

Caitlin Curran
Upper Arlington High School
Upper Arlington, Ohio
Haiti, Factor 16: Education

Haiti: The Use of Education and Aquaponics to Escape the Poverty Cycle

In 2010 Haiti was rattled by a 7.0 magnitude earthquake (Encyclopædia Britannica, 2016). The earthquake devastated the lives of Haitians and ravaged their land. Despite the common misconception, the earthquake did not 'break' Haiti, it was already broken years prior (Milarcik, 2018). The earthquake brought to light the country's existing issues. In the aftermath of the earthquake, many tried to provide relief; organizations and individuals started giving, and giving, and giving (Milarcik, 2018). However, all of the giving was not creating sustainable improvements, rather gifted moments of relief.

Haiti is located on the Hispaniola Island in the Caribbean Sea. Its 27,750 sq km are home to 10,646,714 people with the projected growth rate of 1.34% (CIA World Factbook, 2018). Its highest density of population is located in its capital: Port-au-Prince (CultureGrams, 2018). The landscape is rough and mountainous with substantially less greenery than neighboring Dominican Republic. The mountains cut off trade winds, resulting in a tropical, semi arid climate (CIA World Factbook, 2018).

The typical size of a Haitian family vastly differs. Marriage sometimes occurs later in relationships, but more commonly, men have several different "Madams" with which they have families (Milarcik). The average woman's age at first birth is 22.7 years and she will go on to have an average of 2.72 children (CIA World Factbook, 2018). Infant mortality is 48 out of every 1,000 babies born in Haiti and overall life expectancy is 63 years (CultureGrams, 2018). Houses come in a range of different sizes and types, although the majority are small and are one story tall (Milarcik).

In 2014 my aunt, Laura Milarcik, went to Gresser, a suburban part of Haiti, as a missionary through Christianville. Haitians are usually darker haired, but in her stay, my Aunt recalls that "little kids had such a lack of protein that their hair was orange." The majority of the Haitian population lives malnourished. One out of every five children is malnourished and one out of ten are acutely malnourished (Feed The Future, 2018). Malnourishment in children can lead to physical and mental disabilities and illnesses, which increases the probability of childhood death. One out of every fourteen Haitian children will die before they reach 5 years of age (Meds and Food for Kids, 2018).

The health expenditure in Haiti is 7.6% of the GDP (CIA World Factbook, 2018). Access to healthcare is limited and often depends on the type of healthcare needed (Milarcik). There is approximately 1 doctor for every 4,000 citizens (CIA World Factbook, 2018). Some Haitians even go to witch doctors that use Vodou for medical help (Milarcik). There is a high risk for food and waterborne diseases, such as the cholera outbreak in 2010 (CIA World Factbook, 2018).

The agriculture industry is the largest sector in the Haitian economy. The GDP earned by agriculture equates to one-fourth of Haiti's total GDP (Encyclopædia Britannica, 2016). Haiti is a nation of small farmers called peasants that work small, private landholdings. Of Haiti's land, 40% is worked, although only 30% is considered farmable and 11% highly suitable (U.S. Library of Congress, 1986). Agricultural products include mangos, coca, maize, rice, beans, and Haiti's main cash crops: mild arabica coffee and sugarcane. Thirty-eight point five percent of Haitian agricultural land is for permanent pasture; goats and cattle are the most common livestock (CIA World Factbook, 2018). Domestic food supply has not kept pace with food demand and as much as one-fifth of Haitian food is imported or smuggled into Haiti (Encyclopædia Britannica, 2016). The traditional Haitian meal consists of beans and rice (Milarcik). Other dietary staples in rural areas include sweet potatoes, manioc, yams, corn, peas, bread, and coffee.

Two meals are eaten a day: a small breakfast and a large afternoon meal, along with a snack before bed. Many do not eat the customary two meals a day, rather one or none at all (World Culture Encyclopedia, 2006).

One-half of the Haitian land is sloped and around 85% of watersheds are degraded (Feed The Future, 2018). This ultimately results in frequent flooding, erosion, reduced availability of groundwater for irrigation, and the depletion of nutrients in soil that are required for increased food production (Feed The Future, 2018). In recent years Haiti has been suffering from a long-running and severe drought, and only 970 sq km of Haiti is irrigated (Feed The Future, 2018 & CIA World Factbook, 2018). Coupled together, the lack of irrigation creates a major issue in Haitian agriculture. Most farmers consider machinery inappropriate for use on tiny plots of land scattered among hillsides so they use hand tools such as hoes, machetes, and digging sticks (U.S. Library of Congress, 1989). The use of purchased inputs are rare and Haitian farmers most often employ traditional agricultural practices (U.S. Library of Congress, 1989).

Haiti is far behind other developing nations in the educational sector (Haiti Partners, 2015). The average years of education globally is 8, but Haiti falls below this with 5 years or less (CultureGrams, 2018). Improving the educational standard in Haiti would reap great benefits amongst the nation. Benefits would include improved health, higher wages and economic growth, democracy and political stability, and education of women (Center for Global Development, 2007). But, the majority of students lack access to quality education (USAID, 2018). Schools, like the one my aunt served at, are few and far between. Fifty percent of Haitian children do not attend school (Haiti Partners, 2015). School is nearly unaffordable for low-income families (USAID, 2018). The approximate tuition for one year of schooling is \$130, and 59% of the population lives on \$2 or less a day -- an annual average of \$350 (The World Bank, 2015 & USAID, 2018). Even if a family can afford education, there is no guarantee of a decent education. Teachers are ill prepared, materials are inadequate, and most classrooms are still in ruins (Luzincourt, 2010).

Overall, literacy rates are poor. Sixty-one percent of the adult population is literate. Broken down by gender, 64% of Haitian men are literate while only 57% of women are (Culturegrams, 2018). Women and rural Haitians are the most disadvantaged when it comes to Haitian education. Haiti is a male dominated society, so by nature women are at a disadvantage (Encyclopædia Britannica, 2016). Despite this, the majority of farmers in the developing world are women; greater female education leads to more productive farming (Center for Global Development, 2007). Rural Haitians face disadvantages because by the age of 7 or 8 most children are engaged in serious work and are needed to do many laborious household tasks (World Culture Encyclopedia, 2006).

Despite the fact that the Haitian constitution requires that free public education be offered to all people, the government is unable to fulfill this requirement (World Library, 2018). Currently the government provides very little funds to support public education (World Library, 2018). Education expenditures only take up 9% of Haiti's GDP (Global Partnership for Education, 2018). Some reforms have been attempted, but all have failed (World Library, 2018). In spite of this, enrollment rates continue to rise, but still over 200,000 Haitian children still remain out of school, leaving education a primary concern in developing Haiti (CIA World Factbook, 2012).

Crime and violence are also issues in Haitian schools. The school year is often interrupted by political unrest and parents tend to keep children home whenever a protest is announced or anticipated because they are often violent (CultureGrams, 2018). In addition, population growth is a cause of an uneducated generation. It has been found that the poorest people have the most children (Meadows, 1986). In Haiti, the poorest people, the peasants, are the least likely to go to school because of high costs of education (Luzincourt, 2010). So not only is population growth a cause of an uneducated generation, but the uneducated generation results in a higher growth rate.

Students in Haitian schools do not get a lot out of their school day (Adelman, 2016). Most instructional time is spent on lecturing and eliciting responses in unison from the class (Adelman, 2016). Haitian schooling is often related to repetition and memorization, which does not promote critical thinking and communication (Towler, 2014). Deeper learning is the only way to prepare Haitian students for adulthood in Haiti (Towler, 2014). It is important to educate students with skills they will need in life; vocational schooling proves a viable solution (Heart, 2018). The knowledge, skills, and trades that students learn in vocational schools will increase their job opportunities and enrich their lives and community (Heart, 2018).

A pre-existing vocational school in Haiti is “Heart”. Heart aims to offer possibilities for young people to learn important skills, knowledge, and trades. Currently, they educate on four topics: plumbing and electricity, sewing, construction, and English (Heart, 2018). This organization could be expanded to offer a wider variety of classes. Teaching and aquaponics are both examples.

To offer a course on teaching, the organizations Heart and Color of Hope could pair up. Color of Hope offers teaching classes to adults. The first step to improve education of students is to educate and prepare the teachers (Color of Hope, 2014). The result is a Haitian school instructed by Haitians. Although it is important to give, in the long run, only giving to a developing country stimulates no sustaining improvement (Milarcik). By educating Haitians to teach students, organizations are helping create schools that will both provide for and help teachers and students (Color of Hope, 2014).

For the best learning environment, schools would need to be repaired or rebuilt. It is crucial that Haitians are involved in all steps of the creation of schools. Haitian students in pre-existing Heart courses, could help with this construction. Students in the construction class learn skills that are important in the physical creation of the structure. The students in the electricity and plumbing course can apply their skills to enhance the schools with electricity and indoor plumbing (Heart, 2018). In the process of the construction, those working are offered scholarships to attend school programs or are paid.

Aquaponics is another important program for the Haitian community. Aquaponics is a system that produces food that combines aquaculture, farming aquatic animals such as snails and fish, with hydroponics, cultivating plants in water, in a symbiotic environment (Guardian, 2014). Aquaponic agriculture utilizes the wastewater of fish as natural fertilizer for plants in the aquaponic cycle (Nelson, 2018). Water is scarce in developing countries, and aquaponics reduces the amount of wasted water in farming (Guardian, 2014). Water is recycled through the aquaponics system, cycling in a continuous loop between the fish and plants (Guardian, 2014). Once again pairing with the Heart organization, Nelson and Pade could expand their outreach of their Living Food Bank (Nelson 2018). The Living Food Bank, a Nelson and Pade program, is a unique aquaponic food production system that provides a continuous supply of fresh fish and vegetables that are grown aquaponically. This program was designed for developing countries, urban areas and other places that traditional agriculture does not work or where access to fresh food is not available (Nelson, 2018). By installing an aquaponics system in the Haitian Heart school and having students maintain it, they would be provided a lunch, and a valuable education. Moreover, workers could be paid allowing for Haitians to have a source of income.

Trash litters the streets in Haiti (Global Food Security Index, 2017). Some of this trash could be upcycled in the aquaponics systems. To power the pump that circulates the water, solar panels would be the best option because they are a renewable source of energy and do not rely on power from Haiti (Encyclopædia Britannica, 2016). Once the system is created, tilapia, a fast growing fish, and produce can be added (Tolley, 2015). When the system is in place, the only needed input is fish food (Nelson, 2018). Haitians could even compost the byproducts of the plants to raise worms and other insects to feed the fish. So, once all parts of the system are in action, aquaponics is self-sustaining with the help of some workers.

Similar to installing aquaponics systems in Haiti, schools in Ghana, Africa have seen positive results to installing aquaponics. The project in Ghana was conducted by a collaboration between The Solar Garden and LivinGreen (LivinGreen, 2014). The efforts in Ghana have been successful, proving that aquaponics can help improve education and raise a developing country out of poverty (LivinGreen, 2014). Other aquaponics organizations have set up systems in Ghana including Golden Sunbeam International College of Science and Technology (Tolley, 2015). In a video created by Emily Tolley, a student from Golden Sunbeam, live footage is shown of the aquaponics system in Ghana in which healthy and large fish and crops are shown (Tolley, 2015). In addition, many organizations have reached out with aquaponics to Ghana, showing that it is a successful place for the systems. Ghana, or the organizations creating the aquaponic systems in Ghana, could reach out to Haiti and provide a mentorship on aquaponics. Since they had success, it would be beneficial for them to help Haiti get started. Although, it would be better to have one main organization launching the systems to create a widespread usage and policy in Haiti.

For profit organizations, such as Eleventh Candle Co, are also crucial to helping developing countries. Eleventh Candle Co provides employment for women through a co-op, provides training and education, and supports children through a foster care program. To do this, they sell candles, along with some other products, to raise money for women in Ethiopia. Their efforts have been highly successful and have reaped great benefits among Ethiopia (Runyon, 2018). Eleventh Candle Co could expand their reach to Haiti; Ethiopia and Haiti could work together in production.

The aquaponics systems would also help accomplish multiple United Nations Goals. The aquaponics system would work towards Haiti's escape from poverty, feed the population, and provide for the better well being of the people (Division for Social Policy and Development Disability, 2018). It would also provide work, along with improved education. By having aquaponics systems present in Haitian schools, the whole community, not just the students, would experience improvement in daily life (Nelson, 2018).

The Haitian government is very corrupt (CultureGrams, 2018). Oftentimes, relief provided directly to Haiti never reaches the people who need it, but rather it stays within the rich government officials (Encyclopædia Britannica, 2016). So, working through the government would not be the best route to implement the aquaponics system. Haitian citizens would be the ones who run the system with the help of Non-Government Organizations. Ordinary citizens can play the role as workers and enforcers of the aquaponics system. By the citizens heading the idea, the hope is the government will accept aquaponics because of the good it is doing for the country. Once the government is accepting, it will also play a crucial role in sustaining the aquaponics systems. It will be needed to help circulate money, formed through aquaponics, into the economy and help oversee policies and practices. The government would need to implement and enforce boundaries; it needs to be enforced that no person can tamper with or take from the aquaponics systems without authorization. They would create laws outlining what the citizens of the community can and cannot do in relation to the aquaponic systems.

But, this all needs to start somewhere. An imperative first step is getting companies and organizations to invest in the aquaponics project and the organizations behind it. These companies and organizations should be willing to invest equipment, time, and money. Many materials for the aquaponics system would need to be provided, although some can be repurposed from trash. Time is a huge investment because the building and growth of the system will require companies to be invested in the long run. In addition, time is important because the systems will hopefully grow in number and size. Money is also an important investment because workers need to be paid and more materials may be needed as things progress. In order to do so, the organizations could pilot an aquaponics system at a school in Haiti and monitor its results. The results could then be presented to larger organizations, and individuals, to raise money to create a wider spread of the program. Like companies and organizations, Americans can donate time and supplies. It is important for Americans to care about foreign economies no matter their own because it is

unknown if anyone else will help. If you can help a country generate an economy, it shows people in America that it can happen here, too.

The Haitian population is in desperate need. Haiti is marked a 23 on the Global Food Security Index Security Scale, which is 50% below the global average (Global Food Security Index, 2017). On top of this, half of Haitian children do not attend school (Haiti Partners, 2015). Poverty and education go hand in hand to form a vicious cycle, but education can help break this cycle (Haitian Scholarships). With education comes a knowledgeable generation; therefore, improving the educational standard in Haiti would reap great benefits amongst the nation. Although, without actions from Haitian citizens, communities, government, and international corporations, no advances can be made. It is important to have many people and organizations involved in the uplifting of Haiti, and through it all, it is important to help, not give. Improvements need to be sustainable, rather than gifted moments of relief (Milarcik). A way to accomplish this is through aquaponics. Aquaponics combines aquaculture and hydroponics to cultivate fish and produce (Guardian, 2014). Aquaponics can create a break in the seemingly endless poverty cycle (Nelson, 2018). Not only will an aquaponics system in Haiti be able to better educate the population, it will also provide a sustainable source of food, employment, and income (Nelson, 2018). It is extremely important to create and implement a solution that will not last for a year, but rather further into the future. Haiti needs a source of sustainability, and aquaponics proves to be a key first step.

References

Adelman, M., & Evans, D. (2016, June 9). Why school enrollment is not enough: A look inside haiti's classrooms. Retrieved from The World Bank website:
<http://blogs.worldbank.org/education/why-school-enrollment-not-enough-look-inside-haiti-s-classrooms>

Aquaponics: A sustainable solution to food insecurity? (2014, October 2). Retrieved from The Guardian website: <https://www.theguardian.com/global-development-professionals-network/2014/oct/02/aquaponics-a-sustainable-solution-to-food-security>

Central america and caribbean :: Haiti. (2018, July 12). In *CIA World Factbook*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/ha.html>

Culture of haiti. (2006). In *World Culture Encyclopedia*. Retrieved from <http://www.everyculture.com/Ge-It/Haiti.html>

Education. (2018, January 25). Retrieved from USAID From the American People website:

<https://www.usaid.gov/haiti/education>

Educational aquaponics systems in ghana, africa. (2014, December 10). Retrieved from LivinGreen website: <http://livinggreen.co.il/en/portfolio/educational-aquaponics-systems-ghana-africa/>

Education and the developing world. (2007, November 2). *Rich World, Poor World: A Guide to Global Development*. Retrieved from https://www.cgdev.org/files/2844_file_EDUCATON1.pdfhttps://www.cgdev.org/files/2844_file_EDUCATON1.pdf

Education in haiti. (2018). Retrieved from World Library website: http://www.worldlibrary.org/articles/education_in_haiti

Education in haiti. (2018). Retrieved from Global Partnership for Education website: <https://www.globalpartnership.org/country/haiti>

#Envision2030: 17 goals to transform the world for persons with disabilities. (2018). Retrieved from Division for Social Policy and Development Disability website: <https://www.un.org/development/desa/disabilities/envision2030.html>

Four things you need to know about education in haiti. (2015, March 12). Retrieved from The World Bank website: <http://www.worldbank.org/en/news/feature/2015/03/12/four-things-you-need-to-know-about-education-in-haiti>

"Haiti." *Britannica School*, Encyclopædia Britannica, 9 Aug. 2016. school.eb.com/levels/high/article/Haiti/117382. Accessed 16 Jan. 2018.

"Haiti." *CultureGrams Online Edition*, ProQuest, 2018, http://online.culturegrams.com.ref.ualibrary.org:2048/world/world_country.php?cid=69&cn=Haiti.

Haiti. (2017, September). Retrieved from Global Food Security Index website: <http://foodsecurityindex.eiu.com/Country/Details#Haiti>

Haiti. (2018, July 25). Retrieved from Feed The Future: The U.S. Government's Global Hunger and Food Security Initiative website: <https://feedthefuture.gov/country/haiti>

Haiti Statistics. (2015, November 18). Retrieved from Haiti Partners website: <https://haitipartners.org/haiti-statistics/>

Land use and farming technology. (1989). In *U.S. library of congress*. Retrieved from <http://countrystudies.us/haiti/50.htm>

Living Food Bank. (2018). Retrieved from Nelson & Pade, Inc. website: <https://aquaponics.com/>

Luzincourt, K., & Gulbrandson, J. (2010, August). *Education and conflict in haiti* [PDF]. Retrieved from <https://www.usip.org/sites/default/files/sr245.pdf>

Malnutrition statistics in haiti. (2018). Retrieved from Meds and Food for Kids website: <https://mfkhaiti.org/malnutrition-stats/>

Meadows, D. (1986, June 19). Poverty causes population growth causes poverty. Retrieved from The Donella Meadows Project Academy for Systems Change website:

<http://donellameadows.org/archives/poverty-causes-population-growth-causes-poverty/>

Milarcik, L. (2018, January 11). [Personal interview by the author].

Runyon, A. (2018, February 15). [Personal interview by C. Curran].

Teacher training in haiti. (2014, August 30). Retrieved from Color of Hope website:
<http://colorofhope.org/teacher-training-in-haiti/>

Tolley, E. (2015, March 22). *Aquaponics in Ghana* [Video file]. Retrieved from
<https://www.youtube.com/watch?v=01SWmzaidac>

Towler, L. (2014, November 25). Deeper learning: Moving students beyond memorization.
Retrieved from neaToday website: <http://neatoday.org/2014/11/25/deeper-learning-moving-students-beyond-memorization-2/>

Vocational school. (2018). Retrieved from Heart: Haiti Education and Resource Team website:
<http://heartinhaiti.org/community-development/vocational-school/>