

## X-RUNNER

This case study was prepared in collaboration with X-Runner and Eawag.



<b>Project</b>	X-Runner and sanitation in Peru
<b>Organization</b>	X-Runner Venture
<b>Geography</b>	Lima, Peru
<b>Areas</b>	Urban
<b>Solution</b>	Individual
<b>Date started</b>	2012
<b>Stage</b>	Pilot
<b>Scale</b>	76 households (380 people)



X-Runners users. Source: [www.grandchallenges.ca](http://www.grandchallenges.ca)

## Project description

### History of organization

X-Runner Venture is a social enterprise launched in 2011, which introduced mobile, easy-to-install, water-free toilets to private households in urban slums of Lima (Peru) in 2012. The initial approach has been refined and X-Runner since November 2013 has been piloting an improved toilet design, branding and pricing strategy, as well as servicing operations. X-Runner has received a grant from Borealis and two Swiss Foundations, among others. Currently, X-Runner sells and installs about 6 toilets per week.

### Value proposition and profile of customers

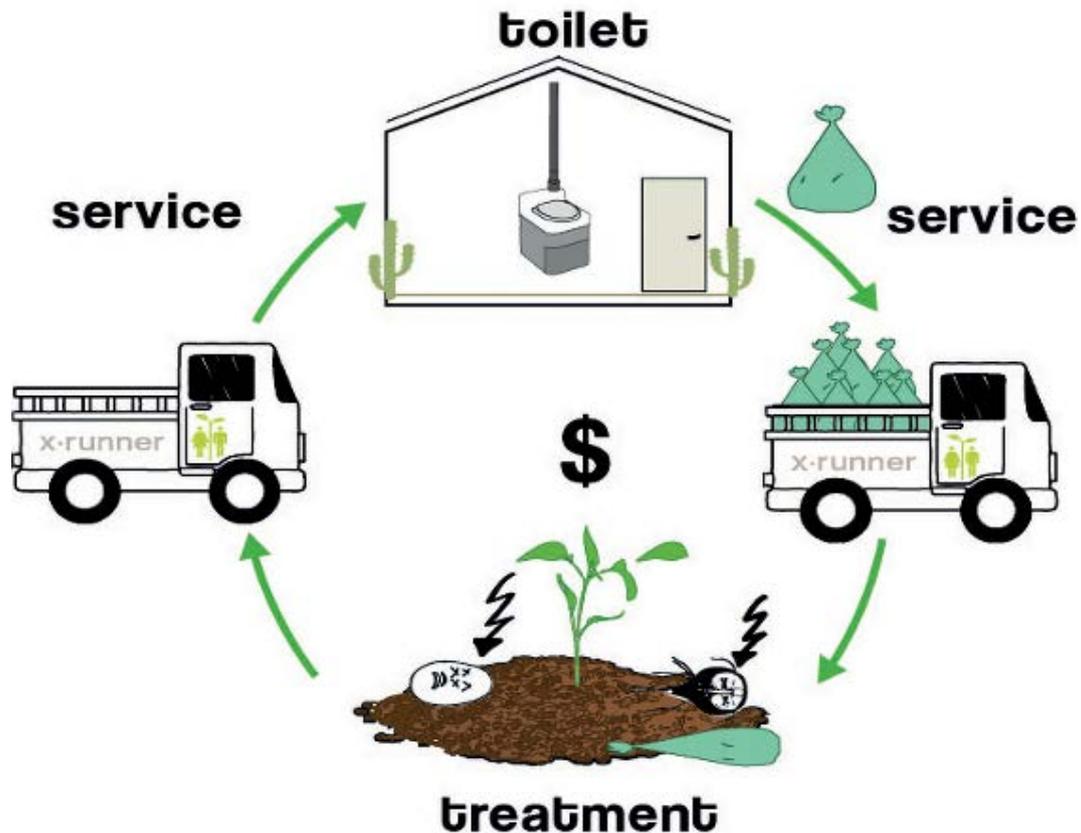
X-Runner rents home mobile toilets to urban slum families and provides them with weekly waste collection services. The waste container is collected once a week in front of the family's home by a pick-up service and replaced by a clean one. X-Runner charges families a service fee of \$14 per month for the collection of containers and the provision of sawdust, a smell neutralizer. The toilet remains the property of X-Runner. There is a small up-front toilet investment for households of about \$18 (payable either in 1 or 4 installments). This helps to ensure that only serious and trustworthy households with a more or less stable income will enter the service agreement. The expansion phase is being carried out in the community of San Juan de Miraflores, where X-Runner is now using biodegradable bags inside the containers that families carry to a local collection point.

The waste collected is stored and treated in a compost site. This compost could potentially be sold to third parties, including municipalities. There has been interest in buying the compost and potential demand seems to be emerging. To meet this demand, the quality of compost processing is currently being improved and studied together with the National Agrarian University of Lima.

The target customers are typically households without access to a sewage system and whose pit latrines cannot be used anymore (either because they are full or have broken down) and who are eager to switch to a new system. Early adopters are people with stable and predictable incomes who usually have small children, they are tired of their latrines and they usually have a large number of people in their homes. Their houses have multiple rooms and sufficient space to locate the toilet. The average income of a client family is about \$500 per month.

Compared to pit latrines, the X-Runner solution can be more expensive (depending on the type of construction and assuming no financing solution). However, it presents many advantages to its adopters, it is an excellent toilet, has little upfront costs, convenience, cleanliness, and hassle-free servicing.

## Value chain



\* X-Runner is currently experimenting collecting waste in biodegradable bags to avoid cleaning and handling of containers.

### Manufacturing operations

The toilets by X-Runner are manufactured (automated production) locally in Lima. The manufacturing cost of the toilet is approximately \$200 for a manufacturing batch of 500 toilets.

The estimated production capacity is up to 2,000 toilets (based on the 3 molds that X-Runner currently has). With the current toilet manufacturer, the production costs will remain at the current level of about \$200. Lower manufacturing costs can only be achieved through a higher-volume production.

The new biodegradable bags used for the new collection system are produced in Chile. X-Runner currently buys the bags at \$ 0.37 piece. Sawdust costs about \$1 per month per family.

### Marketing & sales strategy and organization

X-Runner promotes its branded toilets via the following strategies. Firstly, 'guerrilla' marketing (which creates attention through stickers, graffiti art, and posters displayed in the community). Secondly, community events (where

sales staff undertake product demonstrations and explain the service to their potential clients) and finally through promotions in the street (by distributing brochures, stickers and T-shirts to potential customers).

During these events, potential customers register on a waiting list and are then contacted by sales staff who visit them at their homes and explains the toilet, service agreement and payment arrangements. If the customers are convinced about the X-Runner solution, they sign a contractual agreement with X-Runner that describes the service, outlines respective expectations on payments and the terms of the agreement. The customers also receive payment instructions and a payment record book.

X-Runner is also considering giving incentives to customers for referrals, as it seeks to encourage word-of-mouth.

At this early stage, the sales staff are paid a fixed income and the work is done in teams. X-Runner is exploring motivation schemes to reward sales staff individually.

## Installation

The toilet comes assembled by the production company, so customers do not have to do any additional work. A team of X-Runner installers undertake the installation of the toilet at the family's home, which requires a urine pipe to be connected to a soak pit and a ventilation pipe to be connected to the roof. The average installation time is less than 30 minutes. Installation teams consist of young men with basic technical skills.

## Cash/ payment collection

The small upfront investment and the monthly fees are either collected by X-Runner sales staff or customers can pay at bank agents of the largest Peruvian Bank, BCP. Payments are due monthly and customers receive an invoice every month to remind them of the amount payable.

## Usage and hygiene

Consumers clean the toilet and the container (when using waste bags). There is no specific maintenance necessary and customers can call X-Runner when difficulties occur.

## Waste storage and collection

With the new collection scheme being trialed in San Juan de Miraflores, households are asked to carry the buckets containing their solid waste (which is enclosed in the biodegradable bags) to a local collection point once a week where a truck comes by to collect their buckets. Walking to the collection point takes about 1 to 5 minutes. The X-Runner collection staff retrieves the bags and returns a clean empty bucket with new bags. The truck then transports all the collected bags to the local composting plant for processing, where they are emptied into a large compost pool. The collection team is comprised of 2 to 4 young men.

## Waste treatment, disposal and recovery

Together with the National Agrarian University of Lima, xX-Runner is testing ways to produce safely treated compost by heating it over a period of three months. X-Runner has not yet marketed its compost.

## Technology

### Description of the toilet-related technology

#### Key features

- Design: Portable dry toilet, made out of fibreglass. It has 5 main components: a urine-diversion and draining system, a container for solid waste collection (containing a biodegradable bag for the new collection system), a manual dry flushing system with saw-dust, and a ventilation pipe.

- Durability: Lifetime estimated at 5 to 10 years.
- Installation needed: No installation needed but for the urine diversion and ventilation pipe.
- Water and energy efficiency: No electricity needed. Saw-dust is flushed manually with a handle.
- Malodors and safety: With the sawdust, evacuation pipe and closed compartment, bad smells and insects are avoided for at least a week.
- Waste storage: Urine and feces are handled separately. A closed compartment under the toilet seat keeps gases out and directs the urine away from the solid waste container. Urine can either be drained onto the ground or collected in a plastic jug to be reused. The container is closed.
- Waste collection: The toilet has a removable sealable waste tank, which can easily be removed and handled by the customers. Containers stack up for transport and storage.
- Potential, limitations: The dry toilets allow for composting if used well, but do not work if water is added; a cool climate in peri-urban area enables the limitation of smells, but this can be challenging in countries with a warmer climate. On the other hand, the design of the toilet does not allow for any interface between the customer and the waste, this makes it safer and easier to handle.

### Description of by-products-related technology

#### Key features:

Off-site composting site, which has the capacity to store waste of up to 1000 households. The manure is kept and aerated manually for 3 months, until it is converted into safely treated compost.

#### Requirements, limitations and improvements:

The processing requires that the compost stays a temperature of 60-70°C, but this is a challenging requirement and it is difficult to reach fermentation level. Continuous improvement strategies at the composting site have been initiated in 2013. These include building a roof over compost piles, improving the grounds under the compost and testing innovative ways to increase the temperature.

#### Economics:

Currently, compost is worth \$1 per kilo. The goal is for the compost revenues to cover the cost of processing.

## Social impact

- **Penetration:** So far 76 customer families (i.e. almost 400 users) are using X-Runner toilets (or a penetration of 3% in the target area where they operate). X-Runner aims to reach 500 families by the end of 2014.
- **Acceptance and usage:** Over the last year, X-Runner registered only one drop out, where a family has started to build their own pit latrine. In case of delayed payments, the policy is to charge penalties and after two weeks of non-payment the toilet is removed.
- **Customer satisfaction:** Workshops and discussions with existing users suggest a high level of customer satisfaction.
- **Evidence of impact on health:** No impact study held so far.
- **Promotion of related behaviors:** None for now. X-Runner is considering introducing the sale of hygiene products (e.g. soap).
- **Waste collection and disposal strategy:** The toilets remain the property of X-Runner and are removed in case of non-payment or improper use.

## Economic sustainability

### End-consumers

- **Affordability for end user:** Customers have to pay an upfront investment of \$18 and the monthly service fee is \$14. The service charge corresponds to about 3% of the household average income of the targeted population. Compared to pit latrines, which cost on average \$465 to install (estimated life time of between 6 months and 3 years), and about \$65 to \$70 to maintain and empty per year, the X-Runner solution is more expensive. The prices have been estimated through qualitative assessment of the willingness to pay for sanitation services.
- **End-consumer financing:** No financing required. The percentage of on-time payments has increased from 40% to nearly 90% between April and July 2013.

### Main organization

It is estimated that X-Runner needs at least 500 households to cover its direct costs (excluding SG&A). The production of 1500 toilets would enable X-Runner to cover all its costs (direct costs and SG&A).

## Innovations

- A convenient and well-branded product that looks like a “real” toilet, it uses sawdust and is well-adapted to households in dense urban areas that are not connected to a sewer system (for whom the only alternative of pit latrines is expensive, poorly maintained and not sustainable in the long term).
- A quality service-based model (rather than selling a product) which ensures regular revenues and avoids high up-front investments for the end-consumer.

## Remaining hurdles and bottlenecks

- The production of compost fertilizer is challenging given the small size of the company, which restricts the purchase of efficient production technologies.
- The personalized door-to-door service has been adapted to collection points since it allows for higher efficiency. The main challenge in the new collection method is how to ensure that both staff and customers deliver on time.
- In order to reach a higher scale of customers, marketing and commercial strategies would need to be further developed (e.g. incentives, rewards, customer feedback).

## Contact information

Isabel Medem, CEO & co-founder:  
isabel.medem@xrrunner-venture.com

Jessica Altenburger, Founder & Head of R&D:  
j.altenburger@xrrunner-venture.com

## Appendix

Sources: [www.xrrunner-venture.com](http://www.xrrunner-venture.com), [www.xrrunners.wordpress.com](http://www.xrrunners.wordpress.com), [forum.susana.org](http://forum.susana.org); interview with X-Runner team and visit to site operations in January 2014

**Exchange rate:** 1 Peruvian Sol = 0.35 USD

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