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39th WEDC International Conference, Kumasi, Ghana, 2016**ENSURING AVAILABILITY AND SUSTAINABLE MANAGEMENT
OF WATER AND SANITATION FOR ALL****A social business model for the provision of household
ecological sanitation services in urban Haiti***C. Remington, M. Cherrak, N. Preneta, S. Kramer & B. Mesa (Haiti)***BRIEFING PAPER 2529**

Traditional sanitation alternatives like pit latrines or sewerage systems are often unsafe, economically infeasible or inappropriate for low-income populations living in urban areas characterized by lack of infrastructure, high population density, a high groundwater table, and a subsequent lack of waste treatment. Since 2012, SOIL has launched a household ecological sanitation service, called EkoLakay, in several urban areas in Haiti. This program is showing promising results in providing a sustainable, attractive, and affordable sanitation solution for urban households. Customers pay a monthly fee of \$4-\$5 that covers the installation of the toilet and the weekly waste collection. Waste containers are brought to a SOIL composting waste treatment facility where the wastes are safely treated and transformed into a nutrient-rich compost. As of March 2016, Ekolakay serves 721 households, or 4000 users, in Port-au-Prince and Cap-Haïtien, and demand for the service continues to grow.

Introduction: sanitation in urban Haiti

Despite growing international recognition that sanitation has been the single most important health intervention in the past 150 years and constitutes one of the most basic human rights, 2.5 billion people (36% of the global population) still lack access to an improved toilet (Bosley 2007, UNICEF/WHO 2014). In Haiti, only 24% of the 10 million people had access to improved sanitation as of 2012 (UNICEF/WHO 2014), meaning the majority of people practiced open defecation, used plastic bags, or unimproved pits. Those with improved pit latrines and septic tanks often had them emptied into canals and other waterways, as no formal waste treatment facilities existed at the time. It is no surprise, then, that Haiti has the world's highest incidence of childhood diarrhea, accounting for 16% of deaths in children under 5 (WHO 2013, Fischer et al 2012) and is currently experiencing the largest cholera outbreak in recent global history (CDC 2011).

In the context of urban Haiti, similar to countless other urban areas in developing countries around the world, the more typical sanitation interventions like pit latrines and sewerage are not appropriate household options. Barriers include high start-up and investment costs, dependency on scarce water resources, lack of land tenure, and inadequate space. In addition, traditional options like pit latrines and pour-flush toilets attached to septic tanks are generally unsafe in dense urban areas where they tend to simply displace the public health risk by leaching pathogens into nearby aquatic systems, polluting available drinking water sources. As the world continues to experience significant urban growth, there is a need to develop sanitation interventions that are adapted to this context.

Sustainable Organic Integrated Livelihoods

SOIL (www.oursoil.org) is a US-based non-governmental organization working to promote ecological sanitation services in Haiti since 2006. Over the ten years since its inception, SOIL's approach has evolved from the provision of public urine-diversion toilets in urban and rural settings, including a strong emergency response in the aftermath of the 2010 earthquake, to developing social business models around specific ecological sanitation services. One of these services is EkoLakay, a household urine-diversion toilet service uniquely appropriate to dense urban settings where other sanitation options are often not feasible. This

service was launched in Cap-Haitien in early 2012 with the support of SOIL's partner, Re.Source (Tilmans et al 2015, Russell et al 2015), and then expanded to Port-au-Prince in 2015.

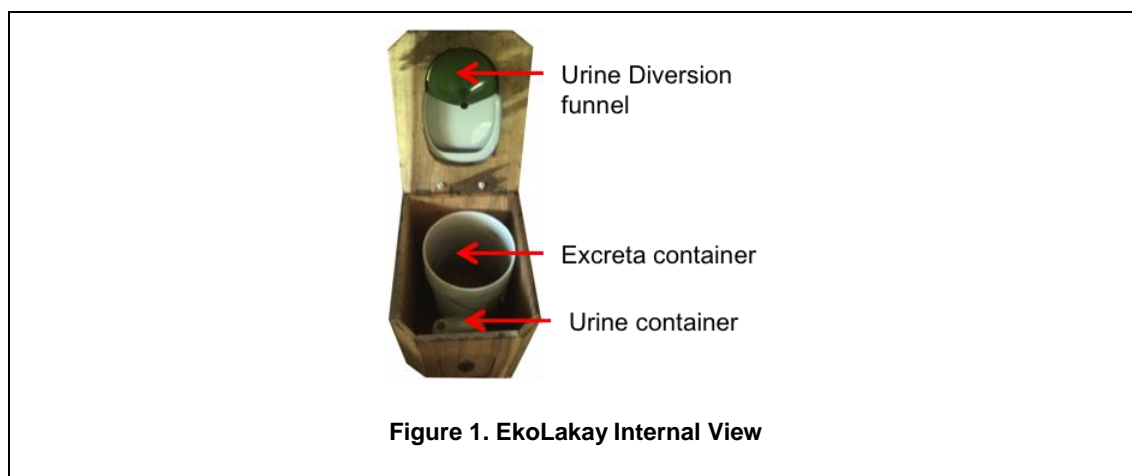
EkoLakay service overview

In areas where the EkoLakay service is being offered, customers can sign up for the service with their first monthly payment of 4-5 USD. This fee covers the installation of the toilet as well as weekly collection of filled feces containers, provision of a carbon cover material termed bonzodè, or "good smell," and final treatment at a SOIL composting waste treatment facility. All material is eventually transformed into nutrient-rich compost through a carefully monitored thermophilic composting process that meets the World Health Organization's standards for safe treatment of human waste (Preneta et al 2013). This final compost, branded by SOIL as Konpòs Lakay, is then sold to recover some of the costs of the waste treatment process.

Toilet design

The EkoLakay toilet is a urine-diversion container-based toilet, which houses both a 20L container that captures the excreta and a 3L container that captures the urine. The separation of urine and feces is achieved by the installation of a plastic funnel in the forward section of each seat (see Figure 1). Each toilet has a hatch in the front that allows customers to easily monitor the level of urine within the 3L container so as to avoid any overflows.

To provide choice to customers and to respond to needs of different areas, SOIL currently offers two different models; a wooden version that costs 50 USD to produce and a ferro-cement model that costs only 22 USD. All materials used to build the EkoLakay toilets are sourced locally. Both are pictured below in Figures 2 and 3.



Whereas the more expensive wooden toilet model allows for easy repairs by SOIL technicians and has been deemed more attractive by some customers, the lower cost ferro-cement model is more durable and better suited to contexts where flooding is a concern.

Marketing and sales

1. SOIL's marketing team uses a variety of strategies to generate demand for the EkoLakay service, including door-to-door marketing, open houses at the depots and offices, and referral marketing.
2. Interested individuals inform SOIL of their interest by calling the EkoLakay service number or by speaking with an EkoLakay agent in the field. Relevant information is collected and compiled into a main database.
3. Weekly, SOIL employees call the list of potential clients to schedule follow-up visits. These visits are used to verify interest in EkoLakay, that the location is within a service area, and that the space is suitable for installation.
4. EkoLakay staff sign a service contract with the head of household and the first month's payment is received. The toilet is installed for the customer, a GPS point is taken, and training is provided on proper toilet usage.

EkoLakay Service: collection and customer relations

1. Customers set aside filled and sealed containers for pick-up on a weekly basis (sometimes twice weekly). Door-to-door exchange of these containers for clean containers filled with cover material is carried out by EkoLakay staff.
2. Filled containers are transported by EkoLakay staff to centralized depots and/or pick-up points using modified wheelbarrows or three-wheel motorcycles (see Figure 4).
3. The Poopmobile (flatbed truck) transports filled containers from depots and pick-up points to the centralized composting facilities.
4. EkoLakay payment collectors visit customer households regularly to collect the monthly service fee, either by bicycle or motorbike.
5. EkoLakay staff perform visits to all clients on a rotating schedule to gather feedback on the service, to ensure toilets are being properly maintained, and to provide additional training on general sanitation and hygiene practices.
6. EkoLakay staff respond to maintenance and other requests received (e.g. additional cover material or repair of toilets).
7. EkoLakay staff cancel service contracts and remove the toilets of customers who have a debt of more than 2 months.

EkoLakay in numbers (as of March 2016)

- 721 customers (620 toilets in Cap-Haitien, 101 in Port-au-Prince), or approximately 4,000 individual users benefit from EkoLakay toilets as of February 2016.
- In February 2016, over 5,150 containers, or over 20.6 metric tons of total waste, were collected from EkoLakay customers' households and treated at SOIL's composting facilities.
- In 2015, the majority (91%) of new clients in Cap-Haitien were found by SOIL's marketing staff via direct marketing strategies, events and door-to-door promotion (see Figure 5).
- The average number of days between when a potential client expressed interest in EkoLakay and when installation occurred dropped to an all-time low of 4 days at the end of 2015.
- From August 2014 to the present, payment rates for customers in Cap-Haïtien have been above 90%, while in Port-au-Prince they are over 80%.
- SOIL has sold more than 100 metric tons of compost to date and are currently selling out of the approximately 4 metric tons per month produced.



Figure 4. Three-wheel motorcycle

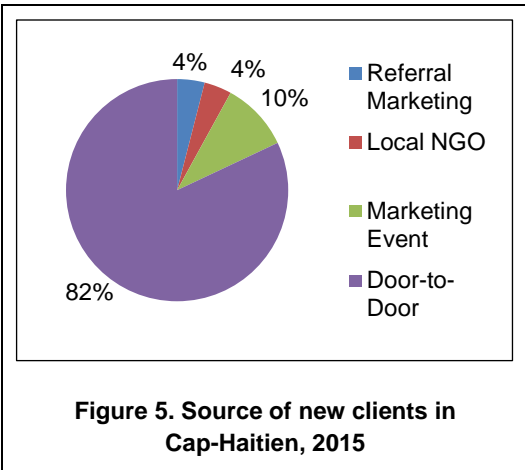


Figure 5. Source of new clients in Cap-Haitien, 2015

Social business development

Given the well-known challenges of long-term sustainability within humanitarian sanitation projects, SOIL has approached the EkoLakay program from a social business perspective. Our research over the past 3 years has focused not only on developing the product and the service, but also on carefully documenting the costs and revenues. Although this research is still in the early phases and the figure is likely to change dramatically as we optimize our processes, we are able to share an initial breakdown of costs for each part of the EcoSan cycle with the intent of generating dialogue among sanitation practitioners. On a per household basis the monthly cost of the service is approximately 20 USD, this cost includes toilet provision, transport and waste treatment. With customers paying a 4-5 USD monthly service fee and compost sales per household equaling roughly 1.60 USD per month, SOIL is currently able to cover an estimated 30% of the overall costs of the service, from toilet provision through waste treatment. The breakdown of the costs for each part of the cycle is shown in Figure 6. It is important to note that the primary cost driver is the waste treatment component and when this component is removed the EkoLakay service is nearly profitable even at the current scale of operations. This cost analysis will be further refined and the processes optimized over the coming year, with the goal of developing a sustainable business model for the ongoing provision of these services. This early data suggests, however, that it may be necessary to subsidize some of the costs of waste treatment, as is generally the case in developed countries with well-established sanitation infrastructure.

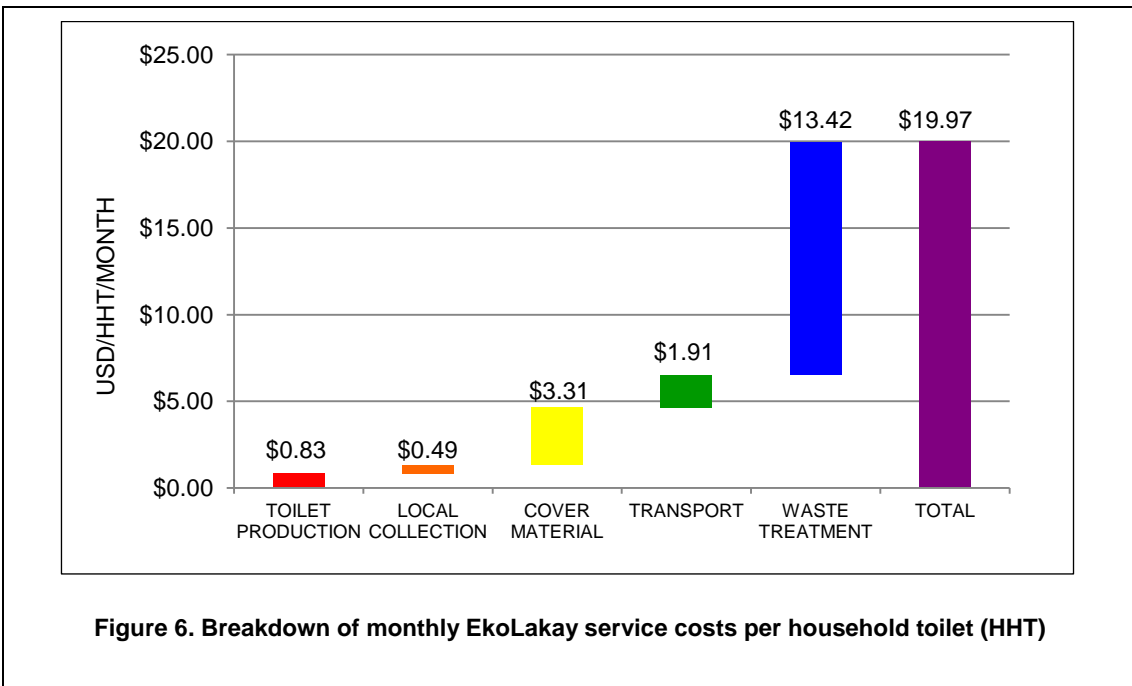


Figure 6. Breakdown of monthly EkoLakay service costs per household toilet (HHT)

Challenges

- **Monthly Payment Collection:** Monthly fees are collected by EkoLakay agents via door-to-door visits, which require significant staff time and costs. Customers regularly struggle saving money for collection day, so multiple visits are often required and face to face interactions with clients increases payment rates.
- **Container Collection:** SOIL has successfully increased density within priority service areas, but low-priority zones grandfathered in and characterized by a low density of clients have a higher per household expense of waste collection.
- **Data Management System:** While the number of clients has increased four-fold in the last 2 years, SOIL continues to rely on an ever-increasing database of separate spreadsheets to collect and manage related information ranging from payments, bucket quantities, maintenance requests, and marketing and sales information. This system is user-intensive, frequently redundant, and ill-equipped to deal with the quantity of relational data we collect.
- **Household Identification:** Customers are often located in dense informal housing settlements. As new clients are signed on to the EkoLakay service, they are identified by a GPS point and a member of the collection team is present to develop a more qualitative understanding of location. Servicing of the individual households currently relies heavily upon the memory and intuition of the collection team members, which will become infeasible at scale.
- **Sourcing of cover material:** Ecological toilets are dependant on a reliable source of organic matter to serve as a cover material in the toilets and a bulking agent in the composting process. The sourcing of this material can be challenging as there are many competing uses for organic materials. As such this constitutes a significant challenge for expansion and should be considered carefully as part of the scale up plan.

Lessons learned

- There is significant demand in the urban Haitian context for the EkoLakay service, both as a sanitation option where few options exist (Cap-Haitien) as well as a preferred sanitation option where latrines and pour-flush toilets are common (Port-au-Prince).
- Despite the majority of customers coming from some of the poorest areas in Haiti, SOIL has found a high willingness to pay for the EkoLakay service.
- Coordination and regular reporting of progress to DINEPA, Haiti's branch of government responsible for water and sanitation, has ensured that the EkoLakay service adheres to the current national sanitation strategy.
- Although a small percentage of customers have benefited from subsidies from local companies or organizations, SOIL has found that these customers do not maintain their toilets as well as those who are responsible for the full cost.
- Periodic door-to-door customer visits by EkoLakay staff are an efficient way to monitor how the toilets are being maintained, understand customers' hygiene practices and behavior, and receive feedback to improve upon the service.
- Although there are certain benefits to working closely with community based organizations (CBOs) to introduce EkoLakay in new service areas, SOIL found that CBOs' own interests and expectations differ from EkoLakay service goal, creating risks to the EkoLakay program. As a result, any collaboration with CBO's require signed agreements that clearly state responsibilities towards each other in relation to the EkoLakay service and its clients.
- To increase payment rates, a strict policy to deal with clients that fall into unacceptable levels of debt must be followed to avoid others following suit. SOIL currently relies on a rental model where the toilet is removed from the household after 2 months of nonpayment.
- To limit costs associated with transport, SOIL has prioritized a local collection model that uses a depot as a distribution/collection site, and lower cost vehicles (e.g. modified wheelbarrows and 3-wheeled motorcycle) for container collection within the neighborhoods. The depot serves as a storage area for waste buckets to ensure that transfers to the waste treatment sites happen only when the Poopmobile can be filled to capacity.
- In order to lower the marginal cost and maximize the impact of the EkoLakay service, SOIL has defined service areas and only accepts new clients from within them.
- The transition from a non-profit mindset to a business approach can be challenging for staff, SOIL has provided multiple trainings on business development for key staff to facilitate this transition.

Conclusion

The EkoLakay toilet and associated service has proven to be an aspirational and appropriate technology for urban households in Haiti. Although SOIL's EkoLakay service has yet to achieve profitability for the full sanitation cycle from toilets to waste treatment, it is promising to see that the current costs of toilet provision can be fully covered by user fees. In the coming years, SOIL will focus on recovering a higher percentage of the entire sanitation cycle's costs through economies of scale, process optimization, and increased service efficiency through the development of alternative payment options, methods of household identification and tracking, and creation of a relational database. Through an open source design process and transparent data analysis, SOIL hopes that this work will not only increase sanitation access in Haiti, but also serve as a model for household sanitation services in informal urban settlements around the world.

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Note/s

ⁱThe service fee currently varies by city, with a fee of 4 USD in Cap-Haitien and 5 USD in Port-au-Prince

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