

# BUSINESS MODEL PROFILES: NUTRIENTS

SUMMARIZED FROM THE FORTHCOMING PUBLICATION  
*RESOURCE RECOVERY FROM WASTE*



RESEARCH PROGRAM ON  
Water, Land and  
Ecosystems



## Compost Production for Sustainable Sanitation Service Delivery

### Business characteristics

Geography	Suitable for slum areas/communities with limited provision of a waste management service and/or no access to the flush toilet system. Urine-diverting dry toilets (UDDT) technology, particularly suitable for flood-prone areas or in locations with high water tables
Scale of production	150-200 tons of fecal sludge-based organic fertilizer
Type of organization	Private or business foundation
Investment cost range	USD 25,000-32,000
Key costs	Capital investment (comprises small offices, public toilets, kiosks/shops), and operation and maintenance
Revenue stream	Sale of toilets, waste collection fees, toilet user fees, sales of compost/fertilizer, rent from kiosk and other shops, and consultancy fees

### Business model

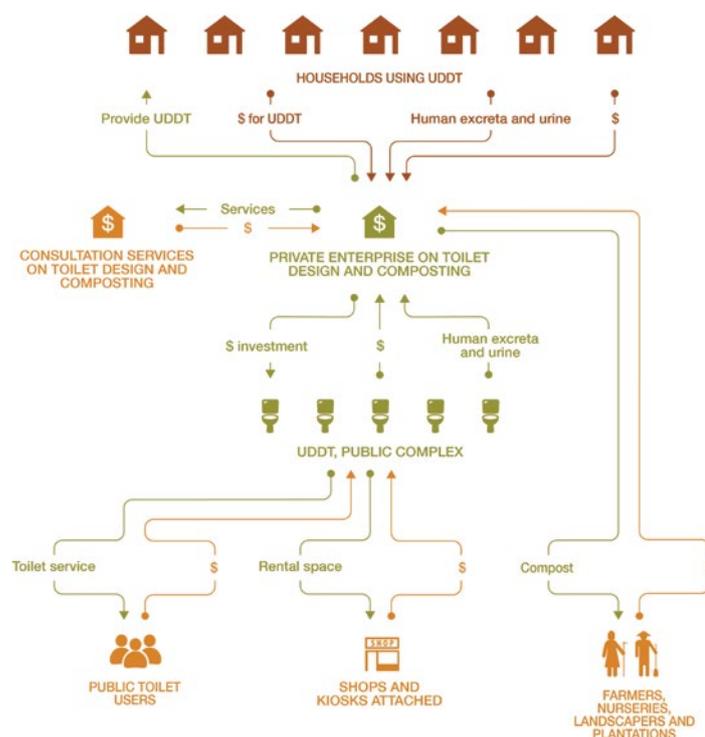
The business model provides sanitation products and services, and converts fecal sludge collected into organic fertilizer for agricultural use. It uses and installs UDDTs which can separate human excreta and urine, making it easier to process. The model also provides a number of social benefits, including increased access to toilet facilities (focusing particularly on poorer segments of society), reliable and clean removal of human waste, and environmentally-safe, cheap fertilizer alternatives for farmers.

The business can be initiated by a private entity or a business-oriented foundation seeking to fill the gap in the sanitation service delivery value chain. In the primary market, the business provides sanitation services to households, through the sale of toilets and the collection of fecal sludge, and to public masses, by setting up public toilet complexes. In the secondary market, the septage collected is converted into a nutrient-rich organic fertilizer and sold to peri-urban farmers and other agricultural producers. The business has many potential revenue streams, including: (i) the sale of toilets

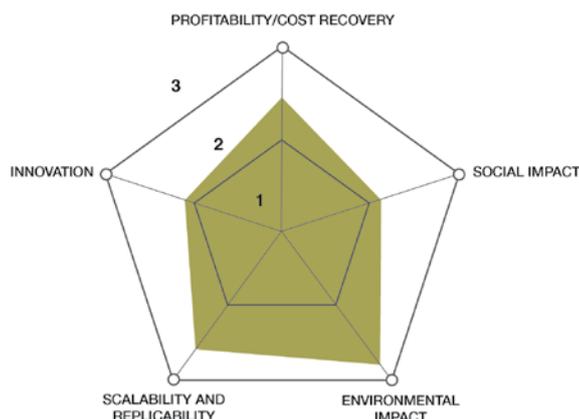
to households; (ii) waste collection fees; (iii) toilet user fees; (iv) compost sales; and (v) consultancy service fees from

the provision of technical assistance for the maintenance of toilets and latrines.

### BUSINESS MODEL VALUE CHAIN



## Business performance



The business model ranks highest on environmental impacts due to its catalytic role in protecting human and environmental health by reducing open defecation and unsafe disposal of human excreta.

## Main risks

**Market risks:** Key market risks relate to households' low ability to pay for sanitation products and services, and farmers' low willingness to pay for the compost in view of chemical fertilizer alternatives.

**Competition risks:** Competition from other suppliers of comparable sanitation products and services from the chemical fertilizer sector.

**Political and regulatory risks:** The scope within which sanitation businesses can engage in resource recovery depends on national regulations on the reuse of human excreta for agricultural purposes; even in cases where reuse is permitted, the lack of regulations and standards on products and quality monitoring pose significant risks for businesses.

**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. In particular, workers that collect fecal sludge and composted materials, and consumers of food products grown with waste-based compost.

### Case study: Kigali, Rwanda

Rwanda Environment Care (REC) is a privately owned company engaged in the business of providing public toilet services and producing organic fertilizer from fecal sludge for sale to agricultural producers. It has set-up several public toilets at different locations in Kigali, Rwanda, using the ecological sanitation (eco-san) technology, which is simple, cost-effective and ensures easy access to segregated waste inputs. These toilets provide customers with adequate sanitation services, and a mechanism for consistent and efficient waste collection and treatment. The company converts the fecal sludge collected into urea-rich organic

fertilizer (urine-enriched compost) which it sells to farmers.

On average, REC's 4,000 daily users generate a total of USD 324 per day, but the company also generates revenue from kiosk and shop rentals (USD 334 per month), compost sales (USD 6,483 per year) and consultancy service fees for the provision of technical assistance in the design and construction of eco-san latrines. The company's activities provide inhabitants, especially the migrating population in Kigali, with access to toilets. This has significantly reduced the incidence of open defecation and 'flying toilets', resulting in reduced environmental pollution and health impacts.

### Key performance indicators (as of 2015)

Capital investment:	USD 29,173 excluding land costs
Labor:	Two unskilled full-time employees
Operation and maintenance cost:	USD 188.39 per toilet block of 8 units and 2 kiosks
Output:	200 tons of organic fertilizer per year
Social and environmental impact:	Reduced risk of groundwater and surface water pollution, reduced health cost associated with poor sanitation, reduced human exposure to untreated waste and chemical pollutants, enhanced soil fertility and productivity, and increased food security
Payback period:	2 years

For more information on the business model and related cases, see Chapter 11 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/](http://www.cgiar.org/about-us/our-funders/)) is gratefully acknowledged.