateries, street-food stalls, marriage-halls, and/or mass feeding locations. Enforcement can be easy since all these establishments require municipal permission to operate.
- Education and training of the entire SWM personnel, from Health Officer down to the supervisors and sweepers, on the importance and advantages of composting and the importance of collecting and

transporting biodegradable waste unmixed and on the importance of prompt and regular lifting of compost rejects from decentralised composting sites.

- Encouragement of institutions, companies and citizens to take up any of the composting methods determined appropriate by recruiting or promoting a resource person who can provide sound technical guidance on composting.
- Buy-back by the city authorities of locally produced compost for use in its parks, gardens, traffic islands and dividers, with prompt lifting and spot payment.
- Promote and assist with marketing activities for compost use in private gardens as well as for agricultural purposes.

Based on the current market demand in India for compost, financial profits from composting activities will still be small. If economic and environmental benefits however are taken into account, composting could be a viable waste management option and a self-sustaining means of transforming waste into a beneficial soil conditioner and nutrient.

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