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Haiti, Factor 6: Sustainable Agriculture

Haiti: Sustainable agriculture to combat soil erosion to encourage economic activity

The Republic of Haiti, a historically and culturally rich country, is continuously crippled by an absence of food security for all but one percent of the population (globalissues.org). Many solutions have been attempted in order to meet the dire needs of the Haitian people, including foreign aid sending staple foods such as rice and other grains, but this assistance leads to only short term results. The path to food security begins within the country through the implementation of sustainable agricultural practices which will allow the two-fifths of the population depend on agriculture (Central Intelligence Agency) to productively produce not only the bare minimum, but also produce high quality products that will lead to a decrease in the need for imported goods, keeping wealth within the country to sustain more than just agriculture, but the colorful and unique atmosphere that is Haiti.

Sustainable agriculture takes on many forms, but in relation to the food security crisis in Haiti, the goal of sustainable agriculture would be to retain natural soil while encouraging healthy soil formation within the limited land available for cultivation.

Haiti is nestled on the mountainous western third of the island of Hispaniola, which is also occupied by the Dominican Republic. Before becoming the first independent black republic in the western hemisphere, Haiti was a colony settled by the French (TravelHaiti.com). The French settled on the tropical, semi-arid island to start sugar plantations, bringing over hundreds of thousands of African slaves with them. The settlers not only enslaved the country, but also began the severe deforestation of the once rainforest covered nation in order to become a leading exporter in charcoal, an act directly related to the severe soil erosion dilemma of modern Haiti. Since winning their independence in 1804, Haiti has struggled as the poorest country in the western hemisphere through many dictatorships, military coups, and foreign military occupations.

As two-thirds of the total population of 9,801,664 population has settled in villages across the rural mountainsides to practice subsistence farming, family compositions and roles have changed very little into the 21st century. Though 80% of marriages are *plasaj*, or common law, and not recognized by the government, they are religiously and socially accepted by communities. While the nuclear family has replaced the traditional *lakou*, or extended family, family roles still remain very conventional. Men perform the labor intensive portions of farming such as plowing and tilling while customarily residing as head of the family. The women's primary role is care taker of the children and home, but are also responsible for helping with weeding and harvesting as well as taking produce to the market. As for children, they are considered "gifts from God" (countrystudies.us/Haiti/29.htm) due to high infant mortality rates. Children are often expected to assist in the fields or in other work forces for extra income, keeping many out of school.

Similar to other developing countries, education remains a major barrier in progressive improvement. Because only 9% national budget during the 2009-2010 fiscal year was spent on education, merely 8% of schools are national (public) schools (lessonsfromHaiti.org) The other 92% of schools are run by private missions or organizations and are out of the price range of most families. With little government funds, it is not uncommon for teachers to go weeks or even months unpaid and with no government regulated curriculum, students receive inconsistent and gapped educations (USIP.org). Despite the national schools being public, the average household spends \$109 US dollars (4,905.9 Haitian gourdes) on schooling expenses annually (lessonsfromHaiti.org). Due to these high prices, 65% of primary aged students are enrolled in school and only 35% of those children complete primary school to go on to secondary school (Central Intelligence Agency).

Health care is minimally available in Haiti. Seven to eleven percent of the national budget is spent on health care, according to OFBC Ministries. 80% of that money is used for salaries, causing there to be only 1.3 hospital beds per 1,000 people and poorly equipped medical facilities.

Often when foreigners prepare to visit Haiti, the joke to be told is "I hope you like rice and beans!" (Mike Stitzmen) The Haitian national dish is riz et pois, or rice and beans. The starch based diet also consists of corn, millet, and yams, often accompanied by tropical fruits such as avocados, mangoes, pineapples, coconuts, and guava. Meals are cooked in three-sided, detached huts over charcoal fires. Because of this method of cooking, only two meals are prepared a day: one in the morning and the other in the afternoon. Despite high servings of starch and fruit, Haitians suffer from a deficiency of protein in their diets. The main meat consumed is beef and goat, but rarely more than once a week. Because of this, 61% of the population is under-nourished and 28% of children are underweight, leading to one-third of the population stunted in growth.

Just as family roles have remained traditional, farming practices are virtually colonial. The typical family farms two acres of land sprawled out on the mountainside (cime.buffalo.edu). During the two growing seasons, April through July and September through November, cash crops such as tobacco, coffee, corn, sorghum, rice, and varied fruits are grown on large scale terraces. With only one tractor per 1700 hectares of cultivated land, farmers rely on hoes, machetes, scythes, and cattle for plowing, planting, and harvesting, and use bat guano, manure, and other natural fertilizers (farmHaitinow.com).

In addition to outdated farming practices, Haitian agriculture faces extreme geological and environmental obstacles. The island of Hispaniola is formed by four major limestone mountain ranges and numerous smaller ones, making two-thirds of the terrain 1,600 feet above sea level. Because of the mountainous land, Haitian soil is classified as inceptisols, characterized as being partially developed soils consisting of red clay and loam as well as lacking in organic matter. These partially formed soil profiles are caused by severe erosion and water logging found in mountainous, tropical regions. The third and perhaps biggest barrier to productive agriculture in Haiti is the inalterable deforestation of the natural rainforest, a practice dating back to French colonial times. Deforestation is the leading contributor to the soil erosion crisis in the country.

Not only do these geographical limitations effect agricultural production, but so does the increasing prices of imported goods. Currently, Haiti imports 400,000 of rice, which makes up 20% of the typical Haitian's diet. Most farmers grow cash crops to sell in order to buy imported goods in return, but as prices for these goods increase and prices for their goods at market remain the same, Haitians are unable to grow enough produce sustain their lives.

Another concern of Haitian farmers is the inaccessibility to markets due to insufficient infrastructure. The road systems in Haiti have not been updated since the United State occupation in the 1980s. In 2004, before the 2010 earth quake that devastated the country, only 20% of roads were in good condition, a percentage much lower now (lessonsfromHaiti.org). With roads in such poor conditions, farmers are forced to take more time and effort to transport their goods to market.

Through research and background of the country, it is evident that due to such high soil erosion from deforestation, implementing sustainable agricultural practices would immensely improve crop production. As only one-third of the land is suitable for agriculture, sustaining the soil that is left is the only way to increase production in a long term setting, which will in return mean higher profits for cash crops sold at local markets and higher yields, reducing the need for imported goods.

The scarcity of arable soil to be farmed, combined with the already limited farm sizes doesn't allow for an adequate quantity of crops to be produced for the subsistence farmer to both feed a family and have enough product left over to sell at market for an income to buy other necessities. Unfortunately, soil erosion is only worsening with little to no sustainable practices being implemented. Soil erosion severity is classified by the land's ability to be cultivated on an eight class scale based on the slope, depth of A horizon, and the texture of both the A and B horizons of the soil. Currently, the land in the mountainous regions of Haiti is depleting due to water run-off during the rainy seasons as there is no forestation to hold root soil down. Because of this crisis, citizens are migrating to the cities in alarming numbers, increasing the population density problems.

Improving soil conservation and sustainability practices will not only benefit family farms by permitting the farm to produce a sustainable amount of crops to both live off of and take to market, but will recover soil health as well as allow the country's economy to grow independently.

The biggest issue with severe soil erosion is the lack of organic matter in the soil horizon. Organic matter is found in the A horizon of a soil profile, and is a necessity to plant growth and quality. When erosion occurs, the A horizon, which is rich in this organic matter, is swept away, leaving the less nutritious B horizon. Sustainable agriculture prevents the loss of essential organic matter, causing more nutrients to decay into the soil profile, effectively maintaining healthy soil for increased agriculture production. Haitian imports account for roughly 50% of the GDP, creating a large scale trade deficit in the country. With improved agricultural practices through sustainability, crop yields will increase, allowing Haiti to export the crops they grow that are in high demand by other countries, eventually decreasing this trade deficit. With the ability to then provide more food as a country for them, less money can be spent on imports and can in return be invested in the local economy to create more jobs and improve the education, health care, and agriculture sectors. These improvements will then lead to better education provided for future rural generations and allow for more modern technology and techniques to be implemented into Haitian farming.

Unfortunately, Haiti suffers from severe weather extremities and regular natural disasters, which each add significantly to soil erosion. The rainy season lasts from May to July, followed immediately by the hurricane season from July to October. During the rainy season, precipitation can get as high as nine inches a month, which leads to mudslides and flooding. Because top soil on the mountainsides is vulnerable with no coverage, much of the soil is lost due to this uncontrollable weather.

Energy demands in Haiti are a concern for the environment, as well. Especially after the major earthquake in 2010, electricity is scarcely available to a majority of the population, and even less so in rural Haiti. To compromise for this deficit, Haitians rely heavily on charcoal as a source of energy for heating, cooking, and it is used as a main export for the country, leaving only 2% of the original forestry population left. Deforestation leads to soil loss, which leaves the nation vulnerable to natural disasters such as mudslides. Some experts even argue that deforestation played a hand in the 2010 earthquake. (Community.timberland.com)

There are many steps Haitian farmers can take towards practicing sustainable agriculture to protect their natural soil and encourage the formation of healthy profiles. While Haitians are currently active in growing cash crops, many of which are not well suited to inceptisol soils, a transition to tree crops can tackle two problems at once. Tree crops such as mango, banana, coconut trees, ect., rather than cash crops, are not only more appropriate for the tropical climate than corn or bean crops, but the large roots of these crops will anchor down top soil and help to reduce erosion caused by water runoff. Also, tropical fruits are in higher demand by foreign countries, which would increase the exports out of Haiti. Another benefit of tree crops is that they do not need to be replanted each year, in the long run saving the family money and labor of seasonal planting.

If a farmer chooses not to switch to tree crops, there are several sustainable agricultural practices they can adopt. The first being no-tillage farming. No-tillage farming is just as it sounds, not tilling the land before planting. Instead, the farmer leaves plant residue from the previous harvest, which allows that residue to break down into organic matter. Tilling also breaks up the top soil, making it more susceptible to erosion by water or wind. Border cropping and strip cropping are also successful practices of sustainable agriculture. Border cropping is simply planting a grass crop around the sides of a field to catch soil from water runoff. Strip cropping is the same principal as border cropping, but in difference is the practice of planting grass crops between rows of regular crops to catch soil from runoff.

Haiti is not an ideal country for traditional livestock raising because of lack of pasture, but is in prime location for aquaculture. Aquaculture has been in practice in shore-front countries such as China, Indonesia, and India for centuries. While in countries like the United States aquaculture takes form in artificial settings, NOAA has recently conducted a study showing aquaculture in the ocean is not harmful to the environment. Haitian diets suffer from a deficiency in protein and many developing countries such as the Philippines and Thailand have adapted to fish being a staple food source in their diets. With an

investment in aquaculture, which is not expensive in start-ups and low in maintenance costs if done in the ocean, Haiti can produce a stable food source without using the limited amount of land needed for crop cultivation.

Environmental and agricultural sustainability in Haiti falls under the Millennium Development Goal Number 7: Ensure Environmental Sustainability; Target 7A: Integrate the principles of development into country policies and programs and reverse the loss of environmental resources. One of the elements under this goal is "Forests are a safety net for the poor, but they continue to disappear at an alarming rate". Through preserving forestry, sustainability of soil will in the end highly improve overall agriculture.

Within Haiti there are several organizations already working towards this Millennium Development Goal. One of these organizations is ECHO. ECHO is working in multiple countries to combat hunger. Currently, they hold an annual conference in Haiti which brings together leading agriculturalists in the country to discuss on-going problems. If ECHO were to expand their conference to send teams of experts throughout the country to continue these conversations with everyday farmers, they could sprout new ideas and spread the seed of change across the nation.

Quesqueya University is one of the major Haitian universities that offer a four-year vocational agriculture degree and many of the graduates pursue careers in agronomy. However, all of the universities in Haiti are located in the few major cities of the country. If the university could open satellite schools throughout the country, it would improve accessibility to the program in rural areas where farmers could benefit from the location.

As it is evident that deforestation is the leading factor to soil erosion in Haiti, a solution to this dilemma needs to start with the government. Haitian government has suffered from instability since it became an independent nation generations ago. The national government needs to regulate logging within the country by setting a legal amount of logging within a given time and enforce consequences for illegal logging.

While humanitarian relief was in dire need after the 2010 earthquake, international organizations and governments are hurting Haiti rather than helping by handing them relief. These governments and organizations need to shift their focus to offering goods, to working alongside the Haitian government and people in order to teach them how to stand on their own, rather than rely on assistance from others. The United States, for instance, rather than continue to send meals and clothing to Haiti, could organize teams of professional agriculturalists to send Haiti to put on seminars or conferences for local farmers and hand out pamphlets detailing in sustainable practices. It is important for international organizations and governments to encourage the local governments to stress their farmer the benefits of sustainable agriculture.

It will take the assistance of all these forces to improve agriculture in Haiti, but the key to change within the country starts at the individual level. If each family and each farmer takes the initiative to practice sustainable agriculture, soil erosion will begin to decrease and fertility will increase.

Just as civilization began with agriculture, it will continue through agriculture. One step at a time, one family and one farm at a time, sustainable agriculture will lead to higher incomes, making a better life possible for that family, their community, and eventually the culturally rich nation as a whole.

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