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Jamaica, Climate Volatility

Jamaica: Rebuilding an Agricultural Empire Under Extreme Conditions

Jamaica is the country that 0.04% of Earth's population calls home ("Jamaica - Place Explorer"). Though that may not seem like much of humanity, Jamaica's population consists of 2.287 million people as of 2021 ("Jamaica - Place Explorer"). Jamaica struggles to overcome the challenges of climate volatility. As the country is located in the Atlantic hurricane belt, it is constantly overwhelmed by the unpredictability of extreme floods and severe droughts ("Still Standing"). Jamaica's typical climate is a dry tropical environment ("That's How Warm It Is in Jamaica"). The climate is challenging to sustain crops and resources, so adding devastating weather conditions is a serious challenge. Climate volatility has a harsh domino effect on Jamaica. The damages these conditions cause take a toll on not only the economy but the community as well. By building dams throughout Jamaica, not only the local communities but also the country would benefit. Introducing and properly educating farmers and other citizens on operating and running these structures is just as crucial as the resources themselves. We must find a solution to Jamaica's climate issues because they are not only damaging Jamaica's beautiful land, but these issues are damaging families and residents ("Still Standing").

Jamaica is primarily self-sufficient, with a diverse terrain throughout the island ("Countryside Studies"). Although Jamaica has many mountains, most of the country consists of plains and beaches. Of the whole island, 41% is cultivated ("Jamaica - Agricultural Land"). Because the beach terrain is rocky, mountain-like land, it limits farm sizes to one hectare ("GreenhousePlants"). The average small family farm in the U.S. is almost 100 times the size of the average farm in Jamaica ("Countryside Studies"), ("Brown Thomas"). Despite this, Jamaica produces and exports a considerable amount of sugar and bananas. Aluminum and Bauxite are among the minor exports of the country ("Morgan"). Farmers withhold enough crops for survival and sell the remaining for wages.

August 6th will be the anniversary of Jamaica becoming an independent country ("U.S. Department"). Over time the success rate of agricultural production and exporting has declined. After starting with a booming production, today's numbers show just how the climate can seriously affect an area over time. Jamaica's leading agricultural export has been bananas and sugar ("Oliveira"). These products are a significant factor in the success of their economy. The weather conditions affected the drastic decrease in banana production in the 1970s. Excessive water intake has harmed parts of the island of Jamaica ("Difficult Times"). Due to flooding and droughts, it became challenging to grow and produce bananas. Jamaica went from producing nearly 190,000 tonnes of bananas a year, as recorded in 1972, to being cut into less than half of that amount today ("Jamaica's Banana Production-1961"). The results are similar for sugar production. In the same year as the banana production dropped, sugar manufacturing rates also fell. The sugar production numbers have been more devastated than the banana records. Over time, the amount of sugar exported has hit an all-time low of around 500,000 tons, nearly 3.6 million less than what was exported in 1972 ("Jamaica Sugar").

"My parents immigrated to this country from Jamaica with no more than a fifth-grade education," stated Wayne Messam ("Sankofa"). Though there is access to free education for any citizen of Jamaica 6-16 years old, not everyone completes school. The only children who attend school their whole lives are the ones who come from wealthy families. Low-income families in Jamaica can not afford for their children to complete school ("The Education System in Jamaica"). Free healthcare is also available for all children under 12 ("Morgan"). However, we learn being free isn't always better. Jamaica believes there is no importance in providing the proper care for citizens struggling with mental health. Research states that of

every four students in Jamaican schools, one has thought about or taken action in committing suicide (“New Mental Health Support”). School is viewed as more of an escape outlet as opposed to a way to learn for children within the country. Jamaica’s communities are filled with violence and negligence. Having a lack of trustworthy school officials leads to students often feeling alone. Males are affected the most by this as they are pushed to develop a strong reputation and enter the world with a stereotypical mindset. Bullying and threats in and outside of the school have a traumatizing effect on young individuals. The children of Jamaica can't grow and develop into strong leaders when their childhood negatively affects them. The viral COVID-19 pandemic has a huge scarring impact on the youth and the community. Once the world shut down longer than what was the initial idea, faith disintegrated. All hope was gone for what the previous normal was to return soon. COVID hurt the mental health of citizens even more than the tragic state students were previously battling (“Make School in Jamaica a Safe Place”).

“No one should take any chances by remaining on or near the coastal areas,” says James Ryan from Cayman’s National Hurricane Committee. As an executive vice president and chief operating officer of a national committee, James Ryan has years of expertise (“Ferocious”). Since 1970, Jamaica has been hit with 44 hurricanes, four of which are well-known significant hurricanes. Allen (1980), Gilbert (1988), Ivan (2004), Dean (2007). These four hurricanes alone caused an average damage of 820 million altogether (“Hurricanes in Jamaica”). In addition to the hurricane damage, Jamaicans lost all the money they would have received from selling their produce. The income loss hurt Jamaica's economy and families. Most Jamaicans are self-sustained and use what they grow to survive. In Hurricane Gilbert, 500,000 homes were destroyed. One hundred thousand of which couldn't be repaired (“Joseph”). One in Eight of the roofs on homes in Jamaica were gone (“Hurricane Gilbert”). These are not just stats, they are the Jamaican reality. Hurricane season for Jamaicans lasts from June 1st to November 30th (“Hodson Mark”). Jamaica is surrounded by the Caribbean Sea, leaving it in the prime of extreme weather (“Hodson Mark”). The six long months of intense weather in such a location make it difficult to recover not just the land and homes but the mental state of mind of citizens.

Climate Volatility causes water scarcity throughout the island. Ironic as it sounds, once hurricane season passes, Jamaica goes into an extreme drought (“Reap Country Case Studies”). There is hardly any water left once the floods dry out. Climate Volatility causes water shortages. Jamaicans barely have enough water to use for themselves and much fewer available crops. The cycle of insufficient agricultural conditions in Jamaica is a serious problem, as it is only expected to digress (“Reap Country Case Studies”).

One of the worst recorded periods for Jamaica was 2014-2015. Agricultural production diminished to 30% of the previous yearly rates. This totaled a 6.5 million dollar loss for Jamaica’s economy (“Still Standing”). This showcases how the sustainability of agriculture within the island was nearly impossible in these conditions.

The present status of climate volatility in Jamaica is extreme rain from August through October and severe droughts from December to April and return in July (“Sheikh Asjad”), (“SemiColonWeb”). Water scarcity endangers food security for all of Jamaica. The rising sea levels, intense hurricanes, and severe droughts are all a part of the cause of this issue. Rising temperatures contribute to the harmful effects of climate (“GreenGrants”). These conditions affect the terrain, farmers, and community. The inability to grow crops is a cost for farmers. Farming is one of the most common and essential careers Jamaicans can have. With the weather conditions destroying the majority of the farmland, it isn't easy to find people who are interested in going into the farming industry. Seeing as the majority of the economy is based on agriculture, this is a significant issue.

“Promoting climate action and resilience to environmental shocks is critical to sustainable development,” Stated Malden Miller, a Caribbean Regional Environmental Specialist at USAID. “This tool is a great

example of how, with funding and technical assistance from USAID and collaboration from partner governments, we can make real change" ("Still Standing"). By building dams throughout the low points of Jamaica, to catch and preserve water, Malden's mission could be a success. Dams not only control the water that hits the land but can distribute water while in the drought season. This solution could meet the needs of all of Jamaica's population. The best path of action pertaining to the involvement of dams is using my proposed plan of education, build, evolve, observe, and adjust (EBIOA).

The first step in this plan is educating us as the problem solvers and the community of Jamaica. Learning about the cost, benefit, and process of how dams are built as well as common errors other researchers have encountered. The average dam costs 6-10 billion to build ("California State Water"). High construction rates mean there needs to be a way to generate funds for the cost of a dam. Though It may be proposed as a disadvantage due to the high price, research shows the benefits dams can hold in the long term.

Jamaica could introduce a new tax for citizens to get the funds for this project. This tax should be based on a percentage of how much an individual citizen makes annually. If taxed an annual average of 5% of all incomes over the middle-class average and 3% of every income under the middle class, within three years, there would be enough funds to build a dam. If this tax has a negative outcome on a Jamaican family's economy, the tax rate could be reduced. However, this isn't ideal as it would push back the date the dam could be built. The dam would not only hold and distribute water, but it could also provide hydropower. Having a renewable source of energy would aid in the farming industry. Lighting, heat, central air conditioning, and overall equipment operation are all necessities for success ("The National Agricultural Law"). This electricity could be put to use in areas of need. The water collected from the hurricanes and held in the dam is an excellent source for irrigation in the fields. Because Jamaica is a very agricultural-based country and water scarcity in crops is a huge problem, having a reliable source for irrigation is essential. The flow of water distribution is vital for successful agricultural growth in Jamaica. Building dams also create jobs for more Jamaican citizens. This benefits the family and the economy.

There are a few negative factors that need to be considered when thinking of building a dam. Educated workers need to be available at all times in case of a malfunction with the dam. With proper training, a person could quickly learn to manage the dam. Educating workers for this project is a big role in the outcome of success. Another challenging factor is the issue of slow water flow and the chance of algae growth. An efficient way to prevent algae or bacterial growth is simple water movement. Algae typically live in still-water areas. If the dam is constantly cycling water with a filtration pumping system, this helps eliminate the chance of bacterial growth within the dam. A filtration pump can also manage the typical debris that could accumulate.

The next step in my plan is to begin the building process. When building dams, first, one must establish a place. Most flooding in Jamaica typically happens near gully banks; that would be the best place to install a dam within the island ("Jamaica Information Service"). The actual building process starts with the walls. After making sure the flow point is facing the main wall, the edges would be constructed. Finally, everything is filled in with concrete and smoothed out. As this is just a summary of the overall process, it can help us have a better understanding of what the building process involves ("How Are Dams Built"). Construction building rates typically take many years. So, building this dam would have to be a high priority. Fast construction rates depend on local conditions, weather, and dam size ("How Long Does"). Typically the lifespan of a dam is 100 years with proper maintenance and construction ("Marlette"). This will benefit many generations to come.

After building, involvement is the key. When installing such a vast structure, many workers are needed. Having workers is yet another benefit created when building a dam. Dams are a solution that keeps on providing. It could generate a source of jobs for Jamaican citizens. Involving the country will help them

better understand the importance of dams and the positive impact they have on Jamaica. As of 2018, nearly 10% of Jamaicans are unemployed (“Jamaica Unemployment”). The need for workers could help the unemployment rate and target those needing a job. Adding jobs for the unemployed will also help benefit Jamaica’s overall economy. Having hands-in on such a beneficial structure for the success of the country will make citizens appreciate the effort.

The Fourth step in my “EBIOA.” The plan is observation. Once the dam is built and staffed, it is essential to watch how things operate. Observing how the dam affects Jamaica is arguably the most crucial step in my plan. In theory, this is a perfect plan to help solve climate volatility in Jamaica. However, as with every solution, flaws can occur. After Hurricane season has allowed the dam to function, we should observe water holding rates, distribution, and structural integrity. We must also observe the environmental issues the dam may introduce. Dams are known to often release greenhouse gasses and destroy carbon sinks (“User Guest, Protect the Environment”). With precaution, this can all be avoided. A small change we can make as we observe the dams is planting native plants along the dam's exterior walls. This will in the end reduce any nutrients that could enter the dam (“Farms Dams”). Greenhouse gases are one of the leading causes of climate change. These gasses can emit into the air and create a thermal blanket trapping heat (“Causes and Effects”). Another issue we could hypothetically run into is the destruction of carbon sinks. As we clear land for the construction of this dam, there is a chance trees will be lost. Restoring them after the structure is complete is crucial since they are what aid in the survival of carbon sinks. A carbon sink is needed to absorb all of the carbon admitted into the air (“About Rinkesha”). As Jamaica is a tropical country, it’s also important to observe wildlife. Overall, large dams can lead to the extinction of marine life, deforestation, erosion of water distribution, and harm to the overall ecosystem (“Environmental Impacts”). If we observe and are aware of all of these possible issues as we try to make a solution, in the end, we can better provide and preserve Jamaica.

Following the observation stage, the final step in my plan is to adjust. After observing how a dam affects Jamaica, we can modify and adjust the structure. After the dam's construction, we can slowly modify this structure into something that produces more benefits for citizens. Initially, the dam's primary focus was to hold back and store water to protect agricultural fields, homes, and the population as a whole. Seeing as erosion and sediment flow typically always end up in dams, we can modify the structure by installing catchment restoration and performing soil conservation (“Reducing Dam Impacts and Costs”).

Over time dams can be a multi-purpose source. They can be modified for recreation, hydropower, tourism, and more (“Colorado Academic Standards”). This is yet another source that can continue to replenish Jamaica’s economy. The success of building the dams opens the door to many opportunities for Jamaica. Following through with this will help educate us as researchers on using this solution to modify and assist in conquering the challenges of Climate Volatility across the globe.

In making these changes, Jamaica can become the agricultural empire needed by the world. Jamaica is damaged by six long months of intense hurricane weather, followed by the remaining six months of the year being extremely dry. With these conditions, it is necessary to find a solution to help Jamaica establish a secure food supply. The economy, community, and the well-being of citizens of this country have all been harshly affected by these issues. Survival is at stake. Building dams will help solve Jamaica’s problems. They can hold and supply water in the extreme seasons, and agriculture will no longer have water-related setbacks. Educating farmers and the community will teach them more ways to protect themselves and their farms. Putting small changes in place, such as planting trees, growing new crops, elevating beds, and building a drainage system, will assist in rebuilding the economy and health of Jamaicans. We must do this to save the millions who live there. Jamaica provides plenty of resources that can benefit the world. Standing as a whole and helping Jamaica rebuild its agricultural empire will save not only the citizens of Jamaica but the fantastic resources they can offer to the world.

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