Turning Waste into Resources May Save Haiti

For 14 years, Marline Jean did not have a toilet in her home. She used one of the many ways residents of Cap-Haitien without toilets relieve themselves: pit latrines, open defecation, or the “flying toilet” method, where excrement-filled plastic bags are thrown into ditches or trash piles.

Even in the Haitian capital 156 miles away, only 33.7 percent of Port-au-Prince’s 3 million residents have access to improved sanitation facilities, like toilets or latrines, according to UNICEF. The toilets that are available usually empty, untreated, into rivers.

Now, when Jean climbs the wooden ladder to her concrete roof, a blue plastic port-o-potty houses her composting toilet. Ten feet away, she has a garden where she grows vegetables, the soil a rich and fertile product of the toilet.

It is urban gardening, on a small scale.

“I am very happy about getting this garden and this toilet, because everyone who comes here and goes to use the toilet always have a lot of questions about it,” said Jean. “Some don’t even believe that this is possible.”

Her composting toilet is a form of ecological sanitation and works to prevent pollution, make urine and feces safe for reuse, and create safe products for agricultural purposes in a country with little sanitation infrastructure.

The problem with poor sanitation is that it piles up. Plastic bags burst open and poorly maintained latrines overflow. Trash clogs drainage canals and when it rains, as it often does suddenly and heavily in Haiti, it creates a slow river of sludge that spills onto streets.

Haitian resident and humanitarian worker, Joanne Gaillard, said the topic of sanitation in Haiti is two-fold: public sanitation and sanitation in homes.
“When I first came to Haiti, I stayed in a home that had an actual toilet, but the only way it could be flushed was by pouring water from a bucket directly into the bowl,” said Gaillard. “The closest water source was a mile away so the toilet was probably flushed once a day.”

For communities with latrines, bayakou, or Haitian underground sanitation workers, come in the night to desludge them—a stigmatized but necessary and dangerous job that until recently went unregulated.

Another issue is groundwater contamination according to Mohamed Ibrahim, author and professor at and Hunter College specializing in sustainable development, water supply and sanitation education.

“This happened in Khartoum, the capitol of Sudan,” said Ibrahim. “The whole eastern part of the city cannot use groundwater because the siphons and pit latrines contaminated it.”

Because of this contamination, many Khartoum residents are forced to drink insufficiently treated water and, according to the U.S. Agency for International Development (USAID), this shortage of potable water leaves two-thirds of the city not supplied with water.

Deadly, contaminated water lead to a cholera outbreak in Haiti in October 2010. The outbreak spread through the fragile country just 10 months after a 7.0 magnitude earthquake killed approximately 300,000 people and displaced another 1.5 million.

The largest cholera epidemic in modern history, which the U.S. Centers for Disease Control (CDC) states almost certainly came from infected United Nations Nepalese peacekeeping contingent, killed more than 8,500 Haitians.

“Cholera is a disease that causes severe, watery diarrhea,” said Dr. Edward Ryan, director of the Tropical and Geographic Medicine Center at Massachusetts General Hospital and professor at Harvard Medical School. “When the person has the diarrhea, the stool that comes out is very heavily laden with millions and millions of the bacteria that cause the infection, and if that diarrhea contaminates something else—whether it’s the water supply or food supply, then that’s the way cholera spreads.”

The outbreak was traced to inadequate and poorly maintained toilets in the Nepalese UN camp in the mountain town of Mirabalais. The bacteria-laden fecal matter leaked into the Meille River, eventually flowing directly into one of Haiti’s main waterways.
In 2014, cholera continues to infect an average of 385 people per week, according to the Pan American Health Organization (PAHO). Besides linking to areas of poorer sanitation, a lack of access to swift medical care is the cause of many cholera deaths.

“You shouldn’t die of cholera,” said Dr. Ryan. “When you actually look at who dies of cholera and what they die of, they actually die of dehydration.”

To date, the United Nations has claimed immunity, a position that is backed by the U.S. government. In a press briefing on December 12, Stephane Dujarric, spokesman for the UN secretary general commented on the ongoing epidemic.

“The legal position of the UN on this case has not changed,” said Dujarric. “That being said, the UN continues to be very involved jointly with the government of Haiti to work on the cholera issue in Haiti, to work on rebuilding the sanitation system.”

Even though the UN was negligent in how it managed its troops’ waste, the epidemic still highlights the need for sanitation and water infrastructure. Before cholera, diarrheal diseases were still the leading cause of death in children. According to the World Health Organization, a significant percentage of diarrheal disease can be prevented through safe drinking-water and adequate sanitation and hygiene.

The UN opened Haiti’s first sewage treatment plant in September 2011 in Morne á Cabrit, but it soon closed for maintenance due to lack of operational funds. Port-au-Prince’s first government-run sewage treatment plant was built in April 2012; its capacity of 900 cubic meters of water a day can only benefit a third of the population.

”The cholera epidemic is forcing us to understand is important and meaningful the implementation of this treatment unit,” said Haitian President Machel Martelly at the plant’s inauguration.

A cholera outbreak in London in 1854 led to the creation of the toilet and the world’s first modern sewage system. After surgeon, John Snow, did mapping of the illnesses, he found that the majority of deaths were clustered around a water pump used at the time on Broad Street. He petitioned the local parish to have the pump handle removed and the illnesses decreased.

In New York City, an epidemic in 1832 left 3,515 dead. Boston suffered from an epidemic in 1849 that left 611 dead in five months, according to the Boston Medical and Surgical Journal. These outbreaks arrived to major cities by sea ports and railways and hastened sanitation and public health improvement in the United States.

In the years following the New York outbreak, the city ordered water commissioners to create a plan for aqueducts to bring clean water into the city. By
1884, the Calf Pasture Pumping Station Complex and Moon Island treatment facility were open and functioning in Boston, greatly reducing the transmission of waterborne diseases in the city.

“At the end of the day, it’s a sin that anybody dies of cholera because it means that some very basic sanitation and water metrics were not met,” said Dr. Ryan.

Composting toilets are an easy to build and a waterless way to prevent human waste from contaminating groundwater or rivers. When fully composted properly, at temperatures that can reach 160 degrees Fahrenheit (71 degrees Celsius), excrement becomes fertile soil. It also offers a cheaper option than the construction of latrines that are often too costly for citizens that make $1 to $5 a day.

The ecological toilet on Marline’s roof and in over 2,600 homes in Haiti comes from SOIL (Sustainable Organic Integrated Livelihoods), a Haiti-based nongovernmental organization.

The toilets, called UDDTs or urine-diverting dry toilets, contain a 5 pound bucket that catches solid waste and a smaller 1-pound container for urine. Families can either dispose of the urine, as it is sterile, or dilute it and use it as garden fertilizer.

It is a social business pilot in sustainable sanitation services that treats 240,000 gallons of waste each year.

Sustainability and using local resources, Ibrahim said, is the only way widespread infrastructure problems can be tackled, and SOIL uses local materials and builders to construct the boxes and receptacles.

Their service includes a biweekly collection of the human waste from its dry toilets for 200 gourde a month, or $2USD.

“That covers renting the toilet itself which is made by local carpenters,” said SOIL program manager Erica Lloyd. “The other thing it includes is cover material that is used to ‘flush’ the composting toilet.”

Sugarcane bagasse, or plant parts left over after rum processing, dirt and ground peanut shells act as cover material. This mixture covers waste after each use and eliminates odor.
“We call it bon odé, which is creole for good smell,” said Lloyd.

After a truck comes to collect the buckets, it travels to Konpòs Lakay, or SOIL’s compost treatment site. The site does have a good smell, unlike most waste treatment plants that house feces. It smells like sawdust and dirt, thanks to the bagasse and peanuts.

Newly arrived buckets are dumped in the first 15 square meter container for raw incoming waste. When the container is full, it is left for a month while thermophilic microorganisms go to work breaking down the material. After a month, the container is turned and aerated and this process continues for three more months. After month four, the material is placed in an open bin of compost where the high oxygen levels promote further decomposition for three to five months.

“In our first experiment it took us nine months to make compost,” said SOIL agricultural coordinator Job Etienne. “Now because we turn it so often, the process takes about eight months.”

Throughout the process, the compost is tested at various times and depths to make sure temperatures stay at a minimum of 122 degrees Fahrenheit (50 degrees Celsius).

“We also take samples and are constantly lab testing for E. Coli, an indicator pathogen,” said Lloyd. “We have a whole sanitation protocol to make sure we are not tracking pathogens back into the community.” SOIL also tests for coliform bacteria, a commonly used indicator of water and food quality.

At the end of eight months, in a different bin sits rich, completed soil. It is high in minerals, free of odor and pathogens. Etienne said he wants to show Haitians that something that so many think is a bad thing actually has tremendous benefits.

SOIL’s household garden project, known as Jaden Kay, teaches Haitian residents how to use the compost to grow even in the smallest available space.

SOIL is based in Port-au-Prince and Cap-
Haitian. In the Petite-Anse neighborhood of Cap-Haitien where Marline Jean lives, 72 percent of residents use open defecation to relieve themselves.

“EcoSan offers a solution that you can start now in Haiti,” said SOIL co-Founder and Director Sasha Kramer. “You don’t need billions or huge construction and you come away with a useful product from waste without using up valuable water too.”

The current sanitation crisis in Haiti is due to neglect, a history of crippling debt and underinvestment. Haiti’s ability to focus on its’ infrastructure and development was significantly hampered by financial obligations spanning centuries. After gaining independence in 1804 after a slave revolt, France forced the Haitian government to pay France 150 million Francs as compensation to the nation’s former colonizers. Earmarked as compensation for property lost, the bankrupt Haitian government was forced to ask France for loans to pay the debt. Even though the amount was reduced to 60 million Francs, without interest, it still took Haiti another 50 years to pay off the debt, in 1947.

Under a 30-year Duvalier family dictatorship between François “Papa Doc” and his son, Jean-Claude “Baby Doc” Duvalier, the nation further accumulated $900 million in loan debt, with little of the funds benefitting the people of Haiti.

After Jean-Claude’s departure in 1986, the transition to democracy halted progress in water supply and sanitation. During this time, outside agencies and countries pulled back on lending during the instability.

Debt continues to keep the Haitian government’s focus on things other than infrastructure.

As recently as 2003, the allocated amount of money Haiti owed that year vastly exceeded the governments’ budget for education, healthcare, environment and transportation.
On the other hand, politics often play a factor in stalled or waning aid and development. In 1998, the United States, Haiti’s biggest foreign aid contributor, blocked the disbursement of $54 million in loans for development of water and sanitation in protest of an election held in the country.

After the earthquake, the US pledged more than $3.6 billion towards relief and reconstruction, but a report released by the Government Accountability Office in June found that USAID has only 31 percent of the funds allocated and that the majority is yet to be distributed.

The government of Haiti developed the National Plan for the Elimination of Cholera in 2012. It is underfunded and projected to take at least 20 years to complete.

That is how most promised foreign aid and government budgets in Haiti operate- slow moving and underfunded. Cost estimates for a nationwide sanitation overhaul in Haiti reach over $1.5 billion, but aid from the international community barely top $200 million.

Advocates, like the director of the Institute for Justice and Democracy in Haiti (IJDH), Brian Concannon, argue that water, sanitation and hygiene (WASH) infrastructure is the UN’s responsibility.

“They’ve spent the money that by their own estimates could create a sanitation system on peacekeeping missions since the cholera epidemic began,” said Concannon who is representing cholera victims. “You’d be hard-pressed to find a Haitian who thinks that was a good use of money.”

IJDH and the Bureau des Avocats Internationaux (BAI) filed a petition on behalf of over 5,000 Haitian victims due to the “negligence, recklessness and deliberate indifference for the health and lives of Haiti’s citizens by the United Nations and the United Nations Stabilization Mission in Haiti (MINUSTAH).”

Case demands include a public apology, financial compensation for victims and the installation of a national water and sanitation system that will control the epidemic. Haiti’s vulnerability is what made the epidemic foreseeable, Concannon told me.

“It’s going to be expensive, but they’ve got a legal obligation to do it,” said Concannon. “It’s consistent with their principles of fighting disease and respecting rules of law.”

To date, the United Nations has claimed immunity.
Meanwhile billions are needed in investments to create a sanitation system in Haiti and a lackluster international community, full of promises, is not delivering. The Pan American Health Organization, UNICEF, and CDC sparked a “call to action” in January 2012 with a 10-year elimination target date for the entire island of Hispaniola.

But the Dominican Republic has better sanitation, with improved water and sanitation sources for over 80 percent of the population and as of June, the country reported 471 total deaths due to cholera, 5.5 percent of the death toll in Haiti.

In a December 2012 plan to ramp up support for Haiti, only 12 percent of the United Nation-requested $2.7 billion has been raised by member states.

Members of the international community met October 9 in Washington D.C. to raise commitments to sanitation and health services over the next three years.

“For decades, water and sanitation have been neglected in Haiti, with serious consequences for public health,” said UN Secretary-General Ban Ki-Moon. “We now need to catch up. We must help the Haitian people.”

The two and a half hour conference concluded with only the World Bank contributing a substantial $50 million. Japan pledged $2.5 million.

DINEPA is the National Directorate for Water Supply and Sanitation in Haiti’s Ministry of Public Works, but their focus is mainly on water supply in urban centers. Created in 2009, its mission is to develop the water and sanitation sector nationally, regulate it, and monitor stakeholders involved in the sector. Since its inception, it has received over US $85 million in investments. The organization was unavailable for comment.

Following the 2010 earthquake, the government of Spain offered a US $5 million emergency grant through the Inter-American Development Bank to DINEPA where it was used to purchase water purification tablets, rubber water tanks, granulated chlorine and chlorinated water for Port-au-Prince.

Like many nations, sanitation in developing countries takes a back seat to water according to Ibrahim.

“Governments do not give much care to sanitation. It is usually of no or low priority,” said Ibrahim. “They pay attention to water but not to sanitation, yet they go hand in hand.”
While DINEPA is regulatory, municipalities are supposed to be in charge of water supply and sanitation in the long-term, but have little resources. What DINEPA will provide these rural communities is technical support, but it will be up to individuals to construct their own latrines.

“Right now, DINEPA is approaching rural sanitation as a household investment,” said Human Rights Watch researcher Amanda Klasing. “Infrastructure is going to be completely addressed by homeowners and they’re not going to provide subsidies or construction.”

Over 7,500 miles (12,266 km) away, ecological sanitation is being studied even more progressively in South Africa. Project coordinator, Bastian Etter, works with the Swiss Federal Institute of Aquatic Science and Technology (Eawag) and eThekwini Water and Sanitation (EWS) to bring ecological toilets to underserved regions in Durban.

The Gates-funded project uses urine diverting dry toilets (UDDTs) to harvest nutrients and create fertilizer from urine. They do not work with fecal matter.

Unlike Haiti, post-apartheid South Africa guarantees all its residents a toilet, per the constitution. Fulfilling the guarantee, municipalities sometimes installed flush toilets in places with inadequate water supply or sewage systems. These dry toilets target those communities.

Etter’s team wants to develop a dry sanitation system that is affordable to the poor, reduces pollution, creates a valuable fertilizer and promotes entrepreneurship.

“We also looked at a potential system where people got paid to drop off their urine at a central collection point,” said Etter.

The municipality of eThekwini is fully behind the project and municipal workers make the urine pickups regularly, with a weekly timeliness like that of garbage truck operators. The municipality actively campaigned in the community to explain the toilets and potential products created from their urine. Etter said support for the project came from not only the municipality but the South African ministries at the federal and provincial level. This interest spread to the citizens.

“After the collection campaign started, people started to use their toilets more because they realized that their urine actually has a use and matters,” said Etter. “In a perfect world, I think it would be great if everyone had one of these toilets, people knew how to use it, and they could have perfect health next to good sanitation practices.”

Just like latrines and international WASH infrastructure plans, even composting toilets come with a cost, and ecological sanitation is relatively new in terms of
market statistics.

“I think the profitability of an alternative sanitation company has yet to be proven, which is exactly what SOIL is trying to do, said SOIL Cap-Haitien program assistant Shannon Smith. “There’s not a huge market there because the competing options of open defecation and flying toilets are free.”

When making choices like food and school tuition on very limited means, Lloyd said paying for sanitation becomes another competing demand.

As for Marline, she just wants to support her family.

“I would like to get my roof completely full of gardens,” said Jean. “I want a really big garden where I can use food for me and my family and also sell a little bit to the neighborhood.”