Background

Haciendita Uno (HU) is a small rural community located in the municipality of Suchitoto, in the Department of Cuscatlán, El Salvador. The residents of HU are poor rural farmers who produce basic grains and agro-industrial crops such as corn, coffee and sugar cane. Other crops, such as vegetables, herbs and/or legumes, would result in better returns, but are not grown due to a shortage of land, a lack of irrigation, and continual increases in the cost of agrochemicals, as well as poor farm management which has resulted in soil nutrient imbalances. The resulting reality faced by small Salvadoran farmers is bleak – the majority remain well below the poverty level and suffer frequent food insecurity.

The situation for youths (aged 18-25) in rural El Salvador is even more dire. Youths are unlikely to own land lacking sufficient funds to purchase any. These youths are doomed to a future of day laboring at $1 USD per hour. In the unlikely scenario they are able to find full-time, or even part-time work, young day laborers can still never earn enough to save for a house. Issues of obtaining a house delay marriage and starting a family within the community. Faced with few options, youth either emigrate to work (frequently in the US) or join a gang with the hope of surviving long enough to profit off criminal enterprise. Neither is a good option for the youths nor for their communities.

Our proposed pilot project is designed to give Salvadoran youths an alternative option to generate substantial income by managing a vegetable cooperative consisting of 10 producers utilizing drip irrigation on small plots.

International Development Enterprises (IDE) has demonstrated that simple, low-cost drip irrigation systems can reduce water needs by 30-70% while also reducing labor and fertilizer inputs on small plots, resulting in yield increases of up to 30%. IDE has over 20 years of proven history of these systems functioning in Africa and India, with more recent (2011) expansion into Central America, primarily in Honduras and Nicaragua. However, the IDE system is dependent on the use of a human-powered stair-stepper treadle pump to supply water to the system tank, which is elevated 1m to obtain head pressure (see Fig 1). Treadle pumps cannot lift water more than 7 meters. Encountering an aquifer at less than 7 meters below ground is possible in most coastal and low lying areas. However, most of El Salvador is situated on a high central plain bordered on either side by two mountain ranges with aquifer depths of 10-100m where treadle pumps will not work. An alternative method is necessary to obtain water.

El Salvador receives significant rainfall during the summer. Collecting and storing rainwater for use during the dry season is entirely possible, but is not feasible due to the high cost of storage containers. For example, 6000 gallon plastic tanks cost $3000 before shipping. Cisterns constructed on site from brick and concrete cost approximately $2000. With per gallon costs of $0.50 and $0.33, respectively, neither is an affordable option. However, 24 m³ Flexitanks (6340 gallons) used in the shipping industry to transport bulk liquids inside 20 ft containers cost around $450, which brings the cost down to $0.07 per gallon. Furthermore, if purchased in significant numbers, Flexitank costs reduce to $190, or $0.03 per gallon. Flexitanks are pillow/bladder tanks composed of multiple layers of laminated plastic (see Figs 2, 3). Empty, they weigh approximately 100 lbs and fold down into a very small space, making them very easy to transport. Obviously
these tanks will be too large to elevate in order to obtain head pressure, but the same effect can be obtained by placing increasing weight (such as sand bags) on top of the tank and/or rolling up the excess as the tank empties.

**Project Description and Scope**

Ten youths from HU will be recruited for this pilot. The youths will each be required to contribute $25 and will receive a zero interest $125 micro-loan, which will allow them to rent a 20x20m plot ($25) and to pay an equipment rental fee ($125). This ensures the youths will have an investment-fueled incentive to fully participate in the project. However, if the project fails through no fault of their own, the loans will be forgiven, which will not be announced unless needed.

Each youth will receive a Flexitank with a large tarp suspended above to collect rainwater and funnel it into the tank. The tanks will be allowed to fill during the rainy season (May-November). Six 20m rows of drip tape will also be installed. Once the dry season begins, 120 tomato plants will be added and the youths will be trained to irrigate and care for the plants, and later to market the fruit. With conservative estimates of 10 pounds of fruit per plant, these systems can yield at minimum $800 gross income in four months. This is largely due to elevated prices during the dry season when no one can produce tomatoes without irrigation ($40/box), compared to the wet season when tomatoes are more easily grown ($14/box). Production results will be carefully monitored and documented.

**Expected Outcomes/Impacts**

The ten youths who participate in this project will gain knowledge and marketable skills in sustainable agriculture techniques. Additionally, the youths will be able provide for themselves and family with their newly acquired knowledge, skills, and resources.

The knowledge generated from this project will be compiled into an article and submitted to a journal, such as the Michigan Journal of Sustainability. A How-to manual and diagram will be produced in Spanish and English and made freely available. If successful, we plan to use the data generated by this project as preliminary data to apply for larger grants to further investigate the use of Flexitanks in the developing world.

**Project Coordination**

BIC will have a member of the Board of Directors (Michelle Leach, PhD, CoE ’13) in El Salvador from May to August. Dr. Leach will serve as the in-country project coordinator and facilitate the interaction of the students with the community. She will continue the data collection and project supervision when the students are not present. The youths will be trained in horticulture and marketing during the wet season as the tanks fill. The project will continue into the dry season, at which point agricultural engineer Jackie Hernandez Ortiz will take over project supervision in country and report results regularly by email to students in Michigan.

**Progress**

**Sourcing and Shipping Difficulties**

Progress has been significantly delayed by a number of difficulties. First, we were not able to source Flexitanks within El Salvador or adjacent Central American countries. Instead, we found a source in Michigan. Shipping the tanks has been very difficult. Due to their weight (approx. 100 lbs each) the most cost effective method is to ship a 20ft container. Shipping costs for a container from Detroit to El Salvador are $3,000 with customs clearing costs and final delivery fees are estimated at an additional $800. Bridging International Communities undertook fundraising efforts and raised the necessary $3,800.
Then we began navigating the complex world of Salvadoran shipping laws. Unlike the United States, where any non-profit organization can receive shipments of donated goods without paying import taxes of 30-50%, not every non-profit in El Salvador has this privilege. Very few organizations retain this privilege (which is referred to as ‘having a franquicia’); however, it is possible for an organization without a franquicia to ‘borrow’ one. Requirements (and sometimes fees) to do so vary greatly depending on what type of organization you wish to borrow from.

After examining a number of franquicia options, we were put in contact with the pastor of the Catholic church in Suchitoto. The majority of the residents of Haciendita Uno attend this church. We explained the project to him and our goals of supporting rural youths. The priest was very receptive of the idea and has agreed to help us navigate the administrative process to borrow the franquicia of his Archdiocese. The priest was subsequently transferred to Peru and we had to begin the process again with his replacement. Luckily, the new priest is also committed to supporting the project. He is currently working on obtaining the franquicia approval letter, and we are hopeful to obtain approval by the end of September.

Once we have the franquicia, we will ship the container, which takes three weeks to arrive in El Salvador. We anticipate a few days for the shipment to clear customs. We hope to have the Flexi-tanks in the community by the end of October. November is the last month of the rainy season, so we should still have time to fill them with rainwater. If not, we will pay to truck water in.

Beneficiaries

Following discussions with the leadership committee of Haciendita Uno, we have made some changes to the proposed beneficiaries. We will be working with the community’s official Youth Group, who will manage a collective plot and one flexitank, and will recruit 9 others from an agricultural cooperative to utilize the rest of the Flexitanks. The committee wanted the youths of the Youth Group, who are significantly younger than those in the cooperative, to have the chance to learn more about horticulture and drip irrigation. However, the committee thought it best that the Youth Group manage one plot collectively, so as not to place too much responsibility on any one of the members, who are generally 12-18 year olds. The youths of the cooperative are all 18 and older.

Working with Haciendita Uno’s Youth Group

We have been working with the Youth Group of the community in anticipation of receiving the flexitanks and drip irrigation supplies. The youth group is supervised by a member of the community’s leadership committee at all times. With the help of the committee, the group has obtained permission to borrow a tract of land to use. The group met with resident agricultural engineer Jacquelyn Hernandez Ortiz and developed a plan of work. They then worked in shifts to clear the overgrowth and open raised beds in rows (Figure 1).

![Figure 1. A work group gets ready to prepare ground (left) by constructing raised row beds (right).](image)

Since we are currently still in the midst of the rainy season, the youths were provided with tomato seedlings and cucumber seeds to utilize the beds while it is still possible to cultivate without drip irrigation. Unfortunately, we underestimated the size of the rabbit population in the area, and many of the young vegetable plants were lost. We are in the process of placing fence posts to enclose the area with a chicken wire fence. However, we do still expect a small
crop of cucumbers from this endeavor. We will replant the tomatoes during the dry season, once the drip irrigation is in place.

**Budget - To Date**

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**Remaining Project Plans**

The majority of the project remains to be completed, pending receipt of the shipment. We will submit a final report following the close of the dry season when harvest is complete, likely in mid-May, 2016.

**Funding**

We are not requesting further funding at this time.