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Dominican Republic, Sustainable Agriculture

Dominican Republic: Working With the Weather

The very popular Caribbean country, the Dominican Republic, has certainly seen its highs and lows in agriculture. Although the country has seen some major improvements within the last decade, is this really enough to combat the list of challenges and obstacles the agricultural industry faces? Between natural disasters, constantly changing weather patterns, pest outbreaks, and malnutrition as well as poverty rates, farmers are in search of sustainable solutions to keep up with providing for their families and the country while battling these challenges. Most plans that have been implemented may be beneficial but are not exactly cost-efficient for small-scale farmers. Even though the Dominican Republic is a developing country, farmers are struggling to maintain efficiency with these obstacles, and money is not an item that comes easily to the country. The industry provides jobs for many people in the country, including one-fifth of the Caribbean population (World Bank). Small farms represent over half of the land, which brings both positive and negative impacts to the industry, and again brings challenges when it comes to helping these farmers make a living when changing weather patterns and conditions are constantly changing.

The Dominican Republic is located on the island of Hispaniola and is considered the second-largest nation in the Caribbean. The island is located between Cuba and Puerto Rico and is located right next to the island of Haiti. Haiti represents one-third of the western part of Hispaniola, meaning it shares the island with the Dominican Republic. The Dominican Republic is home to almost 10.6 million people, and believe it or not, all of these residents rely on agriculture and industry to survive (Stoltzfus). Approximately 83.21% of the population lives in an urban area, with about 16% of the population rural as of 2021 (World Bank). The country's constitution was adopted in 2010 which ultimately separated the power into three branches, leaving the government classified as a Democratic Republic (Global Edge). Out of 48,671 square kilometers, 50.28% of the country's land was cultivated for the use of agriculture. Major crops that the country produces include rice and sugarcane. A majority of the exports that bring in revenue for the country are sugar, cocoa, coffee, and tobacco (Trading Economics). Ninety percent of the farmers are unable to own more than 10 hectares of land due to the amount of labor and the rise in prices (World Bank). For reference, 1 hectare of land is equal to about 107,639 square feet and contains about 2.47 acres. Small-scale farmers are common but have many obstacles that they face while trying to provide for their families. The weather in the Dominican Republic is naturally very warm, due to being near the equator. This warm weather creates a struggle with floods, storms, mudslides, and droughts with increasing temperatures being a major factor.

The average household is about 3.5 people with an average of 2.3 children. With this being said, fertility has been declining (ESRI). All nutritional needs are met in a daily diet. Protein sources include different types of meats and seafood paired with grains including rice and corn, wheat, vegetables, fruits, and dairy products including milk and cheese. The Dominican Republic only imports 16.6% of the country's intake of food, meaning that most products are grown and produced within the country (Trading Economics). Many different cultures like Taino, Spanish, and African have influenced Dominican cuisine over the years. Upon the arrival of the Taino, in the Dominican Republic, there were limited numbers of mammals to hunt for meat, so the majority of the protein came from seafood paired with popular vegetables such as cassava and sweet potatoes. Spaniards introduced meat from mammals, and Africans introduced the use of plantains (Dominican Cooking).

To make a living, families hold a variety of jobs other than farming to support their families. Although farming is popular throughout the country, other jobs are needed to help the economy. Tourism, manufacturing, mining, real estate, and service industries alongside agriculture are vital to the country. Based on a ten-hour day, the minimum wage was 8,310 Dominican pesos a month, which is approximately 152 U.S. dollars (International Trade Administration).

The Borgen Project reports numerous statistics on education in the country. The education system is one of the most underperforming education systems. It is split up into three stages; preschool, primary, and secondary. Preschool is for ages 3 to 6, primary school is for ages 6 to 14, and secondary education is for ages 14 to 18. After high school, some students may go to college; however, primary schools are not strictly enforced and secondary education is not required at all (Lipp). Compared to some third-world countries, the Dominican Republic is prosperous. The country's literacy rate is 92% in the country, however, those who go on to college education are reported to have only a sixth-grade reading level. About 40% of students drop out before eighth grade. Most of the issues found in the education system that are preventing learning in the classrooms mainly have to do with poor-quality classrooms, old or useless curriculums, and overcrowded classrooms (Lipp). Education is extremely important, and the Dominican Republic does not have the facilities to enforce and require education, creating a low success rate in sending students to higher levels of education. Curriculums are proven to be lower and less successful than in some other developing countries. Overall, education is valued but not pressed upon children, creating the cycle of poverty when some struggle to find jobs.

“Dominican youth, particularly the poor, face structural barriers to labor markets, including insufficient education, poor life skills, and weak job skills to transition from school to work” states the World Food Bank (World Bank). The average costs of living in the Dominican Republic are sufficiently lower than those in the U.S.; however, it doesn’t mean the average families are wealthy enough to support these costs. If you look at the economy, everything runs together in a big cycle. Poor education and life skills lead to these weak transitions to jobs, which lead to families in poverty due to the fact that they are unable to earn enough money to provide everyday necessities, including food. With the issues of natural disasters and inflation costs, food is not cheap to purchase within the country. This cycle is consistent and non-stop, and this is where many start to see malnutrition become common in households and schools. About 40.4% of the population lives in poverty where food is a major issue. 25% of children under the age of 5 suffer from anemia. This is 7% of children under the age of 5, and obesity and anemia affect 1 in every 3 women alongside almost 61% of children between the ages 6 to 11 months (Stoltzfus). Trends and statistics have shown that there has been an improvement over the last few years; however, this change is not happening enough. The biggest contributor to this issue is the lack of access to affordable food. It is affecting people of all ages; however, children are seeing the most damage to their bodies as they require plentiful, nutritious food to ensure healthy growth.

Sustainable agriculture is popular throughout the world, and might just be the solution to the issue of natural disasters and destruction caused by weather, which has a clear tie to malnutrition in the Dominican Republic. A potential solution has sprouted from the country of Lebanon, a small country facing food insecurity crises with financial collapse. Farms Not Arms is a group of people passionate about designing farm models that are sustainable and help solve issues like food insecurity and social cohesions. After addressing the issue in Lebanon, the group came up with a farm design that would not only be beneficial within their focus community but in countries across the globe struggling with the same major issues. Creating community gardens across this country would not only help provide fresh foods to the community, but can also be easily accessible and maintained when it comes to major rains, flooding, mudslides, and hurricanes. “We’re using hydroponics to develop nutrient-dense food grown faster and in

larger volumes, and then having education be the binding thing where we have the people who are involved learning all of those different agricultural skills" (Zagami). Combining these hydroponic systems with greenhouses and sturdy buildings would allow safety for the crops being grown inside with the resources to grow the products faster, leading to a more efficient harvest period. It may also provide jobs in these communities for those who do not have a full education and can be a place for socialization, just like Lebanon was utilizing these spaces. These greenhouses could grow numerous crops including specialty fruits and vegetables since the garden would have the ability to be under close supervision. Direct attention to these crops would also allow room for studies to be made. These studies could conduct experiments on different nutrients and amounts of water used to successfully and efficiently grow the crops within the structure.

Although there are many benefits to these structures, there are some questions that need to be answered before considering installing these greenhouses across the country. The major question for this solution is for a population of over 10.5 million people, will it be enough? It is a great project that could be taken on by the World Bank or even non-profit organizations; however not many would be put in place immediately after comparing the costs of the technology involved. It would be heavily community-based after being implemented, so the project would be worth conversing about which communities within the Dominican Republic would truly benefit from. Another thing to consider in this project is the projected price. Greenhouses can be extremely expensive to build, and the downside to this solution is there would be more than just a few being installed across the Dominican Republic. It may be a considerable idea to test this project out in a few different communities to see the outcome and whether it would be beneficial in the country. It certainly would contribute to sustainable agriculture as long as there is enough interest and effort that is willing to be applied. In order for these greenhouses to be put in place, it would require support from the Dominican Republic government in many ways, shapes, and forms. Although it would be taken on by the World Bank, some initial funding would be helpful in starting the development of these greenhouses. Along with funding, the government could also assist in blueprints and assist in working out architectural boundaries that each individual community may have. One of the biggest concerns would be finding the electricity and having enough electricity to power these houses correctly and efficiently. In the scheme of things, the most difficult part of the government getting involved with this process would be dividing the attention and funding to make it happen. Depending on the person you talk to, sustainable agriculture may not be their number one priority, and therefore it could become very difficult to persuade government officials to supporting such a large and costly project.

An even more effective and efficient solution would be more focused on the large pieces of land that can not feasibly have a shelter to protect them from the weather. In an article written by Charles and Seltier, they discussed the more recent effects of extreme flooding, droughts, and hurricanes affecting banana plantations. It has been proven that coconut trees are made to survive these tropical storms, and can potentially be a solution to some of these issues. The idea of adding coconut trees to family farms slowly became a trend. Charles and Evelyn write, "The initiative is part of the second phase of the Coconut Industry Development for the Caribbean project launched in 2015 and funded by the European Union and the African, Caribbean, and Pacific Group of States- and now also CARIFORUM for Phase II of the project. The International Trade Centre implements this project jointly with the Caribbean Agricultural Research and Development Institute" (Charles and Seltier). This is a potentially overlooked solution to sustainable agriculture in the Dominican Republic. It seems so simple yet implementing new cover crops could be the most cost-effective and easiest solution that takes on both the weather and malnutrition issues that the Dominican Republic faces.

As stated before, this is an even more effective solution that should be implemented in the country. Although it may not solve the problem of how to create more sustainable agriculture, it certainly is a big step forward in the right direction. The plan of action would begin with farmers introducing coconut trees to their land (if they have not already done so). Mixing these coconut trees would provide a stable cover crop that would not only encourage healthier soil but would provide a second income for these small farms that are struggling to have a consistent and fair income. It does not mean that banana plantations will be eliminated but will provide a stable income that assists with healthier soil. Funding-wise, it would not be difficult to utilize organizations like the World Food Bank; however, since there are no major structural changes to farms, most of the funding would be covered by farmers when purchasing their trees. This is another place where the government could easily step in to create a policy, law, or tax that provides farmers with funding to implement these coconut trees.

Donations of trees would be the most ideal and could assist the farmers in getting started with their projects as these trees can last from 6 to 10 years before the production of coconuts stops. This solution would be an easy way to encourage sustainable farming practices within the country as no major policies would need to be in place, and it is already a production item well known in the country so it would not interfere with cultural norms or behaviors. The only issue this solution may run into is the fact that the Dominican Republic is a major supplier of banana exports to countries across the world. The OEC (Observatory of Economic Complexity) writes that the Dominican Republic exported $348 million in bananas, bringing them to the eighth largest banana exporter in the world (OEC). These farmers would still be able to produce the same amount of bananas while growing coconuts, creating more of an income for the farmers and bringing more products for the country to export. Bananas were only the fifth largest export for the Dominican Republic in 2020, and this points out that bananas are not the only source of income for the country, which was discussed earlier in the paper. Cocoa beans and natural resources are the two biggest exports of the country, and to put things into perspective, the country of Indonesia is the largest coconut exporter in the world which exported about 17.16 million metric tons of coconuts in 2021. Comparing numbers, there is room in the market for coconut exportation, and realistically would not harm the Dominican Republic. These trees thrive in the environment because of the consistently moist soil and constant warm weather, making this solution a perfect storm for small-scale farmers looking for income and a sustainable farming system that doubles as a cover crop.

In such a developing country, people are always looking for ways to improve issues. Most of these solutions are required to be reasonable because funds are not the most accessible within the country of the Dominican Republic. This is why when thinking outside of the box, sustainable agriculture does not always need to require major technology with a huge price tag, but rather a solution that will be beneficial and complimentary to all small and large scale farmers throughout the country. Maintainable solutions are valued and realistic for developing countries such as the Dominican Republic, and implementing small things like greenhouses or more coconut trees will make an impact. Agriculture is vital to everyone across the globe, and it is used for so many amazing things including providing nutritious food and plentiful jobs. While it seems like an extremely large task to take on, every individual in the Dominican Republic can and should have the ability to advocate for sustainable agriculture. Testing these cover crops could be a great school project for students to test on different plants. This research would be very useful to not only the Dominican Republic but tropical countries across the globe, all while supporting and growing sustainable agriculture in the Dominican Republic. Surveys may also be taken of the population to discuss what needs are not being provided in the community and could be applied to greenhouse research as another potential solution. There are so many different ways that students and adults may be able to be involved in the development of their country, it just takes one to start and believe that an impact can be made. To ensure the agricultural industry stays stable and growing, it is important to use resources and

think toward the future by applying sustainable agriculture to everyday life to encourage growth in every country.

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