

WASTE



Tackling Waste through
Community-Based Composting

BANGLADESH

MANAGING WASTE, IMPROVING LIFE



Community composting reduces greenhouse gas emissions while improving the health and environment in Bangladesh

Waste management has become increasingly problematic in Bangladesh's fast-growing urban centers. Landfills are nearing capacity and the scarcity and cost of land presents a challenge to siting and developing new landfills. Local governments spend 5 to 20 percent of their annual budgets on waste management, yet 35 to 50 percent of it goes uncollected, leading to increased disease, water contamination, greenhouse gas emissions, and land needed for waste disposal, and reduced quality of environment and life.¹

Bangladesh generated approximately 4.86 million tons of waste from urban areas in 2005. The waste sector is a significant contributor to greenhouse gas emissions in Bangladesh, which totaled 151 million metric tons of CO₂-equivalent in 2005.² Untreated waste generates methane, which is 25 times more potent as a greenhouse gas than carbon dioxide. In 2005, the waste sector produced 17 million metric tons of CO₂-equivalent emissions and by 2020, waste-related emissions are projected to increase by 22 percent, to 20 million metric tons.

In Dhaka, the capital city of Bangladesh, this challenge is especially acute. Dhaka has an estimated population over 12 million including its metropolitan area, and is one of the most densely populated cities in the world. In 2010, the city generated about 4,700 metric tons of municipal solid waste per day.³ About 80 percent of waste generated in Dhaka is organic, providing a major opportunity for recycling it into compost.⁴ Compost is used as organic fertilizer for agriculture, and with the large and growing population in Bangladesh, this commodity is in high demand. Furthermore, composting reduces the amount of methane generated by organic waste by diverting it away from landfills.

COMMUNITY ACTION

In this backdrop, a social business enterprise, Waste Concern, initiated the idea to convert waste into resource in Dhaka. They developed a model for tackling the problem of urban waste disposal by developing a network of decentralized composting plants that were adapted to the local Bangladeshi context and would be financially self sufficient. To pursue the idea, Waste Concern brought together several stakeholders and formed a public-private and community partnership. This initiative created a solution that could sustainably manage municipal solid waste, reduce costs to the city, reduce methane emission from waste and create employment opportunities for urban poor, who have traditionally earned a living by sorting through trash to collect and sell recyclables.

In developing countries, large, centralized composting plants are often not economical due to high operational, maintenance, and transportation costs. Cities in developing countries may lack the resources to administer this type of service. Small, decentralized composting locations can be a practical alternative because they require less technological and financial capacity, albeit greater amounts of human labor.

Waste Concern launched its first pilot project in 1995 in Dhaka. It provided communities with door-to-door waste collection for a monthly fee based on affordability. Initial seed funding for the construction of the pilot facility was acquired from friends and relatives and land was provided by Lions International (Dhaka North). The pilot project's success persuaded the government of Bangladesh to partner with Waste Concern to replicate the model at four sites through the United Nations Development Programme (UNDP). However, to further scale up the projects, Waste Concern had to overcome a critical barrier—land acquisition. In 1998, the government issued two policies that recommended the privatization of solid waste disposal, partnership with non-governmental organizations, and recycling and recovering waste for compost and biogas production.⁵ In line with these policies, Dhaka provided public land for siting compost units, as well as water and electricity connections to composting facilities at no cost. Waste Concern was responsible for training the community in management, operation and maintenance of composting facilities as well as marketing the product. It also monitored composting sites for an additional three years to ensure sustainability and provided technical support when needed.⁶ Experienced marketing companies were engaged to market the compost.

The composting plants produce quality compost fertilizer from organic waste collected from households and vegetable markets. Waste is brought into a sorting center to separate out recyclables and to process the organic waste into compost. It takes less than 60 days to convert organic waste into compost using a labor intensive, aerobic, low-cost technology. The sale of recyclables and compost

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generate enough revenue to pay workers, and maintain and operate the units. One ton of organic waste produces approximately 15-20 percent of end-product compost, and reduces half a ton of methane emissions. In addition, the composting facility reduces a significant portion of municipal waste and ultimately only 10-14 percent of the municipal waste ends up in the landfill site for final disposal.

A MODEL FOR POLICY AND SUSTAINABILITY

By supporting a decentralized system for collection and composting of organic waste, Bangladesh achieved a number of sustainable development objectives. These included job creation, poverty reduction, natural resource conservation, prolonged landfill life, reduced waste management costs, improved sanitation and production of valuable fertilizer that has replenished nutrient-depleted soils and increased crop yields.⁷ Specifically, from 2001 to 2006, Waste Concern's projects processed 124,400 tons of waste, producing 31,100 tons of compost at a value of USD 1.1 million. By avoiding chemical fertilizer imports, farmers have also saved USD

Women Workers Bagging Finished Compost at the Bulta Facility



1.24 million.⁸ In addition, the projects created 986 direct jobs, particularly empowering women in the local community with 70 percent of the workers being women.⁹

Bolstered by the success of its composting efforts, in 2006 Waste Concern expanded its scope by partnering with a private Dutch firm, WWR BIO, on a project to construct and operate profit-oriented, large scale composting facilities

under the auspices of the Kyoto Protocol's Clean Development Mechanism (CDM). The project, which is the world's first composting project to receive CDM support, sets a total maximum daily input capacity of 700 metric tons of organic waste for all composting facilities established by the joint venture.¹⁰ The first facility located in Bulta, Roopganj, Narayanganj District of Dhaka began operation in 2008 with a capacity of 130 metric tons per day at a total investment of USD 3.6 million.¹¹ In 2012, the facility was processing 65-90 tons of organic waste every day.

Project Benefits:

- The cumulative amount of organic waste processed during this period was 33,133 tons. About 4,000 tons of compost were produced from this organic waste.
- During this period the plant reduced 10,800 metric tons CO₂-equivalent emissions.
- The informal sector workers now have the opportunity to work in a safer environment. This facility has created 150 direct jobs for the poor. All workers receive free meals and health checkups including medication, as well as access to a daycare center.
- Over 141,000 people have been served; the urban population has received free waste collection, while farmers have received compost.
- Poor farmers can improve their soil condition by applying compost to fields.
- The community is able to dispose of waste quickly, in an environmentally sound way that protects public health.
- Dhaka City Corporation, which is responsible for managing waste for Dhaka, has saved about USD 1.05 million (considering its disposal costs of USD 32 per ton).
- Diverting waste to the compost plant has reduced the amount of waste sent to unmanaged, unhygienic landfills.

Dhaka's composting efforts are an integral component of its National 3R (Reduce, Reuse and Recycle) Strategy promulgated in 2010. The new strategy made source segregation mandatory and directed municipalities to pursue organic waste recycling projects through composting, refuse-derived fuel, and biogas through private-public partnerships such as that between Waste Concern and Dhaka.¹² Since launching the initial project in 1995, the community-based composting unit has been replicated in more than 77 places throughout 23 cities across the nation, with support from UNDP, United Nations Children's Fund, Asian Development Bank, and United Nations Centre for Regional Development.¹³ It has also been replicated in Vietnam, Cambodia, Nepal, Pakistan and Sri Lanka, and is planned to be replicated in a number of cities in Asia-Pacific and Africa, with support from UNESCAP and the Bill and Melinda Gates Foundation.

Figure 1: How Waste Concern Overcame Obstacles to Community-Based Composting

TYPE OF CONSTRAINT	DESCRIPTION OF CONSTRAINT	SOLUTION STRATEGY
Financial	<ul style="list-style-type: none"> Lack of financial resources for pilot projects Lack of adequate funding for research and development Lack of access to credit facilities Lack of government incentives for investment 	<ul style="list-style-type: none"> Initially collected funds from individual donors Personal funds generated through consulting services by Waste Concern Formed a non-governmental organization to collect funds Formed a for-profit private company to access bank loans
Market Information	<ul style="list-style-type: none"> Lack of information about the fertilizer market Lack of access to the national fertilizer market Uneven playing field between compost and chemical fertilizer markets Time-consuming fertilizer licensing and marketing procedure 	<ul style="list-style-type: none"> Received assistance from agro-products marketing company to sell product on the national market Quality standard of compost helped to create large market Negotiated with the city authorities to subsidize the waste collection cost
Knowledge and Skills	<ul style="list-style-type: none"> Lack of knowledge in relevant government agencies Negative attitude of government toward the project 	<ul style="list-style-type: none"> Made demonstration models Conducted an awareness campaign Positive visible benefits for environment, soil and economy
Regulatory Environment	<ul style="list-style-type: none"> 53 permits/approvals required instead of the usual 35 for general projects 	<ul style="list-style-type: none"> Worked with government to formulate or influence policy reform
Physical Infrastructure	<ul style="list-style-type: none"> Scarcity of land in the urban areas Lack of office space, furniture, etc. Large scale compost plant is paying for waste collection services from its own budget, which is an extra burden for the facility 	<ul style="list-style-type: none"> Motivated the local authority to allocate land through model demonstrations and knowledge support Received assistance from influential government representatives and international institutions to motivate the local government to sign a concession agreement for waste collection from different markets The National 3R Strategy for Waste Management mentions that local government bodies will also pay tipping fee to private entrepreneurs for treatment and recycling of waste on per ton basis

Source: Waste Concern.

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ENDNOTES

- ¹ Bangladesh Department of the Environment, Waste Concern, and ITN-BUET. 2004. "Country Paper Bangladesh." SAARC Workshop on Solid Waste Management, October 10-12, 2004. Web. December 2012. <http://www.wasteconcern.org/Publication/SAARC%20Country%20Paper_Bangladesh.pdf>
- ² World Bank. "World DataBank." Web. August 1, 2012. <<http://www.data.worldbank.org>>
- ³ Rahman, Habibur. 2011. "Waste Concern: A Decentralized Community-based composting through public-private-community partnership." United Nations Development Program. Web. December 2012. <http://growinginclusivemarkets.com/media/cases/Bangladesh_WasteConcern_2011.pdf>
- ⁴ Enayetullah, Iftekhar and Hashmi, Q. S. I. 2006. "Community Based Solid Waste Management through Public-Private-Community Partnerships: Experience of Waste Concern in Bangladesh." Presentation at 3R Asia Conference, November 2006. Web. August 2012. <http://www.env.go.jp/recycle/3r/en/asia/02_03-3/06.pdf>
- ⁵ Urban Management Policy Statement and National Policy for Water Supply and Sanitation.
- ⁶ Bangladesh Department of the Environment, Waste Concern, and ITN-BUET, 2004, *op cit*.
- ⁷ Enayetullah, Iftekhar and Hashmi, Q. S. I., 2006, *op cit*.
- ⁸ Waste Concern. Web. August 2012. <<http://www.wasteconcern.org/impact.html>>
- ⁹ Rahman, Habibur, 2011, *op cit*.
- ¹⁰ United Nations Framework Convention on Climate Change. 2010. "Composting of Organic Waste in Dhaka." CDM Monitoring Report Form (CDM-MR). Web. January 2013. <http://cdm.unfccc.int/filestorage/0/W/Z/OWZLFV2BRPAGXYNU4O19SC6M7QDHT/169_MR.pdf?t=Q0d8bWh3c2wyfDCZeu77vUHQu5k5riAyCiFC>
- ¹¹ Converted from Euros at exchange rate of 1 USD = 0.7 EUR, October 2007.
- ¹² *Ibid*.
- ¹³ Rahman, Habibur, 2011, *op cit*.

Photo Credit

Stitching Compost Bags (page 1 photo)
Waste Concern. Web. March 2013. <<http://www.wasteconcern.org/PictureGallery/image/18Stitching-Compost-Bagsbg.jpg>>

The Maturing Shed at the Bulta Compost Facility
Waste Concern. Web. March 2013. <<http://www.wasteconcern.org/PictureGallery/image/12Partial-View-Maturibg.jpg>>

Women Workers Bagging Finished Compost at the Bulta Facility
Waste Concern. Web. March 2013. <http://www.wasteconcern.org/PictureGallery/image/17Women_Workers_Baggingbg.jpg>

Figure References

Figure 1: How Waste Concern Overcame Obstacles to Community-Based Composting
Adapted from Waste Concern. <<http://www.wasteconcern.org>>