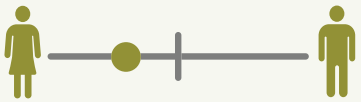
BUSINESS MODEL 11

Subsidy-free community-based composting

Miriam Otoo and Munir A. Hanjra

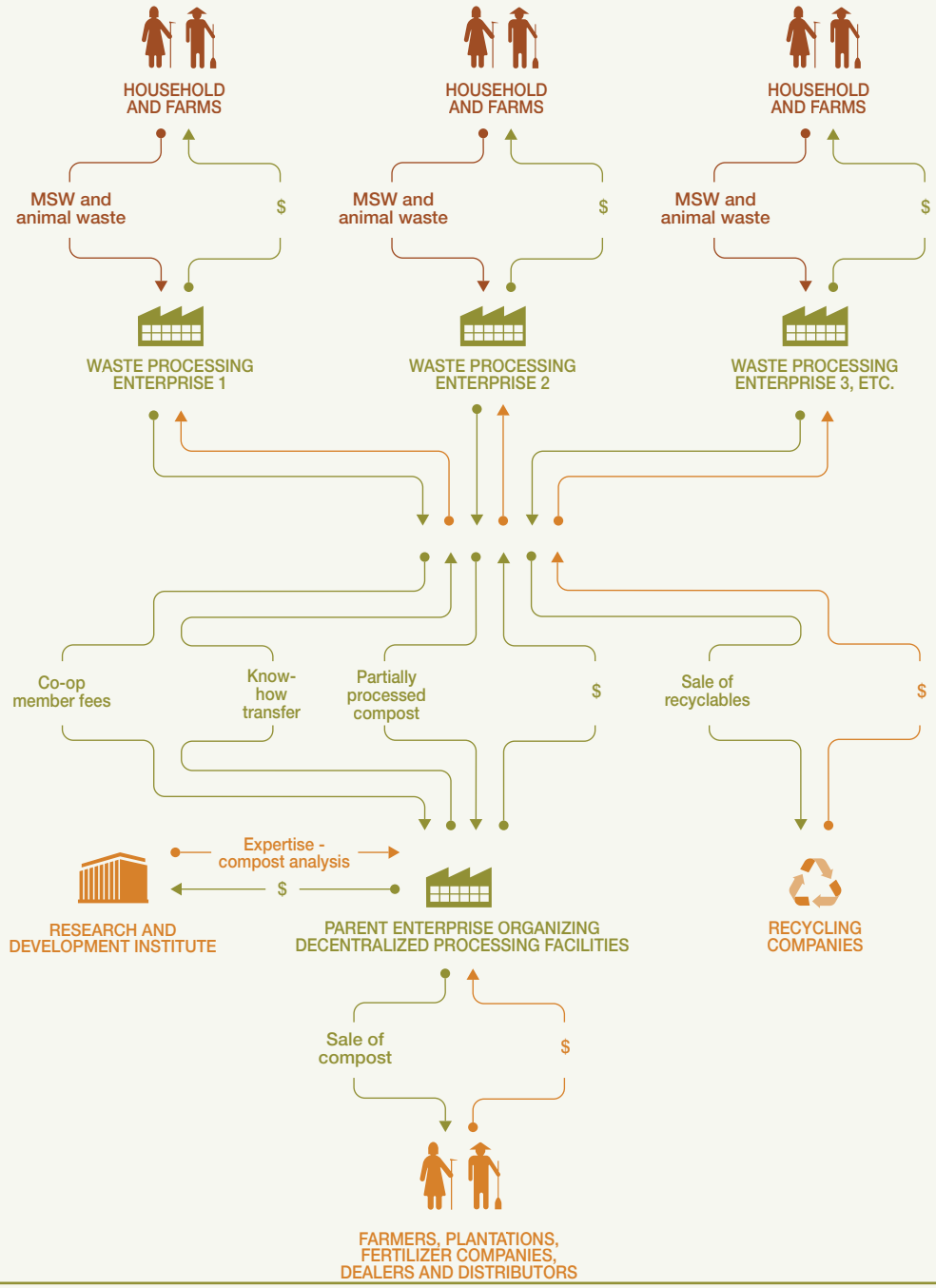
A. Key characteristics

Model name	Subsidy-free community-based composting
Waste stream	Municipal solid waste (including plant and animal waste)
Value-added Waste product	Provision of waste management services to communities, and provision of an affordable and safe compost for soil conditioning
Geography	Replicable in medium and large cities where land availability is limited; abundance and inexpensive labor
Scale of production	Small to medium, 20–30 tons of waste processed per day
Supporting cases in this book	Nakuru, Kenya
Objective of entity	Cost-recovery [X]; For profit [X]; Social enterprise [X]
Investment cost range	Capital cost about USD 3,500–5,500 excluding land costs, and O&M cost USD 7,50 –12,500 per year
Organization type	Cooperative
Socio-economic impact	Improved waste management service, creation of new jobs, provision of organic fertilizers for agriculture, improved soil productivity and a cleaner environment
Gender equity	Pro-gender model. Community based job opportunities for women 

B. Business value chain

Community-based composting models have shown some success but can be limited by poor management, limited access to financing due to investors' reluctance in funding smaller-scale initiatives. The community-based cooperative model however offers opportunities to address these limitations as small communities are able to mobilize their own resources by encouraging members to join the cooperative on voluntary basis and raise their own funding through membership fees. This business model is initiated by a cooperative – a distinct form of enterprise that provides services and/or products to the members, by the members, and for the members at a cost and divides the profits, known as surpluses in a cooperative, among the members pro rata to the amount of business each member did with the cooperative (Figure 138). Community-based organizations (decentralized composting facilities) form the consortium of the cooperative. Membership is voluntary and based on mutual social, cultural and economic needs – waste management and composting in this case. Whilst this could be a cost recovery model of decentralized composting operations at individual member's level, the cooperative element transitions this model into a profit-making model.

FIGURE 138. VALUE CHAIN SCHEMATIC – SUBSIDY-FREE COMMUNITY-BASED COMPOSTING



The CBOs collects waste from households and farms at a fee. Waste separation and its partial composting is done at the premises of each member, although depending on the scale for example, the local government may provide only land and infrastructure for plant operation. Outsourcing waste collection and separation implies land and transport cost savings to the parent enterprise that organizes the CBOs into a cooperative. The partially processed compost is sold to the parent enterprise. The members are incentivized to ensure high quality of the partially processed compost if the price they receive is dependent on product quality. The CBOs additionally generate revenue from the sale of recyclables. The parent enterprise that organizes the CBOs into a cooperative provide technical know-how to its members' composting. The parent enterprise can add value to the partially processed compost received from the CBOs by processing it further (i.e. fortification with nutrient minerals, pelletization), packaging, branding, marketing and distributing the final product. The outsourcing of specific activities to the CBOs by the parent enterprise ensures that an efficient allocation and use of resources. The parent enterprise generates revenue via membership fees and the sale of compost.

The unique features of this business model are: a) no recurrent governmental subsidies are required; b) assured monetary benefits accruing to all economic actors create incentives that underpin success; c) members of the cooperative circumvent the need for high capital investments for purchasing advanced equipment by producing a partially processed compost; d) by outsourcing waste collection, separation and partially composting the parent company reduces its operational costs and need for space, whilst on the other hand, CBOs have an assured market (parent enterprise) for their product; e) product quality and price dependency ensures a high quality product.

C. Business model

The basic value proposition of the model depends on the enterprise initiating the business model. Since this model can be initiated by a cooperative, unique value propositions that underpin this model are the ideals of cooperative movement – providing services for the members, by the members and to the members at cost and sharing the benefits. In that regard, the constituting value propositions are: a) provision of sustainable waste management services to communities; and b) increasing access to an affordable organic fertilizer to agricultural producers. The business model described here is from the perspective of a standalone private enterprise, operating as a cooperative (parent enterprise organizing the CBOs into a cooperative). Cooperative membership is open to all, provided that each member shares in the cooperative's vision and pays their annual membership and subscription fee. CBOs which form the core of the cooperative are contracted out for waste collection, separation and production of a partially processed compost, which is sold to the parent enterprise at a quality-determined price. A key partnership with a research institute is essential in developing a final compost product that is competitive on the fertilizer market. Third party product certification can help garner significant market demand and mitigate market competition effects from the often subsidized chemical fertilizer. The partially processed compost is further processed, packaged, branded and sold to farmers, fertilizer companies, dealers and distributors. The cooperative generates revenue from membership fees and compost sales.

The following elements aggregately ensure the success of this model: a) assured benefits to CBOs ensures commitment, output delivery and success of the cooperative; b) decentralized activities reduce transportation and land/ space costs; c) community involvement reduces waste segregation costs as they have a buy-in and awareness programs are more effective; d) CBOs are able to generate their own capital investment (which is modest given the decentralized nature and scale of operations); e) quality-determined pricing ensures a high quality product and invariably a greater market demand. This is a model that is not only financially self-sustaining (no recurrent governmental support) but also profitable, accruing significant benefits to society. This model can be extended to under-serviced areas such as new settlements and slums, under the scenario where community involvement can be

encouraged and depending on scale of operations, land/ space provided by the municipalities to the CBOs. See Figure 139 below for the diagrammatic overview of the business model.

D. Potential risks and mitigation

The business model presented here was designed and optimized based on the analysis of the NAWACOM case (see previous section). In designing this optimized business model, risks related to safety, local acceptance by the community, and business attractiveness for investors were assessed.

FIGURE 139. BUSINESS MODEL CANVAS – SUBSIDY-FREE COMMUNITY-BASED COMPOSTING

KEY PARTNERS

- University and research institute
- Financiers
- Municipal Council
- CBOs forming the cooperative

KEY ACTIVITIES

- Contract members to collect and compost waste
- Coordinate delivery of partially processed compost by members
- Pricing and quality control of semi-processed compost
- Processing and fortification of compost
- Marketing and distribution of final compost product
- Sharing of profits among members of the cooperative

KEY RESOURCES

- Cooperative societies Act
- Semi-processed compost
- Social capital among members
- Minerals for compost fortification
- Laborers
- Licensing, brand name

VALUE PROPOSITIONS

- Provision of waste management services to communities
- Agricultural producers and input retailers obtain an organic fertilizer at a competitive price

CUSTOMER RELATIONSHIPS

- Serviced by direct, personal help
- Personal help at direct sales

CHANNELS

- Direct sales via word-of-mouth
- Agro-input shops

CUSTOMER SEGMENTS

- Households
- Small-scale farmers, fertilizer companies, dealers and distributors

COST STRUCTURE

- Fee based quality analysis
- Capital investment (land, machinery, licensing)
- Operation and maintenance (electricity, land rent, maintenance costs)
- Quality control fees payment to university and research institute
- Administrative costs (collection of member fees and selling the compost)

REVENUE STREAMS

- Sales of compost
- Membership subscription fees

SOCIAL & ENVIRONMENTAL COSTS

- Dispersed and decentralized processing poses greater health risk to members and neighbours
- Manual execution of activities such as sieving and packaging may be a source of occupational health risk

SOCIAL & ENVIRONMENTAL BENEFITS

- Model to collect waste free of charge
- Reduces existing waste management costs
- Reduces human exposure to untreated waste
- Creates jobs
- Income for low-income population
- Increased access to fertilizer alternatives for farmers
- Government savings from reduced expenditure on waste management
- Community empowerment by means of cooperative principles and sharing of profits among members

General risks*:* Lack of community awareness and interest. There is a need for a reliable leader among the community, which is a pre-requisite to prevent falling into the trap of a 'failed cooperative'. The management structure can be fairly complex and this can affect the sustainability of the enterprise.

Market risks: The model has a very low input supply risk as supply is assured from its members. On the other hand, there are potential risks in the output market and this can arise from policy instruments such as chemical fertilizer subsidies. Additionally, the scale of operations (if small) can imply that the cooperative cannot target large-scale agro-producers who often have large orders. Product certification and branding is imperative to permit greater market penetration.

Competition risks: Key market competition (fertilizer market) as noted above arises due to policy instruments that make substitute products more affordable to farmers than compost.

Technology performance risks: The composting technology typically used (windrow composting) is a relatively mature and simple technology. It can be more labor-intensive and less mechanized which implies that factors such as equipment breakdown, maintenance and repair costs will have a limiting effect on technology perforamance. Members' quest to reduce waste segregation costs and improve the quality of the partially processed compost can result in them being selective of the types of waste they collect, and thus reducing the waste collection coverage in the communities (and increased burning of waste).

Political and regulatory risks: Cooperative models, particularly in developing countries, have shown a mixed record of success even in cases where community involvement and support have been strong.

This has been mainly attributed to poor management. Moral hazard issues often arise, for instance, due to the misuse of funds (sometimes attributable to lack of financial management skills and due diligence) by the executives and influential members. Effects of these issues can however be mitigated via the establishment of an oversight committee (with cooperative members required as signatories in addition to the executives), regular audits, disclosure of financial performance to all the members. Policies and regulations related to waste-based compost sectors differ by country. The oftentimes stronger political support for chemical fertilizer use (slow phasing-out of fertilizer subsidies) and lack of specific government guidelines for the certification of compost and internationally accredited third-party certification entities can represent a significant risk to the sustainability of the business model.

Social equity related risks: There are no distinctive social inequity risks associated with this model. In contrast, the model generates opportunities for increased benefits to women as they are culturally noted to collectively engage in small-scale waste segregation and recycling initiatives. The model supports employment opportunites and additional revenue, suited particularly for the women.

Safety, environmental and health risks: Whilst the simplicity and labor-intensiveness of the technology implies low-level skills and greater job opportunities for the informal workers and people who would otherwise be unemployed, there is a higher risk of worker exposure to waste and related pathogens if the approapriate gear is not used. Additionally, given that the pre-composting process is dispersed and occurs in multiple locations, there may be a larger number of people exposed to waste-related pathogens, depending on their level of training on safety measures and use of safety gear. Similarly, manual execution of activities such as sieving and packaging could be a source of occupational health risk. Trainings on occupational health risk mitigation is imperative for all members of the cooperative, particularly the CBOs. To address the safety and health risks to workers, standard protection measures are also required as elaborated below in Table 36.

TABLE 36. POTENTIAL HEALTH AND ENVIRONMENTAL RISK AND SUGGESTED MITIGATION MEASURES FOR BUSINESS MODEL 11

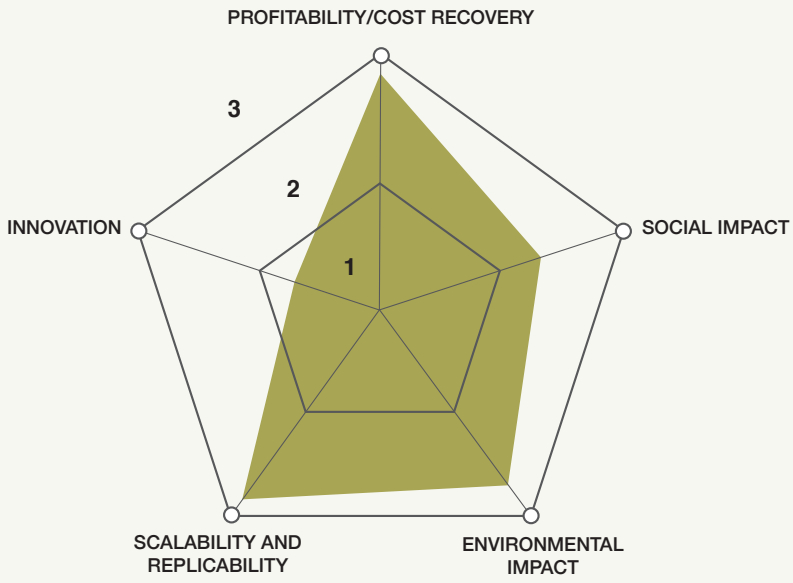
RISK GROUP	EXPOSURE					REMARKS
	DIRECT CONTACT	AIR/DUST	INSECTS	WATER/ SOIL	FOOD	
Worker						Risk of sharp objects in MSW and fecal contamination Potential risk of dust, noise and chemical compost contaminants
Farmer/user						
Community						
Consumer						
Mitigation measures						

Key: NOT APPLICABLE; LOW RISK; MEDIUM RISK; HIGH RISK

E. Business performance

This model is ranked highest on profitability due to the cooperative and cost-saving nature of the decentralized operations that produce a partially-processed compost product (Figure 140). The supplementary value-addition to the product via fortification and branding can represent an incremental price mark-up of the final compost product. The model also ranks high on scalability and replicability. This is because of the simplicity of the technology (low-level skill requirements), low capital costs requirements, relatively lower operational and maintenance costs and profits generated makes it attractive for communities with a cooperative vision to adopt and implement. Social impact and environmental impact rank next, whilst innovation is ranked the lowest which is attributable to the simplicity of the technologies and the word-of-mouth marketing strategy used.

FIGURE 140. RANKING RESULTS FOR THE SUBSIDY-FREE COMMUNITY-BASED COMPOSTING BUSINESS MODEL



9. BUSINESS MODELS ON LARGE-SCALE COMPOSTING FOR REVENUE GENERATION

Introduction

Nutrient recovery from waste initiatives primarily aim to address the waste management challenge, and oftentimes geared towards only partial cost recovery, rarely full-cost recovery or profit maximization. Continuous dependence on external financial support from government grants, subsidies, tax credits and rebates is unsustainable, particularly in view of the ever-diminishing public budget allocations to waste management. Looking beyond cost recovery and aiming for profit-making models is imperative if sustainable financial and economic returns on investments are expected.

Multiple revenue generation streams (i.e. portfolio diversification) represents additional avenues for businesses to become financially viable. This business approach offers a way for businesses to mitigate risk associated with limited/seasonal market demand of certain services and products. A clear example is that of compost with highest demand around the planting season. Seasonal demand implies increased storage costs for compost plants with all year-round production. Additionally, oftentimes given the strong competition in the fertilizer market, compost demand may be low and not generate enough funds sufficient to cover the plant's operational and maintenance costs. In this instance, it will be important for the business to tap into other revenue streams with more stable returns such as sale of recyclables and energy (electricity). Under this model, the multiple-revenue stream approach translates into several value propositions that generate even greater benefits to actors in the sanitation and agricultural sectors. We consider the following value propositions: a) improved waste management services to communities and businesses; b) provision of an environmentally-friendly organic fertilizer at competitive market prices to agricultural producers; c) increased access to input resources for recycling companies; d) increased energy availability to communities and businesses; e) provision of tradable certified emission reduction to meet carbon emission commitments.

The ability for businesses to successfully implement the above value propositions and capture the greatest economic benefits will partly depend on **scale** and **strategic partnerships**. While the composting concept is applicable across scale, large-scale composting offers greater opportunities for capturing economies of scale benefits, revenue generation and market proliferation. Large-scale composting can generate significant environmental and socio-economic benefits as it offers an opportunity for municipalities to manage massive quantities of solid waste generated and collected in the cities. The scale element of the model presents an option to significantly reduce waste quantities transported to landfills (final disposal sites), thus reducing waste management costs. Large-scale operations can also offer access into markets that smaller-scale facilities are often excluded from. In considering the energy sector, for example, waste reuse facilities have to operate at a certain scale (large-scale) to meet the minimum wattage requirements for sale to the grid. This is also applicable to the sale of carbon credits to UNFCCC Annex I countries[1]. Studies show that 98% of all registered Clean Development Mechanism (CDM) composting projects fall in the category of medium- to large-scale composting plants (Fenhann, 2012). The need for strategic partnerships extends beyond those with NGOs for development of CDM projects, compost marketers and dealers to increase market share to include municipal authorities for exclusive rights/access to waste streams, research institutes for product and technology innovation, and informal workers for increased access to slums and waste segregation efficiency.

While a great potential exists for business viability (profitability) and significant accrual of economic benefits to other actors in the agricultural and sanitation value chains, the implementation of the noted value propositions does not come without challenges and risks. Price volatility in carbon credit market, strong buyer power (monopoly) in the electricity market and price distortions in the fertilizer market from policy instruments (subsidies) are among a few of the key factors to be taken into consideration and whose effects need to be mitigated.

This chapter describes the generic **large-scale composting for revenue generation** model and five supporting case examples. The presented examples are not exhaustive and some better cases could have been inadvertently omitted due to information and time constraints but cover a wide range of easily accessible cases at scales ranging from medium to large scale operations in selected settings in Bangladesh and India. It is interesting to note that whilst large-scale composting is a growing concept in Africa, particularly Sub-Saharan Africa – this model is more established in the Asian context.

References and further readings

Fenhann, J. 2012. CDM pipeline overview. UNEP DTU Partnership: www.cdmpipeline.org/ (accessed 19 August, 2016).

Note

1 Industrialized or transitional economies as listed in Annex I of the United Nations Framework Convention on Climate Change (UNFCCC). http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php (accessed November 8, 2017).