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CASE

Cooperative model for financially sustainable municipal solid waste composting (NAWACOM, Kenya)

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Supporting case for Business Model 11	
Location:	Nakuru, Kenya
Waste input type:	Municipal solid waste (including plants and animal waste)
Value offer:	Provision of a safe compost product as a soil conditioner
Organization type:	Cooperative
Status of organization:	Operational since 2002; plant operations had halted at time of last publication review (October 2017)
Scale of businesses:	Processes 28 tons of waste/ day
Major partners:	University of Nairobi, Egerton University, Practical Action, Comic Relief, National Agricultural Advisory Service, World Bank

Executive summary

The Nakuru Waste Collectors and Recyclers Management Cooperative Society (NAWACOM) is a cooperative that has brought together various community-based organizations (CBOs) in the organic waste recovery arena in Nakuru. Their main focus was to take up the waste management challenge in Nakuru town and create an avenue for income generation under the slogan 'turning waste to wealth'. CBOs initially operated as individual entities but transitioned into a cooperative to secure financial support from Comic Relief via Practical Action to scale up their operations. NAWACOM was then formed as the representative umbrella body. The CBOs produce a partially processed compost product from agricultural, household and market waste using a windrow composting technology, which is then sold to NAWACOM. The product is further composted, fortified, packaged and branded under the name Mazingira. The benefits of the decentralization of NAWACOM's activities has ensured that: a) smaller-scale CBOs are still able to financially sustain their businesses by not having to put up significant capital investment for equipment and establishing sound marketing and distribution channels; and b) NAWACOM allocates its resource efficiently – i.e. waste collection and separation is outsourced to communities, reducing high transportation costs. Ninety-five percent of the organic fertilizer is sold directly to farmers through word of mouth and the remaining percentage through agro-shops. Revenue streams of the cooperative are mainly from compost sales and member subscription fees. All accrued profits are shared among cooperative members. NAWACOM's activities have helped

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to significantly reduce the city's waste management costs, reduce human exposure to untreated waste and contribute to the livelihoods of local communities.

KEY PERFORMANCE INDICATORS (AS OF 2015)						
Land use:	0.41 ha					
Capital investment:	USD 4,671 excluding land costs					
Labor:	6 (2 skilled part-time, 4 unskilled part-time) – excludes employees in the different CBOs					
O&M:	USD 9,977 per year					
Output:	100–300 tons of compost per season					
Potential social and/or enviornmental impact:	Creation of 6 part-time jobs, provison of a nutrient rich organic fertilizer for agricultural production and a clean environment					
Financial viability indicators:	Payback period:	5 years	Post Tax IRR:	N.A.	Gross margin:	40%

Context and background

Nakuru town is the fourth largest urban centre in Kenya. It is centred in rich agricultural hinterland with fertile volcanic soils and has an ever developing industrial and tourism industry. Rapid urban growth, which is estimated at 3.4% per annum over the last three years, has resulted in the development of unplanned residential areas and slums; hence garbage heaps are a common sight as the Municipal Council is over-stretched in offering services in solid waste management. To bridge the gap between waste generation and collection, NAWACOM, a cooperative society, in 2002 stepped in with the aim of providing sanitation services and environmental conservation whilst generating revenue. Community-based organizations involved in waste reuse initially operated as individual entities but transitioned into a cooperative to secure financial support from Comic Relief via Practical Action to scale up their operations. In 2006, NAWACOM was registered as a cooperative in accordance with Section 3 of the Cooperative Societies Act (Amended 2004) of the laws of Kenya. Technical support came from Practical Action Kenya, which is an international non-governmental organization while funding was provided by Comic Relief (a UK-based charitable organization). The objective of this partnership was to showcase how community members could contribute towards solid waste management in a sustainable way. The cooperative works by contracting its members (CBOs) to collect and compost organic waste from peri-urban areas of the town (mostly livestock and household waste from famers) and also private waste collectors who sort and compost waste from within the town. At the time of the assessment, membership stood at 94 people, with 55 women and 39 men. Membership recruitment was open to all provided each member shared in the cooperative's vision and was able to pay the annual membership subscription of USD 56.92 (Ksh 5000)[1].

Market environment

The negative effect from chemical fertilizer over-application on soils and water bodies has caused an upsurge in the demand for organic fertilizer use. Farmers have observed declining soil health and decreased crop yields over time, and recognize the need to adopt environmentally sustainable agricultural practices. Additionally, recommended agricultural practices, particularly for the production of exported food products, require the use of organic agricultural inputs. Furthermore, rapid urban population growth in Nakuru city has resulted in the development of unplanned residential areas and slums and subsequently generation of significant amounts of waste. The quantity of generated waste has overstretched the municipal council's budget for waste management. NAWACOM and its community members thus ceased this opportunity to fill in the gap for providing waste management and a safe organic fertilizer for the production of exportable goods.

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Macro-economic environment

The Kenyan government highly subsidizes chemical fertilizers. The government's fertilizer subsidy programs began in 2008 with the aim to cushion farmers against seasonal changes in the price of fertilizer. By the end of the 2012/2013 financial year, over 400,000 metric tons of fertilizer, worth Ksh 13.80 billion had been distributed countrywide. The amount of subsidies on chemical fertilizer has grown exponentially in the last few decades and has been mainly attributed to inflation and price fluctuations in the international market. The government has plans to increase its fertilizer subsidy budget allocation to Ksh 15 billion over the next five years. With continued governmental support, chemical fertilizer prices will continue to be more competitive than organic fertilizer prices making it difficult for new businesses to enter the fertilizer market. With a growing need to increase the availability and quality of bio-fertilizers and composts in the country to improve agricultural productivity while maintaining soil health and environmental safety, Kenya will need to set up a scheme to augment the infrastructure for production of quality organic and biological inputs and some level of price subsidy to organic fertilizer producers to make them competitive on the market.

Business model

NAWACOM is a waste processing cooperative that uses household, animal and market waste to produce an organic fertilizer product – Mazingira, which is sold directly to small-scale farmers. As a cooperative, it contracts its members to collect and compost organic waste from peri-urban areas of the town. Essential in its business model is the decentralization of NAWACOM's activities. Members of the various CBOs compost the organic waste resources on their premises and deliver a partially composted product to NAWACOM, who then processes it further to maturation and fortifies it. This has ensured that: a) smaller-scale CBOs are still able to financially sustain their businesses by not having to put up significant capital investment for equipment and establishing sound marketing and distribution channels; and b) NAWACOM allocates its resource efficiently – i.e. waste collection and separation is outsourced to communities, reducing high transportation costs. The price of the partially processed compost, ranging from USD 0.05 to 0.07 per kg, is determined by its nitrogen content and level of pathogens, which are the indicators of quality. This pricing strategy helps NAWACOM maintain a high product quality standard as all members aim to receive the highest purchase price for their compost as possible per the market's willingness-to-pay. The cooperative is value-driven where quality of the product is the main focus. NAWACOM sells the final organic fertilizer product, Mazingira, mainly to small-scale farmers at USD 17.65 per 50kg bag. The cooperative markets their product via word-of-mouth which has proven to be an effective strategy given the high product quality. The cooperative also generates revenue from membership subscription fees at USD 59 per member per annum, which is used to cover operational costs and has ensured continuous operation of the business. The cooperative has nine staffs, of which six form an oversight committee. The remaining three are the executives who are also signatories to the account. NAWACOM instituted an oversight committee to prevent swindling of cooperative funds by the executives. The cooperative partnered with Comic relief and Practical Action Kenya for financial and technical support at the onset of the business. Egerton University and University of Nairobi are the main bodies in charge of the product quality analysis. The compost is fortified with Mijingu Phosphate Rock as a means of increasing the nutrient content and demanding a higher market price. Plans are underway to get a Kenya Bureau Standard Board (KEBS) certification, which will enable NAWACOM to penetrate the large-scale farmers' customer segment. The activities of NAWACOM have contributed to the reduction of cost associated with waste management whilst keeping the city clean. In addition, it has provided cooperative members with an additional income. See Figure 134 opposite for the diagrammatic overview of the business model.

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FIGURE 134. NAWACOM'S BUSINESS MODEL CANVAS

KEY PARTNERS

- Agricultural input shops
- Egerton University
- University of Nairobi
- Comic Relief
- Practical Action
- Standard Board (KEBS)
- Municipal Council
- Cooperative members

KEY ACTIVITIES

- Coordinating delivery of partially processed compost by members
- Quality control of incoming compost
- Processing and fortification of compost
- Packaging
- Sale of compost
- Branding, marketing

KEY RESOURCES

- Household, market and animal waste
- Mijingu Phosphate Rock
- Laborers
- Licensing
- Brand name Mazingira

VALUE PROPOSITIONS

- Local farmers obtain a quality-checked, organic fertilizers of high nutrient level at a competitive price

CUSTOMER RELATIONSHIPS

- Personal help at direct sales

CHANNELS

- Direct sales via word-of-mouth (95%)
- Agro-input shops (5%)

CUSTOMER SEGMENTS

- Small-scale farmers

COST STRUCTURE

- Capital investment (land, machinery, licensing)
- Operation and maintenance (labor cost (6 part-time), electricity, land rent, maintenance costs)
- Quality control fees (University of Egerton and Nairobi University laboratories)
- Administrative costs (collection of member fees and selling the compost)
- Transport costs savings

REVENUE STREAMS

- Sales of compost (75%)
- Membership subscription fees (25%)

SOCIAL & ENVIRONMENTAL COSTS

- Manual execution of activities such as sieving and packaging may be a source of occupational health risk

SOCIAL & ENVIRONMENTAL BENEFITS

- Reduced existing waste management costs
- Reduced human exposure to untreated waste
- Creation of jobs (6 part-time jobs)
- Improved food security
- Increase in income for low-income population
- Government savings from reduced importation of inorganic fertilizers
- Community empowerment by means of a cooperative

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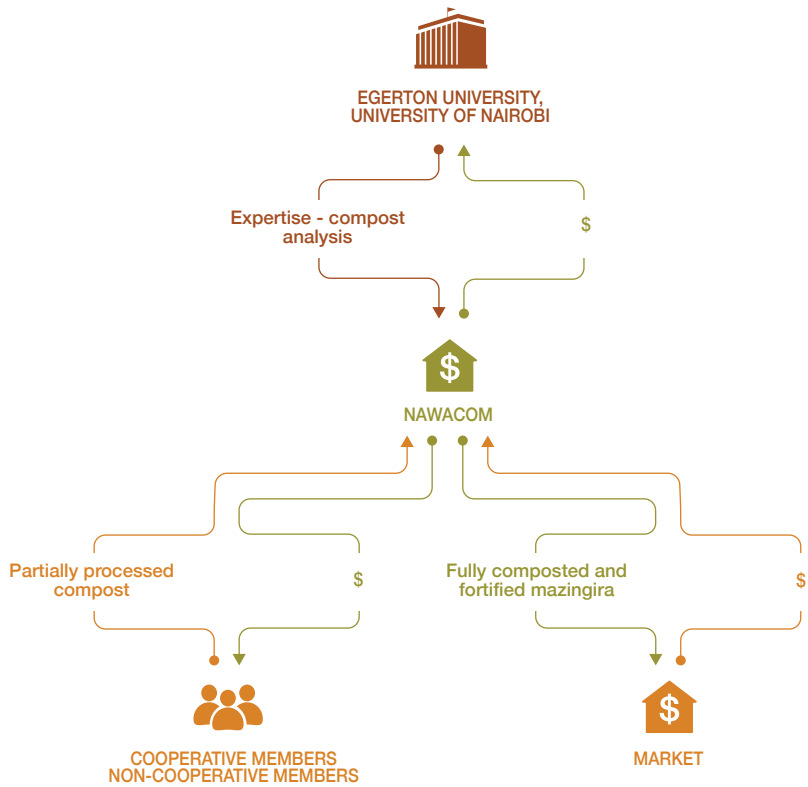
Value chain and position

NAWACOM is a waste processing cooperative that produces organic fertilizer from MSW. The cooperative's activities are the production, marketing and sale of fortified compost (Figure 135). NAWACOM sources its raw materials (partially processed compost) from its members (CBOs) and is their sole client. Market and household waste are the main waste streams used for the composting activities of the CBOs. Given that NAWACOM as a business entity does not directly source for MSW for processing activities, it faces very low input supply risk. Additionally, MSW is an abundant resource especially in the peri-urban areas, markets and high-density inner city with currently limited alternative use. NAWACOM purchases the partially processed compost from its members at a fee (dependent on nitrogen concentration and pathogen levels) and further processes and fortifies with Mijingu Phosphate Rock. The final product is sold directly to small-scale farmers. Although NAWACOM partners with the University of Egerton and Nairobi University for the fee-based quality analysis of their product, the cooperative's failure to obtain KEBS certification has limited its ability to penetrate new markets. Other organic fertilizers and chemical fertilizers are good substitutes for NAWACOM's organic fertilizer. Additionally, chemical fertilizer is high in demand due its ease of application, high NPK levels and KEBS certification. In 2012, NAWACOM received an order for 500 tons of compost to be supplied over the entire year from a major agricultural input supplier. It was however unable to meet the demand as it is illegal to supply large quantities of compost to agricultural input suppliers with the seal of KEBS. NAWACOM faces fierce competition in the fertilizer market but the acquisition of KEBS certification will increase product demand and ease its penetration into larger customer segments, beyond the about 3,000 farmers it serves per year.

FIGURE 135. NAWACOM'S VALUE CHAIN



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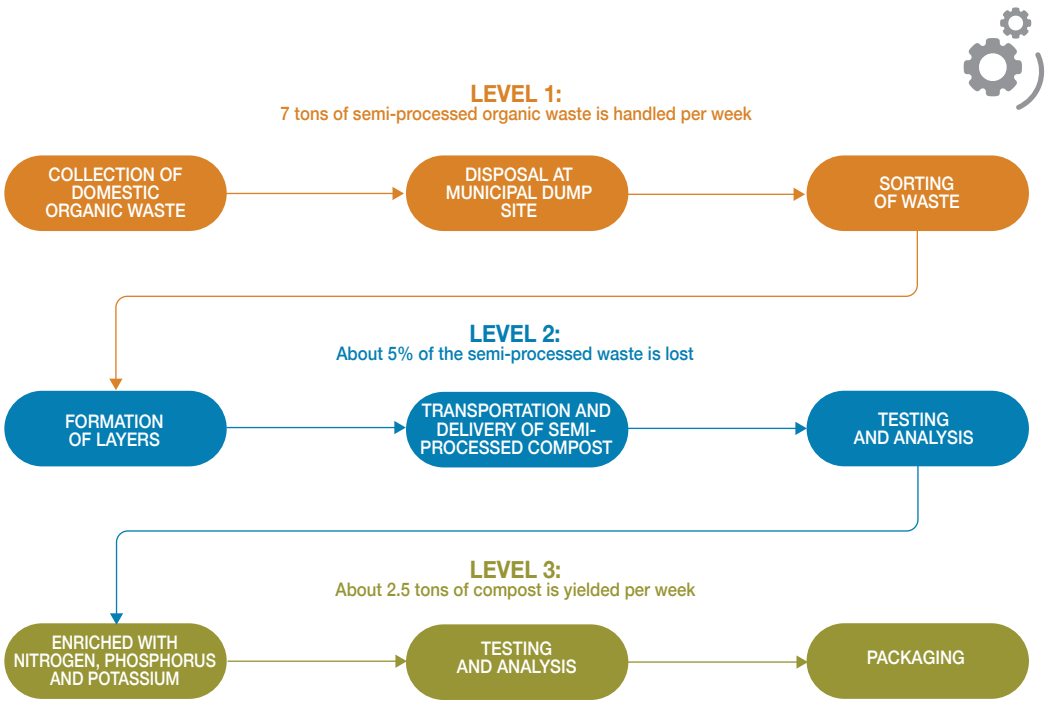
Institutional environment

Management of solid waste in Kenya is dealt with under several laws, by-laws, regulations and acts of parliament. Some of them include the Environmental Management and Coordination Act (EMCA) of 1999 and City Council (solid waste management) by-law of 2007 which requires waste reuse businesses assure the safety of all actors involved in the business operations and the quality of the product. To legally engage in composting activities in Kenya, a waste management permit from the City Council (at USD 200 per year) and NEMA (at USD 471 per year) are a requirement and are renewable on a yearly basis. The Kenya Bureau Standard Board (KEBS) is mandated to certify organic products for sales in the country. Compliance to product quality guidelines for compost is largely unregulated in Kenya although KEBS has developed standards and guidelines to meet demand in the country for marketing of organic fertilizer products. Organic fertilizer produced by NAWACOM has yet to meet the standards set by KEBS and this has limited NAWACOM's access into certain market segments.

Technology and processes

NAWACOM works on a contractual basis where suppliers, both members and non-members (although members are given the priority), collect, sort and compost organic waste in their homes for four to six weeks. Windrow composting is the technology used. This technology, although labor-intensive, requires low capital investment and has high rates of resource recovery (Figure 136). The technology however requires significant amounts of space which can be a challenge for small-scale CBOs. It is in this regard, that the CBOs partially compost the organic waste at their own premises and deliver it to NAWACOM's main processing site for maturation and quality check. Once the compost has fully matured, samples are taken to Kenya Agricultural Research Institute (KARI) and Egerton University

FIGURE 136. PROCESS DIAGRAM FOR PRODUCTION OF NAWACOM'S COMPOST



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for quality analysis, mainly to ascertain nitrogen concentration, and pathogen and heavy metal levels. The compost is then transported back to the cooperative's operations site where it is sieved to a finer particle size. The end product (fine compost) is fortified with Minjingu Phosphate Rock and other natural materials to increase its potassium and phosphorus levels to attain an NPK ratio of 2:1.5:1.8. Products are then packaged into 25 and 50kg bags. NAWACOM implements strong internal regulations, ensuring that all persons involved in the compost production process wear protective gear at all times.

Funding and financial outlook

Initial investment for NAWACOM as a community-based organization came from membership subscription, which amounted to USD 3,529 per year. This was barely sufficient to purchase the partially processed compost that NAWACOM further added value to, thus production and operations were low until 2006 when Comic Relief came in to provide financial support. The provision of financial support (USD 47,000) was on condition that the umbrella body – NAWACOM – be registered and operate as a cooperative. The investment provided covered costs of machinery, inputs (partial compost) and licensing. Operation and maintenance cost is estimated at USD 9,976/year and includes costs of labor (six part-time), electricity, land rent and other associated repairs and maintenance costs. The revenue streams of NAWACOM are sales of compost (75%) and membership subscription fees (25%). Compost is a seasonal product and sold in the two agricultural seasons in the year. NAWACOM sells between 3,000–6,000 50kg bags retailing at USD 17.65/bag. This translates into gross revenue of USD 52,000 to USD 105,000 per year. The cooperative has 94 members and the membership fees yield a revenue of USD 5,527 per annum at a rate of USD 58.8 per membership fee per person per year. NAWACOM has been generating profit since the exit of Comic Relief in 2008, indicating that with increased production and demand, the cooperative stands to accrue high profits/benefits to its shareholders.

Socio-economic, health and environmental impact

Economic gains of NAWACOM's activities include environmental, social and human health benefits. Although no absolute figures were provided, environmental benefits can be traced to reduction of pollution due to reduced human exposure to untreated waste and contamination of water bodies from open dumping. NAWACOM has increased the income of considerable number of people through employment and the sales of semi-composted organic waste. The increase in income for these people represents increased purchasing power, which can be translated into improved food security. The cooperative's activities have also had a positive impact on the government budgets as waste collection is done free of charge. An important risk to bear in mind is that related to the manual sieving and packaging of the compost, which may represent a source of occupational health risk if mitigation measures such as wearing of nose mask and gloves are not adhered to.

Scalability and replicability considerations

The key factors driving the success of this business are:

- Farmers have observed declining soil health and decreased crop yields over time and recognize the need to adopt environmentally sustainable agricultural practices.
- Assured high quality product sold at a competitive market price.
- Strong relationships and win-win partnership with its members.
- Innovative pricing strategy for input (partially processed compost) ensuring high quality product.
- Traditional word-of-mouth marketing strategy has proven to be a successful strategy given the assured quality of their product.
- Establishment of an oversight committee has been essential in curbing the misappropriation of cooperative funds.
- Strong commitment of members to the vision of the cooperative.

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This model has a high potential of being replicated in developing countries where community involvement in waste management is encouraged. This case is unique in that it is a cooperative that has contracted its members to partially compost household, animal and market waste. The monetary benefits accruing to all parties create an incentive for commitment and success of the business. This model can easily be replicated as the start-up capital is fairly low and the technology is simple and capitalizing on the abundance of labor, requires a lot of land depending on scale. With rapid urbanization, rental and sale prices of land in both urban and peri-urban areas in developing cities have skyrocketed and this may represent a major constraint. Additionally, cooperatives have a history of high failure rates especially in developing countries. Stringent and efficient measure need to be put in place to ensure its success.

Summary assessment – SWOT analysis

NAWACOM represents an initiative of a group of CBOs who successfully sustained their business following the exit of donor funding. The cooperative has been particularly successful by implementing an oversight committee, which has been essential in the smooth running of business operations. Assured high quality and affordability of Mazingira fertilizer has been instrumental for NAWACOM in increasing its market demand and exploring other market segments (Figure 137). The decentralization

FIGURE 137. SWOT ANALYSIS – NAWACOM

	HELPFUL TO ACHIEVING THE OBJECTIVES	HARMFUL TO ACHIEVING THE OBJECTIVES
INTERNAL ORIGIN ATTRIBUTES OF THE ENTERPRISE	**STRENGTHS** ▪ High nutrient level organic fertilizer ▪ High up-scaling potential ▪ Low cost of technology ▪ Availability and easy access to waste and production inputs (partially processed compost) ▪ Self-branding has increased market share ▪ Fortification has increased product marketability	**WEAKNESSES** ▪ Financial instability ▪ High transportation cost ▪ Non-government-certified product
EXTERNAL ORIGIN ATTRIBUTES OF THE ENVIRONMENT	**OPPORTUNITIES** ▪ Production of animal feed ▪ Potential to produce granulated compost and access new markets ▪ Increase in the scope of market from product certification ▪ Acquiring KEBS certification increases market and revenues per unit	**THREATS** ▪ High rental prices of land ▪ Attitudinal problem – farmers see organic fertilizer as secondary input ▪ Lack of certification from KEBS may disrupt business activity ▪ Absent scheme for the promotion of organic materials vis-à-vis continued heavy subsidization of chemical fertilizers limits growth. ▪ With continued governmental support, chemical fertilizer prices will continue to be more competitive than organic fertilizer

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of NAWACOM's activities has ensured that: a) smaller-scale CBOs are still able to financially sustain their businesses by not having to put up significant capital investment for equipment and establishing sound marketing and distribution channels; and b) NAWACOM allocates its resource efficiently – i.e. waste collection and separation is outsourced to communities, reducing high transportation costs. The organic fertilizer produced by NAWACOM has not yet been approved by KEBS and this has limited its access to different and larger market segments. It is so far only serving about 3000 small-scale farmers per year, which is less than 2% of the market. A certification by KEBS and pelletization/granulation of its product will enable it to penetrate new market segments. Increasing governmental support along with growing demand for organic fertilizers will represent key opportunities for replication and up-scaling of the business.

Contributors

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Case descriptions are based on primary and secondary data provided by case operators, insiders or other stakeholders, and reflect our best knowledge at the time of the assessments 2015. As business operations are dynamic data can be subject to change. Plant operations were noted to have halted at time of latest edit (October 2017).

Note

1 Ksh is Kenyan shillings. 2015 Exchange rate: USD 1 = Ksh 87.85.