Partially Subsidized Composting at District Level

Business characteristics

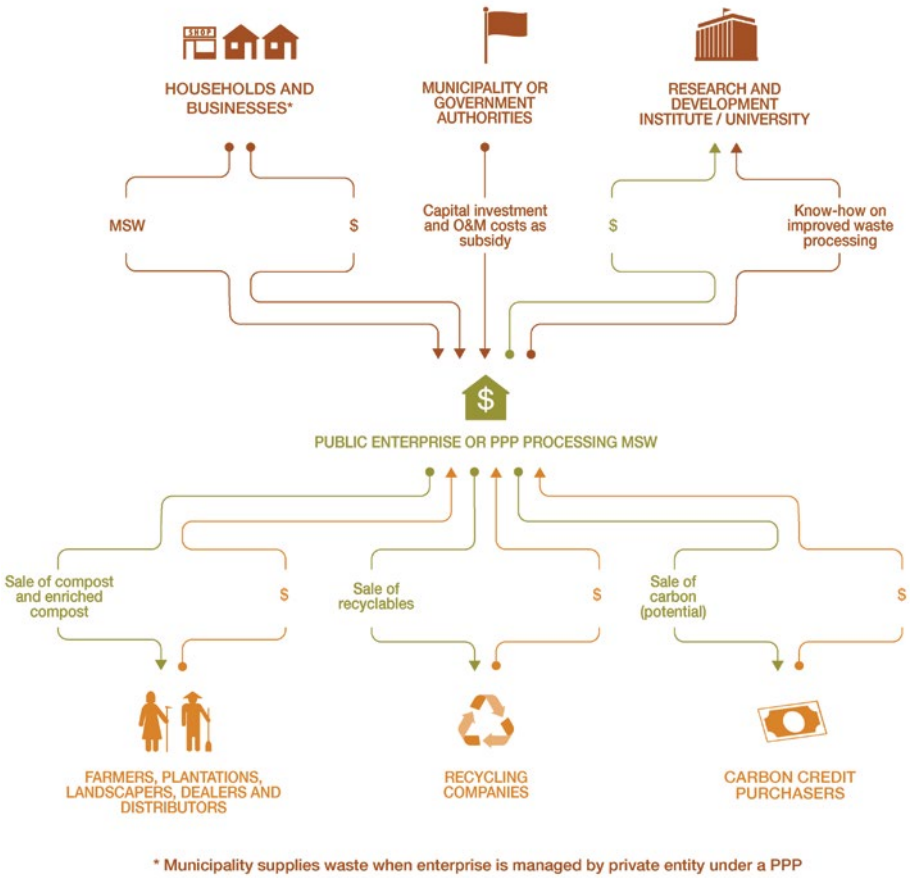
Geography	Medium to large urban areas with large quantities of MSW, land availability and access to inexpensive labor
Scale of production	About 10-75 tons of MSW processed per day
Type of organization	Public or public-private partnership (PPP)
Investment cost range	Average of USD 250,000-370,000 depending on the scale
Key costs	Capital investment costs (including receiving tanks, sedimentation tank, plastic and polythene pelletizer, water treatment facility and drying bed), operation and maintenance (O&M) costs (machinery, infrastructure, labor), quality monitoring fee payment, and cost of buying recyclables
Revenue stream	Sale of compost, recyclables and carbon credits, waste collection funds from the government, waste tax and collection fees, and government subsidy (partial)

Business model

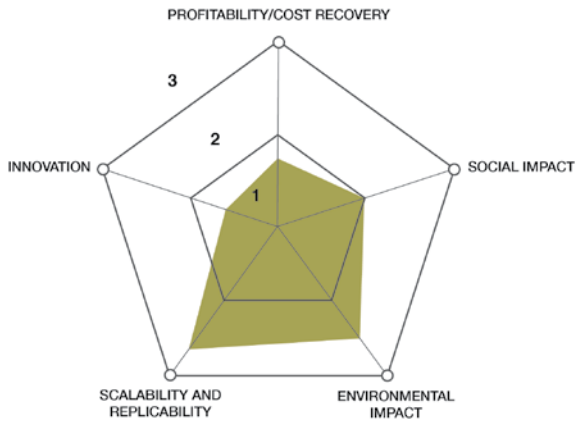
The business model converts municipal solid waste (MSW) and fecal sludge into compost for sale to farmers. Subsidized by municipal and/or government authorities, the business aims for partial cost recovery, with its main goal being to reduce open-dumping practices as well as the quantity of waste landfilled and resulting greenhouse gas (GHG) emissions.

The business can be run by a public entity or PPP, with government authorities providing the capital investment for the set-up of the compost plant and providing support for its operation and maintenance. However, the model has the potential to transition from being subsidy-dependent to full cost recovery and even profit-making by diversifying its revenue streams. By partnering with research and development (R&D) institutes, it can develop a more competitive compost product and increase demand. Additional revenue streams can also be generated through the sale of segregated non-degradable waste to recycling companies and the sale of carbon credits.

BUSINESS MODEL VALUE CHAIN



Business performance



The business model has a high potential for replication in medium to large cities. However, it ranks low on profitability and innovation due to its inherent dependence on the government for financial support and the simplicity of the technology used (usually windrow composting).

Main risks

Competition risks: Competition can stem from price distortions in the compost market, where the product has to compete with other, often subsidized, chemical fertilizers.

Technological risks: Mechanization of the model can lead to increased energy requirements that can be costly, and represent a key challenge for performance, if there are energy shortages. Additionally, the need for advanced skilled labor represents increased operational costs.

Social equity risks: Improved waste collection, segregation and recycling may limit informal workers' access to waste value chains and therefore income.

Safety, environmental and health risks: There are potential health risks to different actors along both the sanitation and agricultural value chains, associated with the collection, treatment, processing and use of human excreta. Correct health and safety measures must be put in place for workers, and microbial testing should be a routine measure for quality assurance of the compost product.

Case study: Balangoda, Sri Lanka

Balangoda compost plant (BCP) in Sri Lanka is a public entity that converts MSW into compost and night soil (human excrement collected at night from cesspools, privies, etc.) into nutrient-rich super compost, as well as treating water and selling recyclables. It was set up to address environmental and sanitation problems in Balangoda city due to waste accumulation.

BCP uses an open-windrow processing technology to compost MSW, and water purifying plants and charcoal to treat wastewater from fecal sludge. Although geared towards cost recovery and receiving partial financial support from the government, it generates income from the sale of compost and recyclables. Compost is sold directly to farmers through agro-outlets in local markets, as well as to various government agencies for landscaping. BCP purchases segregated non-degradable waste from resource centers and schools and resells it to recycling companies at a higher price. Revenue is also generated from taxes charged to entities that do not segregate their waste. BCP has considerably reduced the municipality's waste management costs, created employment, provided farmers with a high-quality organic compost, and improved sanitation health for residents through reduced exposure to untreated waste.

Key performance indicators (as of 2015)

Capital investment:	USD 352,000 including costs of 1 hectare of land
Labor:	17 workers (15 unskilled, 2 skilled)
Operation and maintenance cost:	USD 1,340 per month
Output:	30 tons of compost, 5 tons of super compost and 180,000 liters of treated water per month
Social and environmental impact:	Job creation, production of high-quality and affordable compost and super compost, treated water, improved attitude of young people towards waste, and cleaner local environment

For more information on the business model and related cases, see Chapter 7 of **Otoo, M.; Drechsel, P. (Eds.). 2017.** ***Resource recovery from waste: Business models for energy, nutrient and water reuse in low- and middle-income countries.*** **London: Earthscan/Routledge. In press.** The book has been produced by the Resource Recovery and Reuse subprogram of the International Water Management Institute (IWMI), under the CGIAR Research Program on Water, Land and Ecosystems (WLE) and its Rural-Urban Linkages Research Theme. The support of the Swiss Agency for Development and Cooperation (SDC), the International Fund for Agricultural Development (IFAD), and CGIAR Fund Donors (www.cgiar.org/about-us/our-funders/) is gratefully acknowledged.