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Haiti, Factor 5: Climate Volatility

**Haiti's Tears: Effects of Climate Volatility**

If you were to see through the eyes of a Haitian farmer, what would you see? You would see tears obstructing your view; for the farmer has to decide between feeding his family or sending his child to school to get an education. Keep in mind that the odds of escaping poverty are low, but the hope is there none the less. You would see more tears in his eyes, this time mixed with rain; for the farmer and his family are now homeless due to a hurricane, the one that is currently soaking them, demolishing their home and the means of supporting his family. Years pass and you see no tears; for this year's drought is so extreme that tears evaporate from his face. What you can see is the farmer's field of coffee beans, which are parched to the point of death. If the farmer did have tears, he would water his crops with those teardrops, just to insure his family could be fed. This tale is neither exaggerated nor the account of just one Haitian farmer. This is the hopeless feeling the majority of people feel in the country. Haiti is the poorest country in the western hemisphere and one of the poorest in the world (Shah). A total of 2.5 million people in the country are living in destitution. Furthermore, two-thirds of the population is living on two dollars a day (Farrell). The country's citizens are further crippled by hunger. This hunger has undermined so many Haitians that it is considered the third hungriest country in the entire world (Shah). This shadow of hunger looms over 6.7 million Haitians that are food insecure (Food Insecurity). Even with agriculture being the biggest industry in the country, the Haitian agriculture sector is currently incapable of producing food for all of its residents. Hundreds of thousands of children no older than five are suffering malnutrition and one-third of the country's suffering youth are stunted. The starving and penniless people of Haiti are also tormented with little clean water or adequate sanitation (Farrell). The conditions that Haiti is facing are intolerable. How does the United States, the leading producer in agriculture, let a country that is only 2,000 miles away become the third hungriest in the world? How did we let this country become so hungry and poor? More importantly, what are we doing to help?

Typical families in Haiti are very similar to a typical nuclear family in the United States. A household consists of a mother, father and their children. Adopted children, young relatives and elderly widows are also common members of a household. Men are responsible for planting and harvesting their crops and taking care of livestock. Most of the jobs in Haiti are occupied by men, while women are responsible for cooking, cleaning and laundry. Women also help out at planting and harvest time and they control the family's money as well as manage their property (Haiti. Countries and Their Cultures). Haitians consume about 1,977 calories a day in contrast to a typical American that consumes around 3,318 calories a day (Some Basic Information On Haiti). A typical Haitian's diet consists mainly of rice, corn, cassavas, millet and fruits. Rarely do Haitians eat meat, fish, milk or eggs due to receiving such a low income and not being able to purchase these items (Haiti At A Glance).

Education is a major problem in Haiti. 47% of the population is illiterate. Schools are sparse and mostly private (Haiti At A Glance). The average Haitian only receives 4.9 years of education and only 29% of Haitians receive secondary schooling (Education). Most families have to choose one child to go to school and most children are not able to continue their education in secondary schooling due to their family's financial issues (Haiti At A Glance).

Many Haitians have no access to healthcare. There is one doctor for every 9,846 people (Some Basic Information On Haiti). Poverty often gets in the way of Haitians reaching doctors. Even with groups like Doctors Without Borders and Partners in Health working to provide free clinics for everyone in the country, many Haitians are too far away to utilize these services. If Haitians are able to reach doctors, many of the drugs used for treatment are rendered useless because of a lack of nutrition (Poverty &

Health). Malnutrition is also linked to immunodeficiency which causes an increased susceptibility of diseases and infections, eventually leading to death (TGD).

2.26 million farm workers are currently working on a total of 780,000 hectares (1,927,421 acres) of land in Haiti (Haiti Agriculture). 94% of rural farmers own less than three hectares (7.4) acres (Family Farming). Farmers grow coffee, rice, sugar, corn, sorghum, banana, mangoes, sisal, cassava, yarn and essential oils (Family Farming, Haiti Agriculture and Haiti At A Glance); with coffee being the main cash crop of the country (Haiti At A Glance). Few modern agricultural practices are being executed in Haiti. There are currently only 140 tractors in use in the country, no pesticides are applied to the crops and a total of 14,429 metric tons of fertilizer is being used (Fertilizer and Haiti Agriculture). Haiti has a total of 970 square kilometers (5%) of irrigated land (Central Intelligence Agency). Pigs were once a popular livestock option for farmers, but after an outbreak of African Swine Fever (ASF) in the early 1980s they would be replaced by the cull chicken as the country's main livestock and source of protein (Country Profile).

Agricultural productivity in Haiti has some major barriers to advance through. Its land tenure system is corrupt and unstable. The system's problems are many and include government officials choosing who gets what land, farmers having low land security and most farmers having to rent out land or sharecrop. The agricultural sector receives little support and investments due to the government and donors neglecting it. Farmers participate in few commonly used best management practices and lack seeds, tools and fertilizer. They are constantly losing crops because they have no way to store them or get them to the food market. Haitians are continually facing natural disasters and bad weather. Deforestation, which farmers do to obtain charcoal, creates increased vulnerability to these natural disasters, as well as decreases soil quality (Je).

Earning a living wage in Haiti has just as many barriers. Haitians receive little education, so they have a hard time finding jobs outside of farming and basic services. These jobs often do not provide enough income due to the minimum wage being one dollar a day. Laws are in the works to increase this minimum wage to five dollars a day, but nothing has been passed yet. The country has no social safety net, no unemployment insurance and no health care (Flintoff).

Haitians face major barriers when trying to access food markets and obtain adequate nutrition. Since the bulk of Haitians live on less than two dollars a day, many Haitians that are not farmers are unable to get the food they need due to lack of monetary resources (Je). Recent droughts, floods, hurricanes and earthquakes have led to an increased price of food (Haiti – Hurricane Sandy). These increases will further prohibit Haitians from purchasing food they need to get adequate nutrition.

Climate volatility and climate change are large-scale problems around the world. Climate volatility is the rapid and unpredictable change in weather and conditions of an area. Climate volatility is changing our world ever so slowly, but change is still here. Haiti is one of the best places to see what effect climate volatility has on a country. Climate volatility leads to 80% of natural disasters (Column Five). I believe this impact is what is causing 6.7 million people to become food insecure.

On January 12, 2010, Mother Nature unleashed her rage on Haiti. 220 thousand people died from an earthquake and another 1.5 million were displaced from their homes (Humanitarian Bulletin Haiti). This 7.0 magnitude earthquake unleashed most of its destructive power in urban areas, but it is still held accountable for $31 million dollars worth of agricultural produce to be lost (Agriculture in Haiti). The earthquake led to Haitians meals going from an average of 2.48 meals a day to 1.58 meals a day (Haiti: Nutrition Profile). Haitian farmers lost stock of seeds, tools and irrigation facilities (Haiti Earthquake 2010). Earthquakes are a common threat to Haitians, as the country is located on two seismic faults (Humanitarian Bulletin Haiti).

In August and October 2012, hurricane Isaac and Sandy left a combined agricultural loss of $174 million ($70 million and $104 million respectively) (Food Insecurity and Haïti: Food Security). This burdened many farmers as their already low $700 yearly income fell (Food Insecurity). Hurricane Sandy destroyed 70% of Haiti's crops and 90,356 hectares (223,274 acres) (Food Insecurity and Haiti – Hurricane Sandy). Food prices rose, food availability fell and the number of food insecure people in the country rose (Food Insecurity). Hurricane Sandy caused 54 people to die, destroyed 27,701 houses and affected 39,058 families (Haiti – Hurricane Sandy). Haiti is affected by a multitude of hurricanes and tropical storms due to its location in the Caribbean basin (Agriculture in Haiti).

Floods and droughts are both very common conditions in Haiti and both are a major cause of food insecurity. A drought in May 2012 caused a loss of $80 million in agriculture (Haïti: Food Security). Another drought that continued throughout 2015 affected one million people dropped agricultural productivity by 50% and resulted in a 50% decrease in the 2015 spring harvest (Caribbean: Drought). The effect this drought had on agriculture was devastating to this already poor and hungry country. In November 2014 heavy rains, flooding and landslides killed 17 people. 15,000 houses and 2,200 hectares (5,436 acres) were flooded (UNDP). These droughts and floods were often a result of a lack of watershed protection and problems with irrigation practices (Agriculture in Haiti).

The present status climate volatility and climate change may look small and insignificant, but it is only a preview of the future. Thermal expansion of water and melting polar icecaps are inducing the sea level to rise by 0.12 inches every year (Is Sea Level Rising?). Higher and warmer water is resulting in stronger hurricanes. More precipitation is leading to more flooding. As temperature increases, droughts occur more frequently (Climate Change Impacts: Floods and Droughts). Climate change is hurting agriculture as higher temperatures increase the threat of pests and diseases (Climate Change Impacts). Climate change is especially hurting those in poor, developing countries because they have do not have the ability or resources to protect themselves from these new threats (Climate Change and the Paris COP21).

These trends in climate volatility are only getting worse. Scientist measure climate volatility trends by finding global temperature. Scientists use anomalies, or differences of temperature from two different time periods, to find global temperature. A positive anomaly shows temperatures are warmer than usual and negative means it is cooler than normal. These results show that climate is changing and that changing climate is causing extreme weather and altering environments (Explainer). Released emissions will cause 12-39% of the world to develop unusual climates (Column Five). The world's oceans will continue to increase in size and temperature, causing coastlines and cities near coastlines to be threatened by arising water and intense hurricanes (Coastal Areas). Increased amounts of major droughts will result in less water for farmers, cities and forests (Extreme Weather). Children five and under are 50% more likely to be malnourished if born in a drought and with more droughts there will be more malnourished children (Column Five). Rivers will flood, there will be less snow and spring will come earlier (Extreme Weather). Crops are not going to receive enough water and will be endangered by more weeds, diseases and pests (Climate Change Impacts). It is predicted that in 2050 crops will have 10% decrease in global yields (Column Five).

Changes in climate are not going to be good for rural Haitian families. Rising ocean temperatures will result in stronger hurricanes occurring frequently. Droughts and flooding are also going to increase. Weather changes are going to make it hard for Haitian farmers to grow food to feed themselves and others. As weather grows more extreme, food insecurity will increase due to loss of crops. As the North Atlantic Ocean rises, the coastlines of Haiti will sink beneath the water, leaving many homeless and in need of shelter and food. In order to help Haiti, we need to prevent the cause of climate volatility.

I believe climate volatility is the dominant factor to Haiti's poverty and food insecurity, but it cannot be stopped right away or completely. By finding ways to improve this factor, farmers will recover from disasters faster. With successful harvests, these farmers will be able to sell their crops and feed their

families. With crops to buy, the hungry will be able to finally receive the food they need. Once problems with climate volatility are reduced, organizations can switch their attention to other problems instead of natural disasters. These organizations will provide more services like education and health care to the people. Haiti will be able to produce crops without being able to having to constantly deal with droughts, flooding, diseases and pests. By working to improve climate volatility, Haitians will be less hungry, have more money and have additional opportunities.

Deforestation and land-use change are increasing climate volatility. Haitians participate in these practices when they cut down trees for charcoal or farm land (Je). Deforestation and land-use changes are accountable for 20-25% of carbon dioxide emissions (How Does Deforestation Affect Climate Change?). Pollution is another major issue that creates climate volatility, especially air pollution, with the majority coming from developed countries in the form of factory and car emissions (Air Pollution and Climate Change).

I believe that we can address climate volatility in Haiti in three steps. Each of these steps are going to take time and resources, but if governments, people and organizations work together, we can help Haiti and the world. The first step to help the country is helping them recover from their recent natural disasters. In this step, new sustainable technologies and agricultural practices should be simple to understand, easy to implement and work to reverse any damage done to the country, especially in the agricultural sector. We need to help distribute seeds, tools, fertilizers and livestock after these natural disasters to help farmers recover quicker. The Food and Agriculture Organization of the United Nations (FAO) is one organization that is participating in this step already. The FAO Emergency Operations and Rehabilitation Programme for Haiti helped the country recover from the 2010 earthquake by helping prevent flooding through reinforced irrigation canals and river banks, introducing urban agriculture practices and planting tree crops for soil conservation (Haiti Earthquake 2010). All these practices have helped the struggling country, but I believe the work that the FAO and other organizations do to help this country recover needs to be scaled up significantly. By helping farmers and others recover from these disasters, Haitians can also start to rebound from poverty and food insecurity.

Step two of my plan focuses on improving Haitian agriculture, helping them be prepared for future natural disasters and helping them find ways to deal with those disasters on their own. This involves providing technology to Haitians, growing new and diverse crops able to feed the people of Haiti, giving them new resources such as a weather information system and teaching farmers agricultural practices. Sustainable technologies and practices should primarily focus on prevention of natural disasters, agricultural improvement and should overall be more advanced than those used in the previous step. The World Concern's food security project is an organization that is helping Haitians advance in agriculture the right way. They are helping the farmers by teaching rather than doing, making these farmers become more independent and successful. The organization is introducing tractors and new planting techniques to Haitian farmers to help improve agricultural activity (Food Insecurity). The World Food Programme (WFP) is another organization that is assisting Haitians prepare for future disasters while still being independent with their Cash-for-Assets program, which pays cash for farmers working on watershed managements and soil conservation projects (El Niño). Both of these organizations should be scaled up to further help the country. The Haitian government is also preparing for future disasters by planting over 9 million trees, introducing farmers to more resistant crops (Genetically Modified Organisms) and improving flood mitigation measures (UNDP). Greenhouses and hydroponics should be two agricultural practices utilized when attempting to improve Haitian agriculture and helping the country's fight against climate volatility. Greenhouses could reduce agricultural losses caused by hurricanes and earthquakes when constructed to withstand these disasters. Water regulating technologies such as WaterPulse mats and Stockosorb 660 combined with greenhouse controlled temperatures could decrease crop losses from drought and flooding. Hydroponics, a process in which plants are grown in a nutrient and water based solution, should also be enforced in the country. Plants grow 25% faster, produce 30% more at harvest,

and use less water than when grown in soil (Hydroponic). Both greenhouses and hydroponics are technologies worth investing time and money in, as one Haitian 72 square-meter greenhouse that cost $3,000 dollars to build made its money back in 18 months (Haiti: Greenhouses). All these practices are a step toward the right direction in preparing Haiti toward dealing with future disasters on their own.

The third step in my plan involves introducing Haiti to policies and practices that help improve their country and climate volatility. The technologies and practices implemented in this step could take several years to come to completion. The Haitian government needs to help out more by increasing funding that go towards emergencies, passing rules for disbursement to prevent corruption and allowing for more access to weather data so Haitians can prepare for disasters (Agriculture in Haiti). Haitians should put into place practices like planting mangroves to provide protection from hurricanes or encourage farmers to growing additional livestock which are more reliable in extreme weather than crops (Column Five and Below). These animals will also provide people with meat and manure to use as fertilizer. Reducing Haitian deforestation could result in fewer emissions, which will help the fight against climate volatility. In Nicaragua, the people there added trees to their cattle ranches, which increased their milk production by 50% (Column Five). If Haitians introduced cattle and trees to their farms, more people could access dairy products, less people would be food insecure and farmers would have livestock to fall back on after a natural disaster. Organizations should also focus their attention on other aspects such as education, healthcare, political corruption and poverty. All these practices and policies will help reduce climate volatility, which would aid in the fight against poverty and food insecurity in Haiti.

The combined help of governments, organizations and people in communities are what is needed to help Haiti. Organizations such as FAO, WFP and World Concern's food security project are all organizations that are helping now, but need to be enhanced to bring assistance up to the next level. Coordination of services should occur so that each organization does not overlap. For example, FAO should continue to help the country recover from disasters, while World Concern's food security project should continue to teach Haitians practices that involve technology and fighting climate volatility such as with greenhouses and hydroponics. WFP should advance its work in its Cash-for-Assists program and its School meals programme, in which the organization helps children receive at least one nutritious meal through school lunches and work to teach Haitians everyday practices on how to lower emissions and slow down climate volatility (Haiti | WFP). All organizations should also focus on teaching Haitians about climate volatility and agriculture in general and spread awareness about food insecurity and climate volatility to people outside the country. They should also spread awareness about themselves and their cause to convince governments and private investors to support and fund them. The Integrated Agrometeorological Advisory Services has helped get weather news to farmers in India to help them prepare for upcoming weather (Column Five). This organization should extend their services to Haiti as well as other underdeveloped countries. The government should also reach out to its citizens and organizations to collaborate to figure out new strategies and work together to fight climate volatility in their country. The Ministry of Agriculture, Natural Resources and Rural Development (MARNDR), the group that is responsible for passing Haiti's agricultural and environmental policies, should be open-minded and accepting when learning about new practices and policies that will help its people fight climate volatility (Family Farming). Rural and urban Haitian families can take practices learned from these organizations to heart, should educate and work with other families to achieve success and should work to implement any strategies towards fighting climate volatility. Lastly, every one of us should take part in helping Haiti against climate volatility. We can participate in simple practices such as unplugging things that are not in use, replacing old appliances with energy efficient technology, using bikes or carpooling and educating others (Fern). Together we can help stop the effects of climate volatility in Haiti and around the world. Together we can feed the 6.7 million food insecure people in Haiti. Together we can stop the farmer's tears.

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