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PUBLISHER

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VERSION

VoR (Version of Record)

PUBLISHER STATEMENT

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REPOSITORY RECORD

Zurbrugg, Chris. 2019. “Decentralised Composting in India - Lessons Learned”. figshare. https://hdl.handle.net/2134/31761.

28th WEDC Conference Kolkata (Calcutta), India, 2002

SUSTAINABLE ENVIRONMENTAL SANITATION AND WATER SERVICES

Decentralised composting in India – lessons learned

C. Zurbrugg et. al., Switzerland

IT WAS THE 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'ble 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 section 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.

Why decentralised composting?

In the seventies the interest for large-scale highly mechanised MSW composting plants for urban areas grew worldwide. 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 nineties many small-scale composting initiatives were initiated by NGOs, or community groups often receiving some international assistance and/or advice (Furedy). Some of these exist to date; others have disappeared after a few project years. This paper describes 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.

Decentralised composting schemes can be seen as promising management and treatment options for urban areas as they:

- enhance environmental awareness in a community,
- create employment in the neighbourhood,
- are more flexible in operation and management thus adapting rapidly to changes in user needs,
- are close to the residents allowing close quality surveillance of the service and product,
- are based on labour-intensive technology and better adapted to the specific socio-economic situation,
- 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.

Types of decentralised composting schemes

The 20 composting schemes assessed, are 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.

Community based schemes

Key common features of community-based schemes are their small scale of operation and the high degree of public



Figure 1. Composting bins at Kalyana Nagar, Banaglore

participation. They have all been initiated by residents as a response to a crisis in local hygiene and poor waste management. The needs and priorities of the residents themselves set the framework of the scheme. Primary waste collection service is mostly the core activity of the initiative for which residents pay fees for service. Revenues by fee collection - a very tedious and time consuming task mostly conducted by voluntary members - often guarantees the financial viability of the scheme.

Unreliable secondary collection service of the municipal authorities is often the incentive to start with composting. The schemes rely on source segregated waste. In some cases the waste collectors also sort mixed waste into different fractions during the collection process, as not all households in the collection area can be persuaded to segregate biodegradables. Some schemes have even adapted their collection vehicle to facilitate this activity. Functioning household segregation is considered to be one of the key factors of successful schemes.

Biodegradable waste is composted in bins (figure 1) or by vermi-composting (see table 1). 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 vermicomposting is very often used even when the amount of worms contributing to the process is minimal and the resulting process product did not consist of vermicastings (with the exception of Pammal, Chennai). Composting in bins, observed frequently, consists of filling the biodegradable fraction into brick-built bins constructed with aeration structures. During the composting duration of approximately 2 months limited turning and watering was noted which reflects the perceived "sideline activity" of composting.

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 also been able to target companies for compost use in their gardens and parks. 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 for the schemes are odour complaints by the nearby residents and the lack of the municipal support and 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) with technical and 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 and consist of community-based structures or neighbourhood initiatives, which are formally recognised and supported by the municipal authorities. The municipality provides 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. Initially waste collection and street sweeping are often the priority focus of ALMs. Composting activities usually follow at a later stage (often not without

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

Name of Site/ Company	Composting Technique	land space available (sq m)	no. of households serviced	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

objections by the neighbouring residents). Out of the current 670 ALMs in Mumbai, 284 have incorporated vermicomposting activities. The municipal target is to have at least one vermicomposting site per ward. Even if 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.

Middle-scale business enterprises

These systems are run by individual entrepreneurs, who have identified the organic waste treatment as a business opportunity or expect a market for the end product. Entrepreneurs have invested private money in the business or taken loans while mortgaging private property. Banks consider investments in solid waste management projects as high-risk businesses due to a lack of experience and proven winners in this field. The high cost of land is a major obstacle for the set-up of a viable composting plant in urban areas. Therefore it is not surprising that many plants use municipal property which is provided for free or at moderate rents. All composting business approaches observed, do not use household wastes as feedstock. They all focus on "pure organic" waste streams such as waste from vegetable, flower or fruit markets as well as residues from agro-industries. As for these wastes there is often already intense demand, the composting businesses have to compete for waste provision. Household waste is not used as mixed waste sorting is too time consuming and source segregation is not commonly practised. Even though there is a potential for using segregated waste, building awareness and implementing such systems are too challenging and expensive for enterprises.

The assessed composting enterprises have difficulties in covering their costs through the sale of compost. This can be attributed to the difficult market situation or their inadequate marketing strategies. With the exception of Terra Firma in Bangalore, which markets the compost through a large fertiliser distribution company, the schemes do not fully exploit the compost market. For additional income many entrepreneurs act as consultants for associations or companies wanting to start with composting activities.

Conclusions

Common challenges for all decentralised composting schemes were identified that constrain the replication of such activities on city-wide level. A main common difficulty of all decentralised schemes is considered the lack of municipal acceptance and support.

Municipal support for decentralised schemes was observed to be limited to the provision of land only. 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 study recommends municipalities to ensure:

- Political will and continuity of policy,
- Development of action plans on how to ensure appropriate organic waste management,
- Household segregation,
- Education and training of the entire SWM personnel,
- Prompt and regular lifting of compost rejects from decentralised composting sites,
- Encouragement of institutions, companies and citizens to take up composting
- Recruiting resource persons who can provide sound technical guidance on composting,
- Buy-back arrangements and use of locally produced compost by the city authorities,
- Promote and assist with marketing activities for compost use in private gardens as well as for agricultural purposes.

If there are financial profits from composting activities, they are very small. Currently it is not possible to achieve "gold from waste", as is sometimes stated.

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