

INCLUSIVE INNOVATIONS

Business Models for Collecting Waste in Low-income Areas

Innovative collection solutions for low-income, underserved areas include fee-based subscriptions, reward points, and

HIGHLIGHTS

- Provides private waste collection services to areas unserved by public-sector waste services and reduces burden on strained public-sector operations.
- Provides safer formal employment and livelihood opportunities to informal waste pickers and scavengers.
- Collection services reduce the negative impact on public health and environment degradation by adopting environmentally sustainable waste collection and disposal practices.



Summary

Centralized waste collection provided by governments is unable to keep pace with the rapidly increasing amount of waste generated in developing countries, leaving large portions of populations unserved. Lack of access to waste collection services leads to improper disposal of garbage, posing a threat to public health and the environment. Owing to limited budgets, governments of many developing countries struggle to incorporate densely populated and hard-to-access low-income informal settlements and slums within their scope of collection services. Funding for waste management activities is insufficient and typically diverted to serve richer neighborhoods.¹ This results in overflowing open dumps, poor quality air, and health hazards. The absence of an effective public waste collection system has led to the presence of a large number of informal waste-pickers, who are involved in collection and segregation of waste. These waste-pickers, who are from low-income communities, operate in unhygienic working environments, are unaware of safe or good waste handling practices, undertake manual collection activities that may be dangerous and earn low incomes.

A number of enterprises offer innovative collection solutions to increase access of residential communities and businesses to waste collection services, extend reach to unserved areas by partnering with local municipal authorities and aggregating waste-pickers to enhance their productivity, incomes and quality of life.

Development Challenge

Waste generation is increasing in low and middle income countries; and estimates show that on an average, only a mere 36 percent of the population in low income countries have access to waste collection services.² An approximate 2 billion people across the world are unserved³, resulting in waste being discarded as untreated garbage on street sides and into water sources or burnt in open grounds, leading to an increase in public health and environmental pollution risks.

¹ Ciudad Saludable: Solutions in the Waste, Skoll Foundation Archives, <http://archive.skoll.org/2009/10/22/ciudad-saludable-solutions-in-the-waste/>

² Global Waste Management Outlook, United Nations Environment Programme, 2015

³ Global Waste Management Outlook, United Nations Environment Programme, 2015

In developing countries, waste management is perceived to be a public service to be provided by the government at no cost to the waste generator. The lack of willingness to pay for these services makes it financially unsustainable for local municipal authorities to undertake efficient waste collection; reflected in lower investments in appropriate transportation and waste treatment technology. For example, only 60 percent of the 20,000 tons of waste generated per day in Peru is collected.⁴ Areas inhabited by low-income communities and micro-businesses are unplanned, and often extremely congested, with tightly packed informal structures and narrow lanes. This makes it difficult for waste collection vehicles to navigate and reach waste bins and dumps. Since, these services are free, waste collectors lack the initiative to make the effort to reach these communities.

The unaddressed demand for collection services has led to the emergence of a large informal sector of waste collectors; the United Nations estimates that there are 15-20 million informal waste workers⁵ across developing countries. Most of these countries tend to leave out informal waste-pickers from waste management policies, thereby failing to recognize the contribution made by these workers in waste collection and recovery activities and prohibiting them from entering the mainstream waste management value chain. For instance, it was only in 2006 that the municipal authority of Pune, India granted waste pickers the right to collect waste and charge a service fee from households.⁶ Still, in other countries such as Egypt, policies related to waste management do not recognize informal waste workers.⁷ It is estimated that in many cities across developing countries, the waste sector provides livelihood to more informal waste workers than formal waste workers.⁸ However, unsanitary working conditions and lack of protective equipment subject informal workers to greater health risks; typically, morbidity among waste pickers is higher than among formal waste collectors.⁹ In addition, waste-pickers in low-income countries are often subject to social stigma.

Business Model

Components of the Model

Several enterprises now complement government collection services and provide residential and community level waste collection services (Figure 1). Some enterprises leverage the informal sector of waste-pickers and aggregate them with a view to enhance their productivity and livelihood (Figure 1).

Provide access to waste collection

A number of enterprises provide door-to-door or community-level waste collection services. For instance, Uganda based Waste Master emerged in response to inadequate collection services in the country. The enterprise charges a nominal fee for collection from households in low-income areas. Many enterprises work with their local governments through public private partnership models to provide waste collection services. For example, Wecyclers, collects waste from households, sorts and segregates the waste, and sells it to Nigerian recyclers. Wecyclers works in partnership with the Lagos Waste Management Authority and collects waste using low-cost bicycles, thereby enabling reach into previously inaccessible areas.

⁴ Ciudad Saludable: Solutions in the Waste, Skoll Foundation Archives, <http://archive.skoll.org/2009/10/22/ciudad-saludable-solutions-in-the-waste/>

⁵ Global Waste Management Outlook, United Nations Environment Programme, 2015

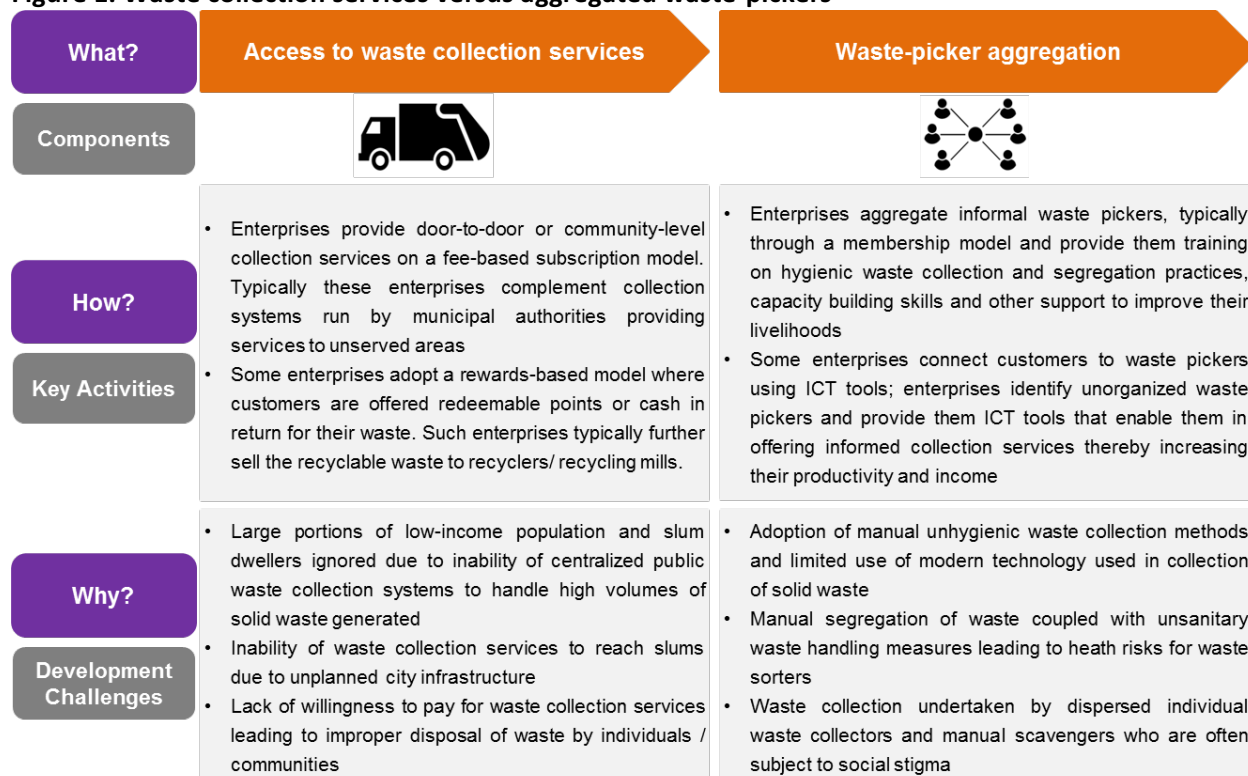
⁶ Integrating the informal sector for improved waste management, Propoarco's Magazine (Groupe Agence Francaise De Developpment), 2012

⁷ The Waste Experts: Enabling Conditions for Informal Sector Integration in Solid Waste Management: Lessons from Brazil, Egypt, India, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, 2010

⁸ Integrating the informal sector for improved waste management, Propoarco's Magazine (Groupe Agence Francaise De Developpment), 2012

⁹ Integrating the informal sector for improved waste management, Propoarco's Magazine (Groupe Agence Francaise De Developpment), 2012

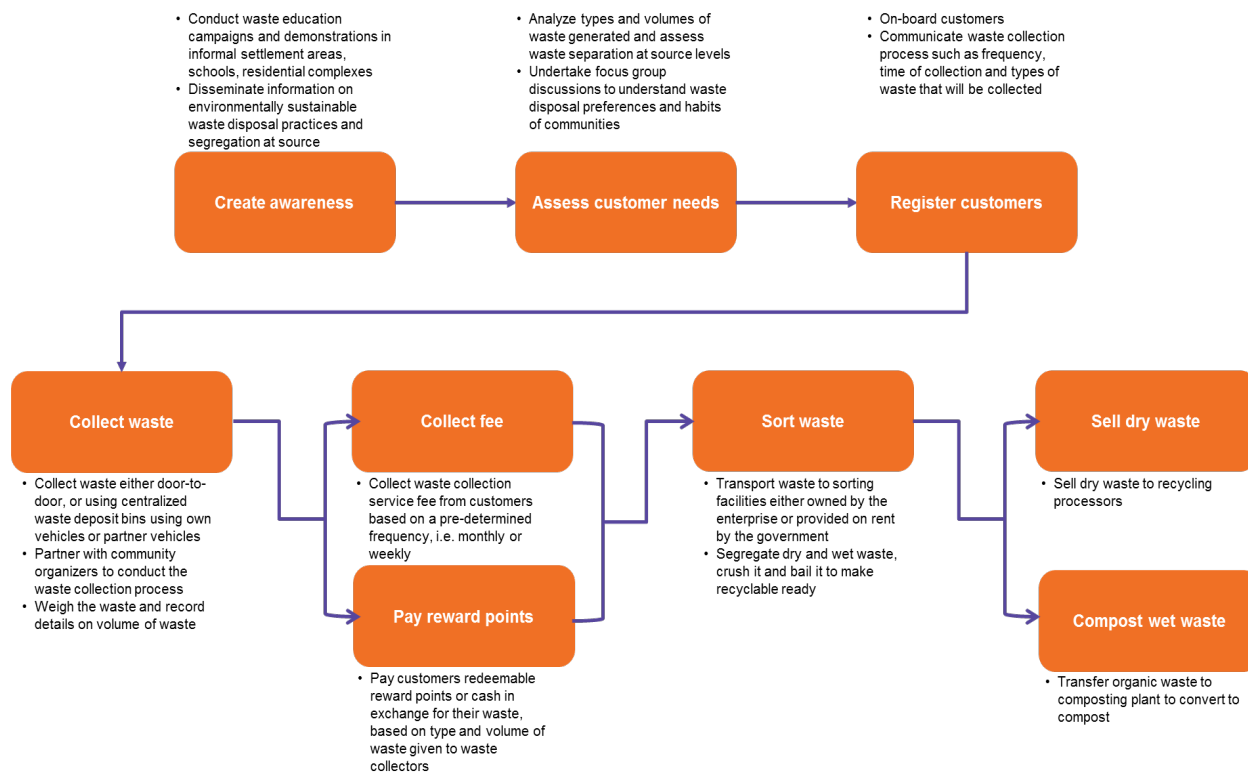
Figure 1. Waste collection services versus aggregated waste-pickers



Aggregate waste-pickers

Enterprises adopt this model to provide a safer, formal work environment for waste collectors, provide them capacity building services and provide their families better quality of life. Enterprises such as Hasiru Dala (the not-for-profit arm complementing the for-profit arm Hasiru Dala Innovations), a membership-based organization, aggregates informal waste-pickers and provide them with skills and training on efficient waste collection and sorting practices. Other enterprises such as Raddi Connect, Citizengage and Mindtree's I Got Garbage connect dispersed waste collectors to waste generators using mobile and online platforms; therefore organizing the waste collection process and enabling waste-pickers to collect more waste and earn higher incomes.

Figure 2. Features of the waste collection model



Cost Factors

Waste collection services primarily incur collection, sorting and transfer costs (Figure 3). Research by the UN on waste management activities in developing countries highlighted that collection and transporting of solid waste constitutes the largest demand on municipal budgets.¹⁰ Of the total expenditure incurred in solid waste management, typically 70 percent to 80 percent¹¹ is directed towards the collection and transporting¹² of wastes.

Collection costs depend on factors such as types of waste collected, location of areas to be served¹³, and density of waste, which in turn dictate the choice of collection vehicles and equipment, collection methods and size of labor crew employed in waste collection activities. Capital costs involved in collection activities include purchase of collection vehicles and collection equipment such as bin liners, weighing scales and calculators. Energy-efficient bicycles—‘Wecycles’ used in Wecyclers’ collection activities cost USD 700 per cycle in comparison to TakaTaka Solutions’ expenditure on waste collection trucks that cost USD 50,000-USD 70,000. Collection vehicles may be provided on lease or free of charge (based on a contractual agreement) by the government to enterprises. In other cases, enterprises may partner with recycling processors who

Hasiru Dala Innovations incurs unit collection cost of USD 1.3 per household
Primary costs include:

- **Fee for waste pickers**
- **Transportation of wet-waste to bio-gas plant**
- **Financing for waste collection truck - Waste pickers pay lease rental for the trucks, ownership of truck transfers to waste pickers in 4 years**
- **Customer care helpline maintenance cost**
 (Indicated by the enterprise in the interview)

¹⁰ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

¹¹ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

¹² As per this reference, the definition of collection and transportation does not involve at-source segregation, sorting, handling, transporting to sorting facilities, cleaning, size reduction, baling, processing (including composting) and manufacturing.

¹³ Waste: The challenges facing developing countries, Propoarco’s Magazine (Groupe Agence Francaise De Developpment), 2012

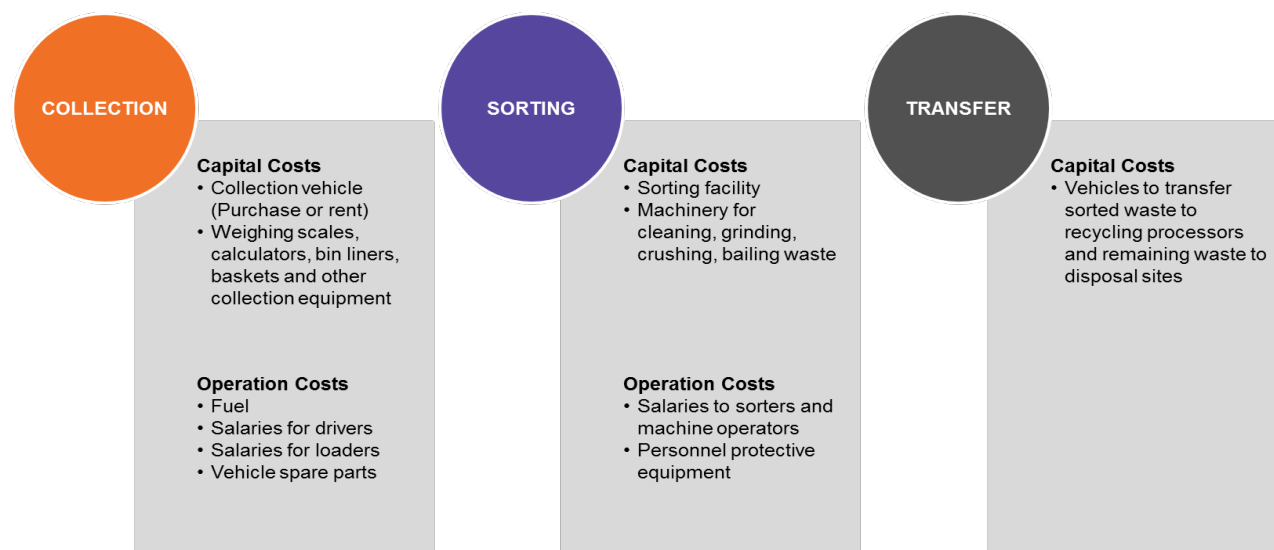
provide their vehicles for waste collection.

Collection methods play a significant role in determining collection costs per household—for instance, community containers incurs the lowest cost of collection, followed by block collection, curb side collection and door to door collection¹⁴. Bintang Sejahtera, ZoomLion and Ciudad Saludable employ a community-managed collection system whereas Waste Masters, Hasiru Dala Innovations, TakaTaka Solutions, BinBag and Wecyclers undertake door-to-door collection. Operational costs include salaries to drivers, loaders, financing of waste vehicle loans, fuel, and purchase of spare parts for vehicle maintenance. Enterprises such as Citizengage and I Got Garbage incur upfront costs on technology and software used in developing algorithms to optimize collection routes in order to aggregate sufficiently large volumes of waste and in connecting waste pickers to waste generators for scheduling waste collection.

Sorting activities can entail up to 50 percent of the total operating costs involved in waste collection.¹⁵ Costs incurred in the sorting process include upfront capital expenses towards establishing sorting facility. In some cases, sorting facilities may be provided on rent or free of charge by municipal authorities. In addition, expenses on sorting, crushing and bailing machinery may also constitute upfront capital investment. Operational costs in sorting include salaries paid to staff who manually sorts waste and to machine operators, personnel protective equipment, electricity and other utilities to operate the sorting facility.

Waste collection providers who reward points in exchange for customers' waste incur upfront costs on purchasing these points from manufacturers and dealers whose products are redeemable by customers. Enterprises that compost organic waste incur expenses on the set up of a composting plant, procurement of composting machinery and equipment, and salaries paid to composting staff.

Figure 3. Typical cost factors involved in waste collection services



Revenue Streams

¹⁴ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

¹⁵ Waste: The challenges facing developing countries, Propoarco's Magazine (Groupe Agence Francaise De Developpment), 2012

Waste collection models that involve enterprises providing fee based collection services earn a major share of their revenue from collection fees charged to waste generators. The fee may be charged as a flat fixed subscription fee that is paid by customers at the beginning of the month or the quarter, dependent on the frequency of waste pick-up. TakaTaka Solutions charges its different customer segments a fixed fee: USD 1 per month to low-income households residing in informal settlements, USD 2-USD 3 and USD 5-USD 6 to mid-sized and large-sized households respectively. Its commercial clients are charged a fee ranging between USD 100-USD 1000 depending on the volume of waste they generate and any services that they subscribe to in addition to waste collection and sorting, like requesting for monthly waste analytics reports. Some enterprises adopt a combination of fixed fee and variable fee based on volume and type of waste disposed by customers. For instance, Hasiru Dala Innovations prices its services on a polluter-pays¹⁶ model. It charges its customers (bulk waste generators¹⁷ in Bangalore) a fixed fee of INR 135 (USD 2)¹⁸ per month per household and variable fee based on the weight of dry waste and wet waste—higher the volume of separated waste the lower the variable fee charged.

60 percent-70 percent of TakaTaka Solutions' total revenue is derived from collection fees

Reward-based waste collection services that involve collecting customers' waste in exchange for redeemable gift points do not earn revenues from collecting waste, they rely instead on selling the waste for further processing by players down the value chain.

Another major source of revenue for enterprises providing waste collection services stems from selling collected waste materials to recycling and bio-gas processors. TakaTaka Solutions earns 15 to 20 percent of its revenues from selling sorted dry waste to recyclers. Wecyclers, Bintang Sejahtera and BinBag also sell sorted recyclable fractions to recycling processors. Citizengage and Hasiru Dala Innovations earn additional revenues by selling organic waste to bio-gas processors. Enterprises that involve community organizers in collection of waste pay these organizers a commission of the revenues earned on sale of recyclable waste to recycling processors.

Financial Viability

While most waste collection enterprises aspire to operate profitably, the lack of awareness about the benefits of environmentally sustainable waste disposal practices, and therefore, the reluctance to pay for formal waste collection services hampers the profitability of the model. Most enterprises do not have additional financial resources to spend on awareness and marketing activities—a key factor in increasing uptake of the model. Enterprises therefore typically rely on donor grants or operate as not-for-profit organizations. For instance, Peruvian community-managed waste enterprise, Ciudad Saludable was awarded a USD 615,000 grant from the Skoll Foundation¹⁹ which enabled it to increase scale in Peru and expand its operations to other countries of South America.²⁰

Financial viability of waste collection service models are also derivative of the costs related to collection method, and vehicle use and maintenance. Depending on context, enterprises select and hence incur varying expenses on operating collection vehicles, maintaining the vehicles and wages to be paid to waste collectors.²¹

¹⁶ Under the polluter pays model, generators pay for the removal and disposal of their wastes according to their quantity and the difficulty of disposing of them in a satisfactory way

¹⁷ The Bruhat Bangalore Mahanagara Palike (BBMP), Bangalore city's municipal authority in charge of waste management, allows empaneled private sector enterprises to provide waste collection services only to bulk waste generators - defined as any hotel/restaurant, choultry, mall, shopping complex, marriage hall, convention hall, temple, residential apartments (10 units and above), institutions, public offices, railway stations, bus stands or any other residential, commercial or a public entity which generates 100 kg and more wet waste per day

¹⁸ 1 INR = 0.015 USD

¹⁹ The enterprise was awarded the grant after receiving the "Skoll Award For Social Entrepreneurship" in 2006

²⁰ Ciudad Saludable: Solutions in the Waste, Skoll Foundation Archives, <http://archive.skoll.org/2009/10/22/ciudad-saludable-solutions-in-the-waste/>

²¹ Collection of Municipal Waste: Key issues for decision-makers in developing countries, UN-Habitat, 2011

In low-income developing countries costs associated with vehicle use and fuel are high, while labor is cheap²². Research also shows that careful consideration should be given to region-specific waste type and volume, local waste handling practices and costs for vehicle maintenance such as lubricants and tires in selecting collection equipment.²³ Prior to providing waste collection services, enterprises conduct in-depth assessments on the potential areas to be served to study the types of waste generated, existing waste disposal practices, volumes of waste generated, road access and infrastructure (specifically in unplanned low-income housing areas) and availability of labor before selecting the collection method and type of vehicle.

Taking into consideration that costs related to sorting activities comprise 50 percent of total collection costs²⁴, enterprises leverage on inexpensive labor to undertake manual segregation of waste versus investing in mechanized processes. Efficiency in sorting waste translates to higher revenues from sale of uncontaminated waste to recycling companies and bio-gas processors. TakaTaka Solutions employs 3 to 4 times more staff than typical waste collection companies in Nairobi to attain larger volumes of clean segregated waste that can be sold to recyclers. A number of enterprises educate customers on separation-at-source in order to minimize time and labor costs involved in sorting waste after it is collected. Hasiru Dala Innovations encourages behavior change in customers by charging them a variable fee commensurate to the level of segregation-at-source: higher the separation levels lower is the fee that they are charged. Prior to on-boarding low-income communities in its service coverage, Bintang Sejahtera assesses the level of segregation-at-source by the community and registers them as part of its service only once sufficiently high levels of segregation are reached. Wecyclers' model is designed to reward customers who are diligent in separating their waste.

Segregation-at-source increases sorting efficiency and helps generate higher revenues from sale of waste material to recycling processors and bio-gas plants

Enterprises also adopt differential pricing strategies that allow them to cross-subsidize low-cost services designed for low-income populations with higher prices charged to affluent households and commercial clients, like in the case of TakaTaka Solutions.

Cost-sharing with partners on collection vehicles and sorting facilities helps in achieving financial sustainability

A number of enterprises leverage strategic partnerships to lower their operational costs. For instance, under a franchisee model, Hasiru Dala Innovations partners with independent waste picker organizations, typically comprising a group of waste workers from low-income populations. Individual franchisee partners comprising 2 collectors, 1 driver and 2 sorters operate independent wards and pay the enterprise a rental lease for waste collection vans under the agreement that the ownership of these vehicles completely transfers to the waste pickers in 4 years. This encourages the truck drivers and waste-pickers to maintain the vehicles in good condition and enables the enterprise to recover upfront costs incurred on purchase of collection trucks. Other

forms of partnership may involve the use of partner recycling companies' vehicles for collection. BinBag partners with recycling companies who provide their trucks for dry waste collection; the recycling companies pay the enterprise for the recyclable waste collected net of logistics and transportation costs. This enables BinBag to remain cash-flow positive. Wecyclers partners with the Lagos Waste Management Authority (LAWMA) and uses the sorting facilities provided by the government body, at no cost, to undertake sorting and bailing activities prior to selling recyclable fractions to processors.

Revenues earned from sale of waste to processors depends on commodity prices, fuel prices, shipping costs, demand for recyclable products, and processing capacities of recyclers and bio-gas processing plants. Therefore, a large part of the model's sustainability is influenced by the recycling industry.

²² Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

²³ Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries, UNDP/UNCHS (Habitat)/World Bank/SDC, 1996

²⁴ Waste: The challenges facing developing countries, Propoarco's Magazine (Groupe Agence Francaise De Developpment), 2012

Partnerships

Waste collection models may entail various forms of partnership in collection, sorting and transporting activities. Enterprises partner with local community champions, municipal authorities, NGOs, and waste-picker co-operatives to create awareness about environmentally friendly and hygienic waste management practices. Enterprises work with these stakeholders in educating both, communities in order to convert them to customers, and informal waste workers, to engage them in the enterprises' formal collection services. For instance, Hasiru Dala Innovations engages waste-pickers who are aggregated by its sister company, Hasiru Dala (Hasiru Dala is an NGO that provides legal identity, formal recognition and dignified livelihood opportunities to informal waste workers in Bangalore, India). Waste workers associated with Hasiru Dala also work with other waste management enterprises.

Enterprises partner with waste processing buyers or the government for equipment and infrastructure. This helps minimize capital expenses for the enterprise. BinBag uses associated recycling companies' collection trucks to collect waste from households. Wecyclers uses sorting facilities owned by the local municipal authority—Lagos Waste Management Authority to undertake its waste sorting and bailing processes.

A number of collection models include cost-sharing and revenue-sharing between enterprises and its partners. Hasiru Dala Innovation incurs upfront costs on purchase of waste collection vans which it transfers to partner franchisee waste worker organizations within 4 years of the partnership. As per contract, waste worker organizations undertake to oversee maintenance of the vehicles during the course of operations. Bintang Sejahtera operates its community-based waste banks by engaging area-specific community leaders as partners. Community organizers are incentivized by sharing revenues on sale of recyclable waste with the enterprise; they manage daily collection services in their locations, oversee segregation at source and educate customers on proper waste disposal practices.

Bintang Sejahtera's partner community organizers operate waste banks within their communities and keep 20 percent of the price of recyclable waste sold to recycling processors

(Banking on garbage and will power, Jakarta Post, Mar 2016)

Implementation: Delivering Value to the Poor

Awareness

Creating awareness is a pivotal requirement to initiate and increase uptake of waste collection services in developing countries. Wecyclers employs local unemployed youth in its collection activities. These youth also undertake awareness campaigns which involve visiting households in Nigeria's slums and imparting education on the benefits of using Wecyclers' reward-based service. TakaTaka Solutions also conducts door-to-door awareness campaigns on waste disposal practices such as educating customers on the type of bin liners to use for different types of waste. Hasiru Dala Innovations typically serves bulk waste generators; however, its education campaigns are designed for varied audience including housekeeping staff, low-income domestic help, children, and high-income residents. The enterprise's awareness initiatives include dumping garbage on a tarpaulin sheet outside the customer apartment complex and engage the residents in segregating wet waste, dry waste, and sanitary waste with the view to educate them on the challenges of unsegregated waste at source later in the waste stream.²⁵ A number of enterprises leverage NGO support in conducting awareness campaigns, community sensitization and mobilization activities, focused towards changing customer behavior related to disposal methods and payment of collection services.²⁶

²⁵ Self-reported

²⁶ Global Waste Management Outlook, United Nations Environment Programme, 2015

Acceptance

Waste collection enterprises conduct extensive focus groups and surveys with target customers prior to registering them for the waste collection services. These interactions help enterprises in designing collection methods, frequencies, timings, type of vehicle and mode of payment (fee-based or reward-based). Conducting this exercise prior to implementing services enables customer stickiness and decreases chances of incurring costs in amending processes. For example, Citizengage learnt that most of its customers prefer to have their garbage collected at night and accordingly, it designed its services to incorporate collection at night.²⁷

Accessibility

Dismal waste collection services across developing countries owing to limited municipal budgets results in large sections of populations left unserved by collection providers. A number of enterprises like TakaTaka Solutions, Wecyclers and Waste Masters provide door-to-door collection services in hard-to-access and unplanned informal settlements. This level of accessibility translates to higher costs and narrower margins. Enterprises like Bintang Sejahtera and Ciudad Saludable provide community-managed waste collection services in low-income communities. Enterprises also provide access to formal employment opportunities to informal waste workers, like in the case of Hasiru Dala Innovations and Citizengage.

Affordability

Enterprises that adopt fee-based collection models charge customers minimal fees for the services. TakaTaka Solutions, for example charges customer USD 1 per month per household. Enterprises, like Wecyclers and Bintang Sejahtera that offer reward-based services enable low-income customers to earn incomes or redeemable points in exchange for their trash; customers can afford useful household appliances and food with these points. Enterprises that involve informal waste workers in their formal service delivery to customers enable these workers to purchase protective equipment for waste collection and sorting activities thereby fostering a safe working environment for them.

Results and Cost Effectiveness

Waste collection rates in low-income countries are a mere 41 percent.²⁸ Private sector participation in the waste collection process is instrumental in supporting the public sector to increase service coverage in developing countries. Private sector participation helps in easing strained municipal budgets on waste collection. Consistent efforts by private enterprises to improve service effectiveness and financial viability also translate into customers receiving quality waste collection services at lower prices.²⁹

Scale and Reach

Waste collection enterprises engage with low-income populations in developing nations in two ways: by providing waste collection services, and by providing income generating opportunities, predominantly for informal waste workers in these countries. A number of private sector enterprises have designed their service models to cater to larger populations and leverage the prevalence of informal waste workers to deliver services.

Ciudad Saludable, a waste collection enterprise based in Peru since 2002 has expanded to Bolivia, Brazil, Colombia, Mexico, Peru, Venezuela, and India. The enterprise has reached 30 percent of Peru's population with waste collection services in 1,835 cities and has organized over 1500 informal waste collectors.³⁰ The enterprise has a community-based model and involves local communities to participate in waste collection and provides them self-employment opportunities.

Community-managed collection enterprises Ciudad Saludable has reached 30 percent of Peru's population and Bintang Sejahtera serves 5000 low-income customers

²⁷ Self-reported

²⁸ What a Waste: A Global Review of Solid Waste Management, World Bank, 2012

²⁹ Kessides, I.N. 2004

³⁰ Skoll Foundation, <http://skoll.org/organization/ciudad-saludable/>

The potential to earn incomes ensures that waste collectors are motivated to provide reliable services, enabling the enterprise to scale and reach other unserved communities.

Indonesia-based Bintang Sejahtera has a similar community based model to provide waste collection services to 5000 people, including 50 households, and schools³¹ in Lombok Island (an island located in West Nusantara, Lombok is one of the most underdeveloped provinces in the country). The use of reward points in exchange for waste coupled with the involvement of local community organizers in managing operations enables the enterprise to reach a larger number of people.

Wecyclers in Nigeria has reached over 11,000 low-income households using its reward-based waste collection model since 2013. The use of tricycles—*Wecycles*—in its operations allows the enterprise to maneuver through narrow lanes in unplanned slum areas thereby increasing its reach to low-income customers. The enterprise has also employed 82 unemployed youth in its waste collection activities.³²

Nairobi based TakaTaka Solutions has served over 12000 households; 80 percent of its customers are from low-income backgrounds paying USD 1 for the enterprise's reliable waste collection services. The enterprise has employed 105 employees including unemployed youth and women from impoverished communities.³³

TakaTaka Solutions provides affordable fee-based collection services to 12,000 households (80 percent low-income households) in Nairobi

Hasiru Dala, established in Bangalore India in 2013, provides low-income informal waste workers capacity building and technical training to improve their productivity in waste collection and recovery. It also provides them with government approved identity cards, health insurance and opportunities to connect with private waste management enterprises for employment. Its suite of services has enabled aggregation of over 7,000 informal waste pickers who are registered members of Hasiru Dala³⁴, which is a not-for-profit. Its for-profit arm established in 2015 leverages on this member base to provide waste collection services to over 20,000 households in Bangalore.³⁵

Table 1. Scale and reach of select companies

Company	Country of operation	Years of operation	Reach
Bintang Sejahtera	Indonesia	4	• 5000 low-income customers
Ciudad Saludable	Bolivia, Brazil, Colombia, Mexico, Peru, Venezuela, and India	14	• 30 percent of Peru's population as customers • 1835 cities served in Peru • 1500 informal waste workers provided employment
Citizengage	India	1	• 2000 households (bulk-waste generators) and 100 commercial clients
Hasiru Dala (not-for-profit arm)	India	3	• 7000 informal waste workers provided membership
Hasiru Dala Innovations	India	1	• 20,000 households (bulk-waste generators) as customers. Low-income population involved in waste collection activities
TakaTaka Solutions	Kenya	5	• 12000 households (of which 9600 households are low-income) as customers • 105 waste workers from low-income

³¹ Self-reported

³² Self-reported

³³ Self-reported

³⁴ From waste picker to recycling manager, Citiscope, Apr 2014 <http://citiscope.org/story/2014/waste-picker-recycling-manager>

³⁵ Self-reported

			background
Waste Masters	Uganda	5	• 500 low-income customers
Wecyclers	Nigeria	3	• 11,000 low-income households as customers

Improving Outcomes

Waste collection enterprises have not only enabled extension of services to previously unserved low-income populations, but also reduced environmental degradation and ground-water contamination caused by improper waste disposal. Service expansion and engagement of informal waste workers has also fueled job growth and increased incomes in developing economies. Improved facilities and waste collection equipment used by private enterprises not only increase waste workers' revenues but also help in increasing their productivity.³⁶ The use of technology in connecting waste pickers to waste generators in real-time has enabled optimization in scheduling pick-ups and thereby increasing productivity of these waste workers.

Waste collection remains the primary outcome in the business model. Bintang Sejahtera manages 28 tons of organic waste and 25 tons of inorganic waste per month reducing garbage in Lombok by up to 53 tons on a monthly basis.³⁷ Wecyclers has diverted 525 tons of waste from reaching landfills in Nigeria.³⁸ TakaTaka Solutions collects 470 tons of waste per month, enables recycling of 446 tons of waste per month and produces 50 tons of compost per month.³⁹

Enterprises have also provided informal waste workers with a formal and safer work environment along with increased revenue generating opportunities. Hasiru Dala Innovations has helped waste pickers double or triple their income—a waste picker partnering with the enterprise earns revenues in the range of USD 1.5-USD 3 per day which translates to USD 135-USD 150 per month.⁴⁰

Hasiru Dala Innovations has enabled associated waste workers to increase earnings by 2 to 3 times. They earn up to USD 150 per month (self-reported)

Employees of Wecyclers, who were previously unemployed and comprise the at-risk group, have the ability to earn incomes in proportion to the waste that they collect—average income earned by waste collectors is USD 150 per month which is approximately USD 8 more than the minimum wage in Nigeria. Waste workers involved in Bintang Sejahtera's collection and sorting activities are typically low-income farmers who cultivate harvest twice a year and earn a gross income of approximately USD 1000 per season that is USD 2000 per year. As additional sources of income, these farmers earn USD 100-140 per month, which is USD 1200-USD 1680 per year undertaking waste collection and sorting activities.⁴¹ In addition, the enterprise's waste banks allow communities to deposit their waste in exchange for immediate cash payments or cash deposited as savings (average accumulated savings: USD 19-USD 23 per month) that customers typically withdraw on a quarterly frequency.⁴² Technology driven services provided by Citizengage enables optimized scheduling and helps waste collectors plan their waste collection routes and increase their efficiency in collecting waste. The enterprise has enabled its workers to increase incomes by two to three

Wecyclers' waste workers earn USD 8 more than the minimum wage and earn revenues in proportion to the waste that they collect (self-reported)

³⁶ Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries, UNDP/UNCHS (Habitat)/World Bank/SDC, 1996

³⁷ Banking on garbage and will power, Jakarta Post, Mar 2016 <http://www.thejakartapost.com/news/2016/03/22/banking-on-garbage-and-will-power.html>

³⁸ Self-reported

³⁹ Self-reported

⁴⁰ Self-reported

⁴¹ Self-reported

⁴² Banking on garbage and will power, Jakarta Post, Mar 2016 <http://www.thejakartapost.com/news/2016/03/22/banking-on-garbage-and-will-power.html>

times.⁴³

In addition to increasing incomes, enterprises have also improved working conditions and provided livelihood opportunities for their associated waste workers. Ciudad Saludable organizes groups of informal waste collectors - '*recicladores*' to form community-level microenterprises. Under the informal sector, these workers earned approximately USD 2 per day selling small amounts of recovered waste to recycling centers. They also worked under unsafe conditions without appropriate protective gear, were victims of gang violence and prosecuted by the police. The enterprise provides them legal and technical support, and microcredit to purchase tools and equipment for collection activities, such as collection vehicles, gloves and helmets. Workers are also given the opportunity to consolidate recovered waste from individual collectors thereby increasing their bargaining power.⁴⁴

Hasiru Dala's member waste workers are provided government-recognized identity cards that help improve the social status of these workers.⁴⁵ The enterprise has also helped over 1800 families in obtaining health insurance under the Rashtriya Swasthya Bima Yojana⁴⁶ and has helped 4500 people in attending health camps. In partnership with Mindtree—an IT company, the enterprise has provided 100 education scholarships.⁴⁷ Bintang Sejahtera donates 50 percent of its revenue to funding education requirements of the communities that it services.⁴⁸

Hasiru Dala has helped over 1800 families in obtaining health insurance, 4500 in attending health camps and provided 100 education scholarships

Cost-Effectiveness

Private waste collection enterprises provide waste collection services either by charging low-income customers affordable prices or by rewarding customers in exchange for their waste. For unserved low-income populations, these enterprises help in combating ill-effects to public health and environmental degradation created due to improper disposal of waste within these communities.

It is estimated that collection costs make up more than 90 percent of total waste management costs in the lowest income countries that resort to open dumping after waste is collected.⁴⁹ It is also hypothesized that although costs of environmentally sustainable waste collection practices may seem high now, they will prove to be cheaper than to continue with unsuitable waste disposal practices like open dumping. Calculations⁵⁰ reflect that incremental costs of proper waste management will be USD 5 to 7 per capita whereas likely cost of inaction and inadequate services may be USD 20-USD 50 per capita.⁵¹

More than 60 percent of total dioxin emissions are attributed to open burning of uncollected waste in developing countries (UNEP)

Other statistics on the negative impact on public health and environmental pollution indicate that the present costs incurred in undertaking proper waste collection services outweigh the costs incurred if ineffective or non-existent waste collection services are provided. For instance, UN Demographic and Health surveys show that diarrhea and acute respiratory infections in children, in areas that burn or dump their waste in yards, are twice and six times as high

⁴³ Self-reported

⁴⁴ Ciudad Saludable: Solutions in the Waste, Skoll Foundation Archives, <http://archive.skoll.org/2009/10/22/ciudad-saludable-solutions-in-the-waste/>

⁴⁵ Hasiru Dala is fighting for the rights of Bengaluru waste-pickers and turning them into entrepreneurs, Your Story, Aug 2016 <https://yourstory.com/2016/08/hasiru-dala/>

⁴⁶ Rashtriya Swasthya Bima Yojana is a Government of India health insurance scheme for below the poverty line unorganized workers

⁴⁷ Self-reported

⁴⁸ Self-reported

⁴⁹ Global Waste Management Outlook, United Nations Environment Programme, 2015

⁵⁰ These cost estimates take into consideration a 'typical' city with a GNI/capita of USD 1000 per year and where collection rate is 50 percent and waste is delivered to municipal dumpsites at costs equivalent to USD 3-USD 5 per year

⁵¹ Global Waste Management Outlook, United Nations Environment Programme, 2015

in areas where waste is collected regularly.⁵² And the UNEP Dioxin Toolkit suggests that in developing countries, of the total dioxin emissions, more than 60 percent is attributable to emissions⁵³ associated from open burning of uncollected waste.⁵⁴

Scaling Up

Challenges

Most enterprises cite challenges that relate to the government's role in waste collection—manifested either as an absence of policies or inadequate implementation of enabling policies. For example, enterprises in countries that don't mandate segregation-at-source end up incurring high costs in sorting and treatment activities. Enterprises also cite the same problem in the case of countries that do have policies on segregation-at-source but have not been able to actively enforce the mandate.

Given that waste receives scant attention in developing countries, enterprises face challenges in creating awareness about environmentally sustainable waste disposal methods. Enterprises particularly refer to difficulty in carving out adequate marketing and client awareness budgets from the limited revenues they earn by charging minimal waste collection fees to customers (customers will discontinue availing their services if charges are increased). However, customer awareness and education is critical to the profitability of the model. Failure to educate customers about the benefits of paying for formal waste collection practices, or the importance of segregating waste at-source or teaching them on the correct use of bin liners will all result in enterprises either not being able to on-board customers who are willing to pay or in increasing their operation costs.

A number of enterprises are also face with severe competition from other players in the market. For instance, TakaTaka Solutions, despite providing its services at USD 1 per month to low-income households faces stiff competition from illegal waste collectors who charge customers USD 0.50 per month and dispose collected waste into open dumping areas that are not legal landfill sites. Customers' lack of concern in understanding where their waste is discarded after collection drives them to avail cheaper services of illegal waste collectors.

Frequent absenteeism of waste workers makes it difficult for the enterprises to provide reliable collection services to their customers. Informal sector waste workers may be reluctant to work with private enterprises if they perceive a loss of their independence or suffer a loss of income⁵⁵ (despite an improvement in their working conditions and increased indirect benefits).

Enterprises also face challenges in developing efficient business plans that include pricing strategies, designing awareness strategies and linking practical application with business theory in the waste management sector, more specifically when catering to low-income customers. Capacity building programs to support enterprises in technical and business development help scale the enterprise. For example, Uganda-based waste collection enterprise, Wisdom and Insight undertook the Living Earth's 'African Urban Enterprise Development Program'⁵⁶ in 2012. After completion of the training, the enterprise expanded its customer base and increased its turnover by 300 percent and operates on a 75 percent payment rate in large part due to the quality of services and the proximity of the company to the community that it serves.

Role of Government and Policy

⁵² Global Waste Management Outlook, United Nations Environment Programme, 2015

⁵³ Emissions associated to open burning of uncollected waste include highly toxic, carcinogenic and short-lived climate pollutants (SLCPs) such as polyaromatic hydrocarbons and black carbon

⁵⁴ Global Waste Management Outlook, United Nations Environment Programme, 2015

⁵⁵ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁵⁶ The program was designed to build capacity of micro and small enterprises in business development, and follow-up mentoring

Waste collection models across developing countries assume different forms based on the role of national and regional governments in the waste management sector. Enterprise relationships with governments involve contracting, franchising, open competition or concession.⁵⁷ Under contractual agreements, the municipality or regional authority selects a private sector service provider and defines the activities to be undertaken by the enterprise; the payment to the enterprise is made by the municipal authority. Governments also identify an enterprise as a franchisee and designate independent areas of collection that can be serviced only by the selected enterprise; in this case, the enterprises collect payments directly from customers. Open competition involves governments providing licenses to qualified enterprises who compete to provide services to areas of their preference. Governments also construct facilities and provide a concession to select enterprises to operate the facility and subsequently transfer complete ownership to the government.

Experiences between enterprises and governments reveal that governments in most developing countries lack competencies and resources to structure agreements and engage effectively through various forms of public-private partnership.⁵⁸ Public-private partnership models in waste collection could involve enterprises using government owned collection vehicles or government owned sorting facilities. Research indicates that success of a relationship with private sector players depends largely on the local government partner more than the private sector enterprise.⁵⁹ Governments should therefore engage in developing staff capabilities and understanding on waste collection processes, expectations from enterprises and policy monitoring responsibilities. Special purpose agencies like the Infrastructure Investment Facilitation Company in Bangladesh, established to increase government staff competencies in handling public private partnership models in waste management, serve as an example for other developing country governments to follow.⁶⁰

Governments should increase staff competencies in engaging with waste collection enterprises under public-private partnership models

Monitoring and enforcement of established policies is key in shaping customers' willingness to pay and influencing behavior change towards adopting waste disposal practices

Legislation and, more importantly, the enforcement of legislation, are critical in shaping an effective waste collection system⁶¹ in developing countries. Implementation and monitoring of policies ultimately influence customers' willingness to pay and their diligence in following proper waste disposal practices. For example, Local Ordinance No. 2031 passed in Cebu City, Philippines mandated segregation-at-source and established

violation penalty charges. However, it was the effective enforcement of the law that resulted in a decrease in violations.⁶² This is in stark contrast to the situation in Bangalore, India where lax enforcement of the segregation-at-source law passed in 2003 does not restrict citizens from continuing to dispose mixed waste since they are not subject to any penalties.

Policies mandating extended producer responsibility (EPR) will increase partnership opportunities for collection enterprises to engage with large corporates—a source of significant revenue for enterprises in the waste collection space. Zero-waste management policies will also increase enterprise engagement with institutions like hotels and resorts that would like to demonstrate environmentally friendly practices in running their businesses.

⁵⁷ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁵⁸ Global Waste Management Outlook, United Nations Environment Programme, 2015

⁵⁹ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁶⁰ Global Waste Management Outlook, United Nations Environment Programme, 2015

⁶¹ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁶² Global Waste Management Outlook, United Nations Environment Programme, 2015

Governments in developing countries need to address the significant gap in collecting reliable and timely data on waste collection particularly since costs incurred on waste collection represent the largest share of total waste management costs⁶³. Research institutes that support governments in framing policies typically focus on recycling and disposal rather than collection.⁶⁴ Area-specific data⁶⁵ on waste composition, density, volumes, and waste handling efficiencies⁶⁶ will help governments and enterprises in selecting appropriate types of collection vehicles. Sufficient data will also help in planning collection routes and categorizing zones while contracting enterprises under zone-based collection systems; for example, Government of Uganda's Kampala Capital City Authority, divided the city into seven zones ensuring an equitable distribution of informal settlements in each area with high-income neighborhoods in order to help private service provider to cross-subsidize their operations.⁶⁷ Governments can also use this data to estimate waste processing capacities and build sufficient recycling and bio-gas plants, which will absorb recovered waste while providing collection services—a key revenue stream for most waste collection enterprises.

Conclusion

Given the low collection rates across developing countries, it is apparent that waste collection enterprises have a significant opportunity to plug in the gaps in servicing low-income populations. Taking into consideration the dual impact of waste collection services, in improving the environment and public health, and in providing a dignified source of employment for informal waste workers, enterprises serve a need that cuts across different income segments. They have therefore been able to garner sufficient recognition in recent years and reach a large number of customers within a few years of their operation.

However, the model's profitability will hinge on the role that the government plays in engaging with these enterprises. The support that governments provide in terms of bearing upfront capital costs incurred on waste collection vehicles and equipment for sorting will determine cost structures of enterprises. Policy mandates related to proper disposal methods and segregation-at-source, coupled with strict enforcement by regulatory authorities involving penalties for violation will also have a marked impact on shaping customers' willingness to pay and waste disposal preferences, thereby influencing viability of the collection model.

Table 2. Social enterprises in waste collection services

Enterprise	Country	Description
Bintang Sejahtera	Indonesia	Bintang Sejahtera is a community-managed waste collection enterprise that operates in Lombok Island in Indonesia. The enterprise identifies community organizers who manage waste banks, where community citizens deposit recyclable waste. Based on the weight of waste deposited, customers are rewarded cash. The enterprise sorts the waste and then sells it to a recycling company in East Java.
Ciudad Saludable	Bolivia, Brazil, Colombia, Mexico, Peru, Venezuela, and India	A community-managed waste enterprise established initially in Peru. Informal waste workers are organized into groups to form a microenterprise that then manages waste collection of their communities. Waste collectors sell collected waste to recycling companies.
Citizengage	India	A technology driven waste collection enterprise that provides collection services to bulk waste generators in Bangalore, India. The enterprise employs waste workers from low-income populations and enables them with technology to track collection schedules. The enterprise sells wet

⁶³ Of the total expenditure incurred in solid waste management, typically 70 percent to 80 percent is directed towards the collection and transporting of wastes and 90 percent in lowest income countries where open dumping is practiced predominantly

⁶⁴ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁶⁵ Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries, UNDP/UNCHS (Habitat)/World Bank/SDC, 1996

⁶⁶ Collection of Municipal Solid Waste in Developing Countries, UN-HABITAT, 2010

⁶⁷ Global Waste Management Outlook, United Nations Environment Programme, 2015

		waste to bio-gas processors in the city.
Hasiru Dala Innovations	India	A fee-based waste collection provider servicing bulk waste generators in Bangalore, India. The enterprise charges customers based on the volume of segregated waste at source. The enterprise partners with informal waste workers to deliver its waste collection services.
TakaTaka Solutions	Kenya	A fee-based door-to-door waste collection service provider, with specific focus on low-income customers. The enterprise cross-subsidizes its services by charging higher prices to affluent households and commercial clients. It collects waste, sorts it, sells recyclable fractions to recycling companies and converts wet waste to organic compost.
Waste Masters	Uganda	A fee-based waste collection enterprise that specializes in household and institutional door-to-door garbage collection in rural and peri-urban areas.
Wecyclers	Nigeria	A rewards-based door-to-door collection enterprise. It uses low-cost energy efficient tricycles 'Wecycles' in its waste collection from densely located informal settlement areas in Lagos.

Additional Reading

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This series on Inclusive Innovations explores business models that improve the lives of those living in extreme poverty. Editors are Elaine Tinsley and Natalia Agapitova. Researched and developed by Intellectap.

CASE STUDY: TAKATAKA SOLUTIONS



Founding year: 2011

HQ: Nairobi, Kenya

Countries of operation : Kenya

Orientation: For-profit

Employees: 105

Turnover: USD 350,000

Nairobi and surrounding counties generate approximately 3500 tons of waste on a daily basis, of which 70% is organic waste that if left uncollected, contaminates dry waste making it unrecyclable. Only 30% to 50% of the waste is collected by legal waste management companies while the remaining waste is either left uncollected or collected by informal waste workers who dump it illegally. The city's waste collection setup is based on free competition and is not restricted to ward-wise collection. As a result, a number of waste collecting agencies opt to serve areas that are easily accessible and financially viable. These companies do not dispose waste in an environmentally conscious manner thereby accentuating the problem of mismanaged waste.

TakaTaka Solutions provides formal affordable waste collection services to unserved low-income households in Nairobi. It undertakes door-to-door collection of waste, sorts it, sells dry waste to recyclers and composts organic waste in its composting plant. Its operations divert 95% of the waste from reaching landfills. The enterprise has served 12,000 households of which 80% are low-income households.



Operating Model

TakaTaka Solutions is a Nairobi-based waste collection enterprise. It offers affordable door-to-door collection services to low-income households and informal settlements that were previously unserved—2.5 million people (two-thirds of Nairobi's population) cannot afford waste management services.⁶⁸ The enterprise also collects waste from mid-sized and large-sized households and commercial businesses. Lack of environmentally sustainable waste disposal options leads to a majority of the city's population either burning their waste or dumping it in unauthorized places. For waste that is collected, waste collectors in the city typically undertake one collection trip per day and spend 4-6 hours in long queues awaiting their turn to unload their trucks at the Dandora dump yard - Nairobi's official landfill. With over 200 trucks entering the dumpsite and disposing over 800 tons of waste on a daily basis, the landfill overflows into neighboring slums of Korogocho, creating severe health and environmental problems.⁶⁹ Mismanaged landfills, coupled with lack of sufficient formal collection services, and a dearth of uncontaminated recyclable waste were primary factors that led to TakaTaka Solutions' inception in 2011.

80 percent of TakaTaka's customers are low-income households and informal settlements in Nairobi, Kenya

⁶⁸ TakaTaka Solutions: How innovation in recycling saves water and lives, Grand Challenges Canada, Aug 2015

⁶⁹ TakaTaka Solutions: How innovation in recycling saves water and lives, Grand Challenges Canada, Aug 2015

TakaTaka Solutions employs local unemployed youth to collect waste and trains clients on effective ways to manage their waste using bin liners. Collected waste is transported to the enterprise's sorting facilities and manually segregated by staff, primarily women employees, into 40 fractions. The enterprise converts wet waste to organic compost in its composting plant and sells the various dry waste fractions to recyclers in Nairobi. In this manner 95 percent of the waste collected is recycled. This represents one of the highest recycling rates in the world (for example, the US has a recycling rate of 34.5 percent⁷⁰).

The enterprise markets its services directly to landlords of low-income informal settlements. It conducts door-to-door sales and proposes its services to landlords. Its marketing budget is minimal given the limited fee charged to customers. TakaTaka's experience of serving low-income customers indicates that they are willing to pay for waste management services. However, lack of awareness about best practices in waste disposal combined with weak policy enforcement related to waste disposal standards drives these customers to either illegally dispose their waste or subscribe to informal waste collection services that are marginally cheaper than TakaTaka Solution's service.

Financial Sustainability

The enterprise adopts a differential pricing strategy across customer segments to cross-subsidize the low prices it charges to low-income households. Its pricing strategy leverages on the fact that while low-income households are concerned about reliable collection, high-income commercial clients are interested in environmental impact. Accordingly, the company provides affordable collection services to low-income households and charges commercial clients higher prices by bundling value added services along with waste collection services, such as publishing CO₂ emission reports to help these clients track their carbon footprint. The enterprise conducts waste collection 9 times a month and charges low-income customers a fee of USD 1 per month per household. Mid-sized and large-sized households are charged USD 2-3 and USD 5-6 per month respectively. Commercial clients are charged a fee ranging between USD 100-1000 depending on the volume of waste they generate. Taka Taka also offers other services that commercial customers can subscribe to in addition to waste collection and sorting, such as requesting for monthly waste analytics reports providing details on their contribution towards carbon emission reduction.

TakaTaka employs 3 to 4 times more staff than typical waste collection companies in Nairobi to attain larger volumes of clean segregated waste that can be sold to recyclers

TakaTaka's primary competitors in low-income areas are informal waste collectors who offer collection services at USD 0.50 but dispose the waste illegally and not in designated landfills, creating further environmental issues.

TakaTaka incurs significant costs in salaries paid to staff involved in sorting activities. By employing sorters and composting staff, the enterprise typically employs 3 to 4 times more staff than other waste collection companies in Nairobi. This enables it to derive higher volumes of segregated and clean waste, which commands higher revenues from sale of recyclable waste to recyclers.

Labor costs incurred in collection, sorting and composting activities; purchase of bin liners; and fuel to operate waste collection trucks also constitute major costs. The enterprise owns 2 sorting facilities: the capital cost in maintaining the facility is USD 40,000 per facility of 20 tons daily input, operational cost incurred is USD 10,000 per month. It incurs capital costs of USD 350,000 to maintain 1 composting plant of 25 tons of input per day. In addition, the enterprise purchases premium quality waste collection trucks that are priced between USD 50000-USD 70000 per truck.

⁷⁰ Advancing Sustainable Materials Management: Facts and Figures, US Environmental Protection Agency

The primary sources of revenue include collection fees, sale of dry waste to recycling processors and sale of organic compost to small-scale farmers to help them improve soil productivity.

Impact

The enterprise collects waste from 12,000 households in Nairobi and surrounding counties, diverting 95 percent of the waste collected from residential clients and 100 percent of that collected from commercial clients from reaching landfills. It collects 470 tons of waste per month, enables recycling of 446 tons of waste per month and produces 50 tons of compost per month. TakaTaka has provided employment opportunities to 105 employees including youth and women in its waste collection, sorting and composting activities. It has saved 1,100 carbon dioxide (CO₂) emissions per year based on composting calculations alone.

TakaTaka provides over 9600 previously unserved low-income households formal waste collection services at affordable prices, creating significant environmental and health benefits

Challenges and Lessons

Waste management is perceived to be a public good and one where the benefits are not visible to customers. Low-income customers value reliable collection services but are not concerned about where their waste is disposed after it is collected. TakaTaka's model, despite being an affordable formal waste collection service, is more expensive than services provided by informal waste collection providers who dump the waste illegally; low-income households subscribe to these services instead.

CASE STUDY: WECYCLERS



Founding year: 2012

HQ: Lagos, Nigeria

Countries of operation : Nigeria

Orientation: For-profit

Employees: 82

Turnover: USD 200,000

Nigeria faces a waste crisis that will only worsen as the city's population grows. People living in slums and informal settlements lack access to formal waste collection and are subject to insanitary living conditions and prone to diseases. The overburdened municipal government of Lagos collects only 40% of the city's garbage and a mere 13% of recyclable materials are salvaged from landfills. On the other hand, recycling firms in Lagos face a supply constraint, operating at sub-standard capacities since they cannot access adequate supply of quality materials required for processing.

Wecyclers, in partnership with the Lagos Waste Management Authority (LAWMA) collects dry waste, sorts the waste and sells it to recyclers. The company provides door-to-door waste collection using energy efficient bicycles - 'wecycles'. It employs local unemployed youth in undertaking collection and sorting activities. Wecyclers rewards households with redeemable points, communicated via SMS, depending on the volume and quality of waste collected.

It has served over 11,000 households and has collected 525 tons of waste.



Operating Model

Wecyclers is a dry waste collection company based in Nigeria. The urban waste management company uses an SMS based incentive mechanism to encourage low-income households in densely populated settlements to dispose their reusable waste in an environmentally sustainable manner. Its model is geared towards solving the severe lacunae in Lagos' waste disposal infrastructure and debilitating recycling culture—a meagre 40 percent of waste in Lagos is collected by local authorities and a mere 13 percent of recyclable material is recovered for further processing⁷¹.

95 percent of Wecyclers' customers are low-income households

The enterprise identifies unemployed youth in low-income communities and hires them to be part of Wecyclers' collection and sorting activities. The youth are also engaged in spreading awareness about its services amongst low-income communities—they impart education about the ill-effects of improper waste disposal and provide knowledge on the benefits of using Wecyclers' reward based waste collection service.

⁷¹ <http://www.smallispowerful.fr/wecyclers-nigeria/>

Households register for the service and the team provides door-to-door waste collection services on a weekly basis. The company collects waste using low-cost bicycle-powered collection vehicles called “wecycles”. These vehicles are cost-effective, easy to operate and simple to maneuver through Lagos' traffic ridden roads and narrow lanes in informal settlements - Wecyclers' core areas of operation. Customers are not charged a fee for collection of waste, but instead are provided reward points that can be redeemed for household goods and electronic appliances. The process involves a web based point management system where in waste collectors weigh and assess the dry waste and input the data into the system, the points calculated thereafter are communicated to individual households through mobile text message updates.

The collected waste is transported to sorting hubs where it is sorted manually, typically by women employed by the company. Sorting and segregating the dry waste includes activities such as removal of labels, bottle caps and aluminum can contents to convert mixed waste into segregated fractions of recyclable material. The sorted waste is then sold to local recycling processors at prevailing market prices.

As a partner, the local government agency, Lagos Waste Management Authority (LAWMA), provides waste aggregation and sorting facilities and support in identifying potential areas of operation along with creating awareness about its model amongst low-income communities. The company also partners with corporate institutions such as DHL Nigeria and Unilever Nigeria in reaching more customers and promoting its model.

Financial Sustainability

The company's financial viability hinges on the consistency in sourcing quality material that it can continuously supply to processors. The team collects and sorts 500 kilograms—1 ton of waste on a daily basis. Households are provided redeemable points in exchange for their recyclable waste, based on the weight of the waste. For example, 1 kilogram of plastic would equal 10 points translating to 10 Naira, 1 kilogram of aluminum cans could fetch a household 20 points. Wecyclers sells the waste to recycling processors and earns revenues; 1 kilogram of plastic would be sold at 15 Naira. The company typically earns an 80 percent margin excluding the cost of collections, overheads and cost of waste sorting. At the start of its operations, Wecyclers purchased 25 collection cycles for USD 700 per cycle and procured software to manage text feeds.⁷² The company is not yet profitable and is currently supported by donors through grant funding.

The use of bicycles in its waste collection activities and rent-free government facilities to conduct its operations helps the company maintain low costs.

Impact

Wecyclers creates significant social, economic and environmental impact. It employs local unemployed youth allowing these youth to earn incomes that slightly exceed the minimum wage in the country - employees are paid an average salary of USD 150 per month, approximately USD 8 more than the minimum wage. The enterprise has created 50 jobs in Lagos, and has collected 525 tons of waste and prevented it from reaching landfills. Wecyclers use of energy-efficient bicycle collection vehicles enables easy access to underserved neighborhoods with minimal environmental impact.

Wecyclers' reward based model provides a source of improved livelihood for many low-income families in Lagos—a family on average receives USD 10 per month, roughly 20 percent of their total income, which they can use to buy household necessities. In addition, it helps its partner families to open bank accounts that they can use to receive Wecycler points or use for other transactions.⁷³ Wecyclers has received several awards including the Sustainia Award in 2014, Tech Awards in 2013, and SEIF Award for Social Entrepreneurship in 2015.

⁷² <http://www.smallispowerful.fr/wecyclers-nigeria/>

⁷³ <http://www.smallispowerful.fr/wecyclers-nigeria/>

Challenges and Lessons

The lack of awareness about responsible waste disposal practices and the benefits of recycling make it a significant challenge for Wecyclers to increase their customer base. However, the partnership with LAWMA helps in reaching more low-income households and creating awareness. The incentive based waste collection model requires significant financial support, which is in limited supply.