The use of Composted Municipal Solid Waste and Its Proposed Marketing Strategy in Indonesia[1)]

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ABSTRACT

Composted organic wastes can be used to supplement chemical fertilizer in agriculture. The application of good quality compost can do much to reduce soil erosion. Other beneficial uses of compost include urban parks and garden, golf courses, horticultural, landscaping, shrimp farming and rehabilitation of poor soils. This paper reports on the current situation of municipal solid waste composting in Indonesia and the need to develop its marketing strategy. The reason for composting of municipal solid waste was firstly, the application of compost can reduce the use of synthetic fertilizer, secondly composting occurs much closer to the waste generation source than disposal does, and thirdly, methane produced by anaerobic decomposition is a much more potent greenhouse gas (GHG) than the carbon dioxide produced by composting. Investigation and data collection were carried out by using existing reports, site visits, site inspections and meeting with stakeholders in the composting industry. Consultations with government authorities were conducted to ensure coordination and coherence with the overall waste management strategy of the government of Indonesia. The study area included Jakarta, Bogor, Tangerang, Bekasi, Sukabumi and Bandung. The results showed that current compost production is 400 tonnes per month. This consists of 50 tonnes per month of composted municipal solid waste and 350 tonnes per month of agricultural or horicultural solid waste. Around one half of the production is consumed in the study area, while the other half is sold outside of the study area, used by producer or is disposed of after production. All production is sporadic and both private and public sector operations lack business development plans. Future growth of the market should target agricultural and non-traditional large - scale applications such as landfill cover and land reclamation projects, since increased compost production is only feasible with a secure market. To meet the consumers needs, the compost quality and quantity must be secured. The compost standard for specific use must be developed and well socialized.

BACKGROUND

Composting of the organic portion of MSW is being considered as a means of diverting some of the waste. There are three key reasons to compost organic waste: (1) reduction of waste going to landfills (thus increasing landfill capacity for other wastes); (2) the desire to create and use an organic soil amendment for the enhancement of agriculture; and (3) protection of the environment through the reduction of leachate at landfills and the avoided production of methane gas.

Most composting systems address all three of these areas, but usually one of them predominates. In the case of Jabotabek, there appears to be a case for each of the three reasons. A shortage of land creates a strong desire to achieve a reduction in waste going to landfills; intense

agriculture in the surrounding areas requires organic supplements to maintain soil structure; and the avoided production of methane gas.

In order for the system to work economically as well as technically, a system must be chosen and implemented that produces a desirable product for agriculture that has a value for the local farming community. The system must also be simple to operate and maintain.

This paper would overviews on: (1) the current situation of municipal solid waste composting in Indonesia, and (2) the need to develop its marketing strategy. The method used in this study were: (1) investigation and data collection by using existing reports, site visits, site inspections and meetings with stakeholders in the composting industries (2) consultations with government authorities to ensure coordination and coherence with the overall waste management strategy of the government of Indonesia.

1. CURRENT WASTE MANAGEMENT IN THE STUDY AREA

Solid waste management is a pressing issue in the highly urbanized area of western Java, includes the capital city and its extensive suburbs (Jabotabek). Generally, it is accepted by local governments that 15-40 percent of the garbage generated in the study area is not collected, and is left for the generators to deal with. The most common means of coping with this waste is to burn it or dump it on unused land or in rivers and canals. This has serious environmental consequences, such as local air pollution and increased incidence of flooding. As the urban population continues to grow and waste generation per capita increases, effective waste management must become a priority for the local authorities in order to prevent severe environmental degradation. Given the high percentage of organic material in the waste stream, large-scale composting may prove to be a viable solution to improve waste management.

1.1 Waste Generated

Quantity of the waste

The Jabotabek region contains the largest concentration of urban residents in Indonesia. Unofficial forecasts suggest, that the year 2005 about 26 million people will live in the region, while the population of Botabek (Bogor, Tangerang and Bekasi) is likely to reach 13 million. The 8 Million residents and 4 Million commuters of Jakarta produce about 5,000 tons of municipal waste per day from which about 80% is organic material with a clear predominance of vegetables residues. Presently about 60% of this waste is collected and transported to dump sites.

Composition and quality of the waste

The variation of the composition of the waste found by different experts can be explained by seasonal influences and by the different origins of the particular samples. Based on the composition and quality, composting sound to be one of mostly feasible treatment, since it is a less technically demanding option than sanitary landfilling (with methane recovery), land reclamation, or incineration and provides a cost effective way to partially deal with the growing waste stream. In Jabotabek area the organic compounds varies between 65% in Jakarta and more than 80% in Bogor.

The waste composition (1999) of Bogor

No	Waste Composition	Value	No	Waste Composition	Value
1	Organics	82.6%	8	Stones	< 1%
2	Papers	5.2%	9	Others	0.1%
3	Woods	2.4%	10	Sum (1-9)	100.0%
4	Textiles	0.9%	11	Fermentable Fraction (1)	82.6%
5	Plastics	6.5%	12	Compostable Fraction (1+2+3)	90.2%
6	Metals	1.1%	13	Recycling Material (4+5+6+7)	9.6%
7	Glasses	1.2%	14	Density (t/ m3)	0.5

1.2 Collection and Transportation

The municipal waste is collected unsorted from households by means of small carts and gathered at central collecting points. Firstly, it is temporary disposed at TPS (generally each neighbourhoods has one TPS), and loaded on mainly open trucks and transported to the final disposal site (TPA).

Collecting of household waste is done regularly by private persons, which are paid by the municipality. They transport the waste by carts from the house to the collection points. The transportation from there to the dumps sites is also organized and financed by the municipality. Furthermore, there are some private companies collecting the waste directly from households by truck. These companies are also paid by the city of Jakarta.

Domestic waste collection services are often poor; the main complaint is that they are sporadic. Regular collection of municipal solid waste is carried out only in larger cities and even so, covers only the more affluent districts. Often before waste is collected, it is picked over by scavengers who salvage materials that can be used again as it is or sold to a recycling dealer who will then sell the material to a recycling factory. These scavengers can disrupt the official waste collection system, if household waste is scattered. Some households have taken up the custom of burning the domestic waste in front of their house or at the curbside, particularly when official collection is lacking. This creates serious air pollution. Intermediate storage of waste along roadsides also attracts pests, animals and scavengers.

Transportation of waste to the disposal site is also time consuming. A collection vehicle will often take several hours just to travel from the city to the landfill site because of the heavy traffic and crowded streets. Therefore, most collection vehicles can undertake only 2 trips per day.

1.3 Disposal System

The actual disposal of the collected solid waste often deviates significantly from the official plan of each city. Open dumping at the roadside, along and in water channels, rivers and along railways is quite normal. These areas are particularly sensitive to water pollution. There is no ground water protection or monitoring. The leachate from the waste pollutes groundwater and/or rivers, and storm water drains are blocked by waste.

Presently there are several dumpsites throughout the Jakarta area. Most of them are unsealed and uncontrolled dumping areas, which will be closed in the near future. Once this has happened, all of the collected waste will be taken to the nearer city (Bekasi), until other dumpsites are developed. This dumpsite currently receives about 50% of the waste collected in the region. The capacity of the smaller dumpsites either is exhausted or they must be closed

because they are situated in areas of the city that are now being settled. Locations for the inevitable new dumpsites have not yet been identified. The increasing shortage of land, however, makes it more and more difficult to locate acceptable areas.

2. PRODUCTION AND CONSUMPTION OF COMPOST

There are over twice as much compost is made than is used. It indicates that we still need significant stimulation in order to increase compost consumption. Compost production still can be increased, since the raw material is available in large amount. Figure 1 shows the present production and of compost.

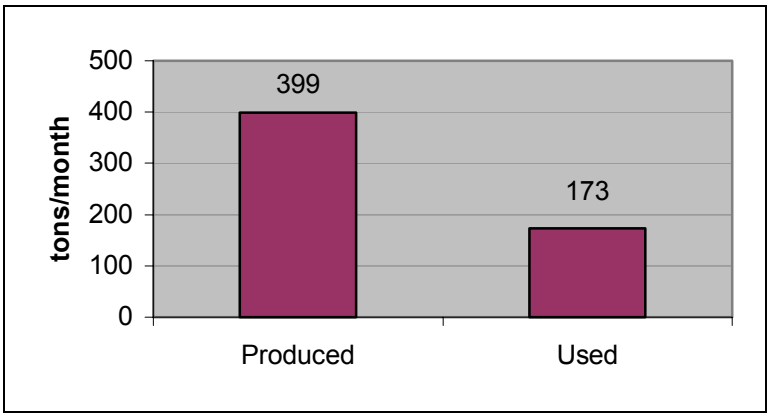

Figure 1. Total compost production and use, from all feedstocks

Generally, the use of compost is difficult to be broken down into use of MSW and non-MSW compost, because most consumers are not aware of the source of their compost. Producers do not advertise the source of the organic waste, and consumers have yet to express an interest in this information. There is good potential for large-scale composting to improve the market of MSW compost.

In order for composting to maintain its positive image, however, it should be governed by a set of regulations that prescribe its characteristics. An unregulated compost industry will lead to difficulties in marketing, which will impede efforts to scale up the industry.

3. QUALITY OF COMPOST

Indonesia has established standards governing the composition of compost, but are not well known at this time and have not been subjected to an international review. It still need a review of compost quality standards in order to increase awareness of the standards and provide a basis for proposing updated standards of international quality.

The standards regulating compost quality must be put into place and enforced strictly. The standards are needed to reduce the production and subsequent dissatisfaction with low-quality compost, as well as to regulate contaminants. Standards are also necessary to regulate the production of compost, so that production centers themselves do not become sources of pollution.

Standards are expected to be effective and efficient measures for quantitative and measurable indicators of compost quality and safety. The existence of compost standards can guarantee the high quality of compost. Compost standards and application have been developed by industrial countries based on the results of research for many years (Otten, et al., 1997). These quality standards influence compost marketing strategy of producers.

The existence of responsible and effective compost regulations are an important aspect in expanding the compost market, both domestically and internationally. Indonesia has the potential to develop large quantities of good quality of compost, if the right steps are taken early on in the development of the industry. Indonesia has large amounts of municipal solid waste and agroindustrial w aste (for example livestock, agricultural, fishery, and forestry waste) that are rich in organic matter and can be used to produce compost.

Steps to maintain quality

Now that the compost quality has been tested once, it is important to maintain testing procedures in order to monitor changes in quality that may be associated with scaled-up production. **Firstly**, in terms of the presence of pathogens and other contaminants, carefully adhering to the existing or improved protocol will help to ensure that levels do not increase. **Secondly**, the source of material that is used for composting should be carefully investigated to ensure that they would not be a source of contamination. Once sources are established, producers should attempt to have a consistent supplier or suppliers, so that the characteristics of the waste are also reasonably consistent. **Thirdly**, regular testing of compost samples by an accredited laboratory is essential. This testing will provide data both on contaminant and nutrient levels that cannot otherwise be known.

The option of adding nutrients to the compost is one that will need to be weighed by the local composting council (yet to be established). It is understandable that producers want their compost to be competitive with chemical fertilizers, and undeniable that even with added inorganic nutrients, compost is still a preferred option. The council may decide to have multiply classifications of compost, which would allow consumers to know if they are using a purely natural product or one that has had its nutrient content inorganically upgraded.

4. MANAGEMENT ASSESSMENT

All facilities visited are still having many problems, majority at the result of the operational conditions of the plant. All of the existing plants run by local governments lack a long-term plan for their maintenance and growth. This uncertainty means that the plants are reactive, as opposed to proactive in terms of maximizing their growth and potential to impact solid waste management in western Java. With a long-term plan in place, the operations could attempt to forecast waste generation rates and changes in market demand and match their production to supply of waste and demand for compost.

The lack of marketing programs for the compost also limits the production of compost. Facilities lack the space to store large quantities of compost, making it impractical to stockpile. It is also financially impractical to make a product that is not sold. The operations should function like a business, with the intent of becoming a source of income for local governments. Operating like a business would entail the creation of business and marketing plans and operating with maximum efficiency to maximize production while minimizing costs. The table below shows management assessment of currently composting facilities.

Management Assessment of Composting Facilities

Aspect		Existing Condition	Expected Condition	Improving Programs
Management	Planning for the future development	- Not existing or outdated	- Existing and current	- Introduce strategy to increase the effectiveness of the composting facilities - Introduce strategy to fulfill the required specifications of compost and regulation
	Composting plant management (in the case of government producers)	- Composting plants are managed separately from other waste treatment facilities - No specified organizational structure for managing the compost plants	- Composting plants are integrated fully in MSW management plans - Availability of appropriate organizational structure that ensure the sustainability of the composting plant	- Integrate the composting plants in the MSW management - Formulate appropriate organizational structure for managing the composting plant
	Personal	- Lack of skilled and trained labour	- Enough skilled and trained labour	- Provide education/training program - Provide technical support
	Marketing	- Lack of activities in marketing the compost produced - Insufficient promotion/socializati on of the advantages of the compost	- Availability of large number of compost users/large-scale compost consumption	- Provide support programs including the strategy for compost marketing - Direct the marketing efforts to create or identify large compost users - Intensify the marketing activity/promotion - Demo project
	Coordination between government agencies, the various level of government, and between government and private sector	- Poor	- Good	- Intensify coordination between government agencies, the various level of government, and between government and private sector

5. MARKETING OF COMPOST

Marketing systems used by the NGO and private sector of compost producers vary, including setting up a store and acting as a retailer, cooperating with an agriculture store, using an agent, as well as having a contract with an institution. Most NGO/private sector producers believe that the current price of compost is about right, as they receive. Consumers pay for the compost by cash, down payment, by installments, or a combination of methods. The price of compost is determined mainly by the seller or by bargaining. Market areas of compost are currently between-cities or within the cities, and between islands.

Obstacles experienced by the producer NGOs/private sector in marketing the compost are insufficient promotion, not enough users, not enough large-scale consumption, and competition from chemical fertilizers. Future growth of the market should target agricultural and non-traditional large-scale application such as landfill cover and land reclamation projects, since increased production only feasible with identified end use. To meet the consumer need, the compost quality and quantity must be secured. The compost standard for specific use must be develop and well socialized.

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