

Appropriate Technology

Incorporating
Agriculture and Equipment International
International Agricultural Development



Bicycle power

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International

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Development

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The publishers gratefully acknowledge the support of regular bulk subscribers to Appropriate Technology including, Misereor, CAFOD, ITDG, Peace Corps and VSO.

Front Cover: Myriam is physically disabled and is now employed as a bicycle mechanic at Ability Bikes Co-operative, Ghana. Ability Bikes imports used bicycles and mobility aids from partners in North America and the United Kingdom, and refurbishes them for sale. *Credit Re-Cycle (see page 45)*

New rotating composting toilet

Composting toilets, which use the aerobic process to treat excreta instead of flushing with water, have been in use for many years. Toilets for People, a startup based in Brooklyn, has developed an affordable, sustainable composting toilet targeted at people in the developing world. Currently under test in Peru, Haiti and El Salvador, Jason Kass describes his design known as the CRAPPER – the Compact, Rotating, Aerobic, Pollution Prevention Excreta Reducer.

Across the tropics, there are over two billion people who do not have access to a decent toilet, which works. One in three people in the world are regularly faced with the choice of using overflowing pit latrines or defecating in the open. The consequences to public health, safety and economic prosperity are dire.

In April 2012, I was in one of those places in rural El Salvador. I was using concrete to build latrines above ground with Engineers without Borders. An early rainy season washed away the roads and any hopes of materials being delivered. But we had promised toilets to several families, so I started brainstorming alternatives. At my home in Vermont, I have been using a composting toilet for years, so I decided to replicate that \$1500 model using locally available materials. Three days later we had a prototype of the CRAPPER and the idea for Toilets for People (TfP) was born. (see box)

Many design tweaks later, we think we've landed on something pretty great: An attractive, privately owned, indoor composting toilet, which costs under \$200 per unit. TfP has applied the same composting toilet technology that has been the industry standard in North America and Europe for decades and made it available for the first time to people in the developing world.

Our innovative design allows people in developing countries to enjoy the close-to-home toilet convenience, which we Westerners take for granted.

Here's how it works:

Our design starts with a composting barrel that spins, much like a garden composter. When the drum spins, the waste is aerated, which is essential for the micro-organisms that eat the waste and make the compost. The user just needs to add dry cover material - dry

leaves, saw dust or peanut husks work perfectly--after they use the toilet. The composting process reduces the volume of waste by 80 per cent, mitigates odors and reduces the presence of dangerous pathogens.

When the drum gets full—after a few months, depending on usage—it's time to empty some compost out. The drum is spun with the waste door open so some of the waste falls out into a bucket underneath. The compost is left in the bucket for three months until the next time the drum needs to be emptied. At this point the compost in the bucket is ready and can be safely buried outside with wood ash added as a disinfectant.

The addition of wood ash when burying the compost is an extra precaution to disinfect any remaining pathogens in the waste. Many families in developing countries cook with wood or charcoal, so they have easy access to ash. Then, the last step is just to cover the hole over with soil. Wood or

charcoal ash naturally has a high pH, which creates a caustic environment that kills the pathogens.

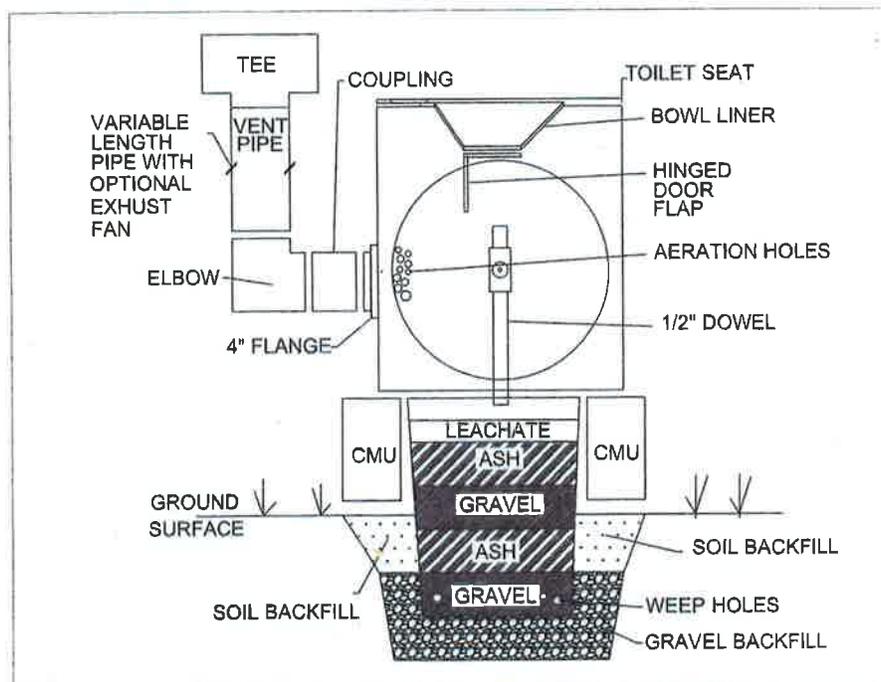
This innovative three-step treatment process, which employs biological (aerobic composting in the drum), physical (drying out the compost in the drop down chamber) and chemical (burying the compost with caustic ash) processes, turns disease-causing, pathogen-rich human poop into a safe waste product that can be disposed of without impacting the environment or causing disease.

Design

The CRAPPER is a self-contained, horizontally mounted, rotatable bio-drum based compost toilet. The design maximises aerobic degradation to dramatically reduce waste volumes and is odourless thanks to ventilation. The drum housing is designed to allow for safe, sanitary and easy access for the removal of excess compost when the chamber becomes full.

These composting toilets can be located near the family's home providing for safe access for all family members and friends. The toilets come with recommendations regarding where to optimally locate the compost toilet to maximise light and ventilation.

Public toilets often fail to remain



A drawing of the CRAPPER

clean and functional without someone in charge to take responsibility for upkeep. For this reason, we recommend our toilets be purchased by families and privately owned. Routine maintenance of the toilets involves spinning the toilet three times weekly and emptying it once every three months. These tasks are easy and straightforward but there needs to be a designated person to take care of it, like anything else. The CRAPPER can also be installed in churches, schools and other institutions with designated maintenance staff to take up these responsibilities.

During the first half of 2014, TFP will continue to deploy the CRAPPER in the field by partnering with respected non-profit organisations. Through our partner in-country NGOs we will train locals, especially women, how to build CRAPPER composting toilets using this open-source technology for their own families or as a money-making enterprise.

Once the toilets are in place, we will follow up intensively with the users to get feedback on the current prototype.

Toilets for People

Toilets for People ("TFP") is a social business working to improve sanitation in developing countries. It focuses on low-middle income residents of rural, peri-urban and transitional (refugee) communities in the developing world that live in places where pit latrines and flush toilets are impractical or simply don't work.

TFP developed the first affordable, self-contained composting toilet system that enables owners to dispose their waste cleanly and conveniently and experience the privacy, comfort and safety that communities in the developed world have enjoyed for more than a century.

Founded in 2012, TFP was a finalist in Wharton's 2013 Social Venture Business Plan competition and took third place in a Social Entrepreneurship contest in 2013 at the Massachusetts Institute of Technology.

Our long-term vision is to achieve scale by manufacturing the product in plastic. The lighter weight and easier to mass produce durable plastic model will also be easier to ship and rapidly deploy to service the immediate needs of our disaster relief clients. Another TFP goal is to utilise in-country factories and store outposts near our clients in order to generate new jobs in the communities we serve.

Field trials

CRAPPER toilets are now under test in Haiti, Peru and El Salvador. It is expected a full appraisal of how well they are working will be available later in 2014.

For more information contact Toilets for People, 394 Broadway, 5th Fl., New York, NY 10013, USA. Tel: 617-233-5058; email: info@toiletsforpeople.com; Web: www.toiletsforpeople.com



The CRAPPER. The handle in front is used for rotating the drum, and the waste is removed at the side.

Credit Toilets for people