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Haiti, Climate Volatility

Revolutionizing Agriculture in Haiti

Haiti is located on a major island in the Caribbean Sea. It borders the Dominican Republic to its east and is home to more than 11 million people (World Food Programme). Culturally, it is distinctive with an intermixing of African and European traditions. The Haitian vernacular, for example, is a creole language with French influences. Beyond the richness of its culture, Haiti possesses a beautiful landscape. Approximately 10,714 square miles of the land area is covered in lush mountains, which used to defend the country against tropical storms (Library of Congress, 2010). However, climate-related disasters in recent years have overcome this natural barrier and perpetuated food insecurity in Haiti by destroying crop yields and agricultural infrastructure. The recommendations below seek to combat this issue by introducing climate-resilient practices into the cultivation process and redirecting infrastructural repair funds to local nonprofits.

Haiti's population is distributed unequally between urban and rural areas. Approximately 57% are concentrated in larger cities such as the capital (Port-au-Prince) and the remaining 43% live in remote villages (World Bank, 2020). A tremendous wealth disparity exists between the nation's urban and rural folk since two thirds of the poor can be found in rural parts of the country (World Bank, 2020). When compared to the other nations in the Latin America and Caribbean region, Haiti is the poorest with every six of ten citizens living beneath the poverty line (World Bank, 2020). These Haitians survive on less than \$2.41 USD per day (World Bank, 2020).

The average Haitian is likely to be employed in the agricultural sector, since it accounted for nearly 50% of the nation's jobs in 2019 (Statista). The typical farm size in Haiti is just half of a Hectare, or a little larger than a football field (World Bank, 2017). They are mostly run for subsistence, growing crops such as cassava (manioc), plantains, maize, and rice, but there isn't enough so the country imports "60% of its food" to supplement domestic production and satisfy needs (IFAD, 2018). Another issue with the agricultural sector is that "only one-sixth of the land" is arable, despite the fact that so much more of it is being cultivated (Bargout & Raizada, 2013). The majority of the land is unfit for farming because of the rugged terrain and patterns of precipitation, which together, have caused rapid soil erosion.

Although there are nicer homes in Haiti, the typical urban dwelling consists of two rooms that are supported with cement walls. Rural dwellings are very similar except the walls are made of mud and the roofs are strewn together with palm leaves. Most dwellings are only lightly furnished and very few have

indoor plumbing (Encyclopedia Britannica, 2021). A mere quarter of the population has access to the primary electrical grid so the families that cannot afford it elect to use environmentally unfriendly diesel generators instead (USAID, 2021). Basic sanitation continues to remain out of reach for two thirds of the population who lack access to toilets or hand washing facilities (World Bank, 2020). In fact, the word “bathroom” is not associated with an enclosed space, but rather, a hole dug out at a certain distance away from the home.

If the average adult in Haiti had complete access to education and healthcare, the Human Capital Index finds that they could have been “45% more productive.” The barriers to a quality education for children are numerous. The costs for private schools are largely unaffordable for the average family (4.3 persons, figure from the Population Reference Bureau) and often very far away, requiring children to travel along busy roads just to attend. Healthcare is mainly out of reach because it is too expensive for the average family to afford. There is an additional issue of inaccessibility because medical facilities are often destroyed when a natural disaster occurs (The Solidarity Center, 2019). Nothing truly escapes the volatile climate surrounding Haiti. Everything from the farms, to the schools, the hospitals, and the homes, are vulnerable to the destruction caused by extreme weather events. Currently, there are 4.4 million Haitians in immediate need of food assistance (World Food Programme, 2019) so fortifying agricultural production is the first step towards preventing another food crisis.

Haiti’s central location in the Hurricane Belt contributes to a recurrence of natural disasters in the region. Whether it’s a hurricane, earthquake, or flood, the impact on agricultural productivity remains negative. In analyzing the extent of damages after Hurricane Matthew in 2016, the United Nations found that “up to 100%” of crops were destroyed in affected areas. This resulted in a food crisis for 806,000 people inhabiting Haiti’s southwestern peninsula, which is the most vulnerable region to climate change (Food and Agriculture Organization, 2016). Earthquakes in the past have similarly wiped out crop yields but they have also caused irreversible damage to infrastructure and residential areas. The most recent earthquake which occurred in 2021, was responsible for leveling 53,815 houses as well as 83,770 buildings which previously functioned as schools and hospitals (Concern Worldwide, 2021). The farming community was brutally affected since their crops and the roads leading in and out of their villages to local markets were destroyed completely. Irrigation is out of the question since village waterways are either severely damaged or contaminated after events like these (less than 5% of Haitian farmers use irrigation - 2013 figure). The crucial food storage and processing facilities throughout the country faced damages too, and the collective impact of it all was that 980,000 Haitians were suddenly in need of food aid (Food and Agriculture Organization, 2021)

Although the country experiences a rainy season between April and June, and again from August to mid-November, the effects of climate change have altered weather patterns in Haiti. Particularly in the case of rainfall, Haiti will experience an intense period of drought followed by a torrential downpour that floods the terrain. These are poor conditions for the soil, especially on open fields. Too much sunlight can

dry out the soil and exhaust it of its nutrients, while an excessive amount of water can wash away top soils which are integral for cultivation (World Bank, 2017). Without the necessary defenses, the crops will inevitably face damage.

Haitian farms can develop climate-resilience by adapting their calendars to seasonal predictions. Many extreme weather events can be anticipated based on data, but for farmers to know this information, it is critical for meteorologists and climate experts to have a clear line of communication with them. Locals can also consider growing short-cycle crops before and after periods of extreme weather so that they can be harvested quickly (Food and Agriculture Organization, 2021). Several varieties of beans and vegetables have been known to do well in the southern parts of Haiti, including beets, okra, peppers, spinach, Lima beans, Roma tomatoes, and leafy amaranth (ECHO Community, 2016)

Planting trees (agroforestry) is a simple, yet effective way to prevent soil degradation. As vegetation grows, there is more organic matter in the soil to enhance fertility and lock in moisture. Water cannot easily evaporate in the presence of forest cover, allowing for harvests to occur even in periods of drought. These positive effects are further reinforced by agronomic practices such as harrowing, grafting, and mulching. To help irrigate local farms, it is encouraged to try programmed irrigation and small reservoirs. Flood mitigation is a little bit different, locals should use raised-bed systems and field dredging instead. These methods are helpful in getting rid of excess water and aerating the roots of crops, all while reducing the compression of soil. In the mountainous regions of Haiti, local farmers can utilize grass strips to prevent soil erosion and surface water runoff (Food and Agriculture Organization, 2021).

There aren't many practices to be implemented directly on farms that can protect crops against hurricanes and earthquakes. Farmers might be able to preserve their yields if there are early warning systems, but these need to be developed by local climate researchers and policymakers. Another way to minimize damage to produce is to add fortifications in storage facilities. Walls can be sturdier if they are made out of cement and roofing can be modified to drain rainwater with ease. Produce itself can last longer in processing facilities if UV lights are used for dehydration, and packaging must be able to withstand moisture (Food and Agriculture Organization, 2021).

In transporting produce, natural disasters pose an awful risk. Roads are oftentimes completely destroyed by the earth's convulsions or blocked because of rubble triggered by landslides. There have to be emergency plans for these vehicles that are carrying food items in times like these, allowing them to maneuver damaged areas and safely transport aid. Assessments and training on food losses during transportation should be conducted periodically. When it comes to local markets, weather advisories can help vendors in adjusting their prices on the days that they want to sell their products. Vendors can also use pumps and purifiers to collect rainwater if precipitation is heavy (Food and Agriculture Organization, 2021).

While these solutions can be sponsored by international organizations, it is better for local groups to take charge. The people have suffered more over the years from the interventions of foreign powers than they have gained. Historically, Haiti became the first black-led nation after winning its independence from France in 1804, but it was forced to pay back a debt of 150 million Francs (the equivalent of 21 billion USD). After another century the nation was occupied again, this time by the United States. The U.S. used Haiti's finances to pay off its own debts until 1934, finally giving the Haitian people their own sovereignty (Concern Worldwide, 2021). Although Haiti has had brief periods of political stability, the United States continuously intervenes in their presidential elections. This occurred right after the assassination of former Haitian president, Jovenel Moïse, last year. As Haiti's political elite scrambled to assume power, diplomats from the United States pressured the government into choosing now-President Ariel Henry as the new Head of State (*The New York Times*, 2021). The issue with this, according to civil rights groups, is that the Haitian people didn't get to choose their leader. They're frustrated with their nation's lack of autonomy and international aid organizations only tend to make this worse. In 2010, the U.S. Agency for International Development sent 90,000 tons of food aid to help the families impacted by the earthquake, but this unintentionally hurt thousands of local farmers who were trying to sell their own produce (Kushner, 2012). The best way to solve the food crisis is not by providing short-term food assistance, but by equipping farmers with the tools that they need to be self-sufficient in the long-term.

Acceso Haiti, Harvesting 4 Haiti, and the Smallholder Farmers Alliance are all terrific examples of local organizations that do this. Acceso Haiti is a social agribusiness that expands the market for local farmers and sponsors initiatives for all of the solutions listed previously (i.e. agroforestry, crop rotation, etc). Since 2014, they have provided more than 700,000 meals to impacted communities (Foodtank, 2021). In addition to covering short-term food assistance, they locally source peanuts, mangos, limes, and a number of other crops for sale to international buyers. This is an organization that is focused on empowering Haitian farmers with the modern tools that they need to succeed - a solution that is sustainable in the long-term. Harvesting 4 Haiti shares a similar mission of helping local farms "become self-sustaining." In a span of nine years, the organization has purchased six farms and equipped them with nineteen unique varieties of crops. Over 82 tons of produce have been locally sourced as a result (Harvesting 4 Haiti, 2022). While the founder (Frantz Dorcel) isn't native, he and his team have successfully mobilized rural communities to become self-reliant in times of food insecurity.

The Smallholder Farmers Alliance is another local organization which supports farming businesses. Their five-year Timberland Initiative involved 3,200 area farmers, all of which experienced an average increase of 50% in household income after participating in the program (Smallholder Farmers Alliance, 2021). Their model focused on reforestation efforts and provided seeds and tools to local farmers. A total of 4.9 million trees were planted by the end of their program, and each member farm experienced a 40% increase in productivity (Smallholder Farmers Alliance, 2021). Having large-scale NGOs like the World Food Programme and USAID redirecting their funding campaigns towards these local organizations, enables Haitian farmers to experience a second revolution. The first one gave them political independence, but this one will give them agricultural independence to last forever. With a combination of

weather-proof agricultural practices and domestic infrastructural development, Haiti will be well on its way to becoming a food secure nation.

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