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Water and Sanitation

## **CUBA: Making Clean Water for Ourselves Addressing Food Insecurities in Cuba with Water and Sanitation Improvements**

Cuba is a country in the Caribbean known as an island surrounded by Caribbean Sea. With its description as an island, you may think water is a natural resource that's plentiful to the people who live there. However, many people who live in Cuba face challenges because of the lack of adequate water supply. This lack is caused by outdated water systems and weather events like long droughts. (Kesselring, 2017) While the majority of people living in Cuba are generally happy and healthy, the lack of water can impact the availability of food which can mean they have more than one major source of lack. Water isn't only a basic need, but it's essential in support of other basic needs like food. We need water for many reasons including cleaning our bodies and homes and to consume for our health and well-being; and we need it for growing, preparing, cleaning, cooking, and serving food. As we think about food insecurities across the world and the importance of water, we must also think about sanitation which can impact cleanliness and health concerns. In considering opportunities to explore for global challenges, Cuba's water and sanitation began an interest to me. Everyone needs water and sanitation, so it is hard to imagine how a country can manage without an adequate supply as it impacts health and economy. Without people across Cuba having a continuous supply of clean water, I'm concerned of their ability to produce or access clean food. Without improving water and sanitation in Cuba, other efforts to address food insecurity may not be as successful because of the importance of water with food insecurities.

Cuba is very unique as a country with a population of more than 11 million, and greater than 22 percent of their population is rural. (World Population Review) The rural part of Cuba could be used more for agricultural activities; however, the rural population is typically faced with the greatest challenge of water and sanitation because of limited updated water systems. (Kesselring, 2017) While their government is a democratic centralist political system, some of the people face greater challenges than others. (Sawe, 2019) Cuba may not have access to supplies from other countries and their resources because their previous leader didn't have good relationships with other countries like the United States of America. The United States currently has limited interactions and economic practices with Cuba. (U.S. Department of State, 2019) This

could have limited some resources to them. One of Cuba's environmental issues is water pollution. (Country Reports, 1997-2020) The measurements by the World Bank in 2011 provided more than 60% of Cuba's land is farmland with many farmers which support exporting items like sugar, honey, etc., but they also import food. (Crowell, 2016) While having this amount of farmland helps with the production of food, the agricultural needs are also a

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demand on water. With more water supply, Cuba may be able to increase the percentage of land for farming to help with food insecurities. Increasing water for agriculture could also build a source of economics for Cuba by increasing their exports. The general climate is tropical and humid with a geography that is mostly flat to rolling plains. (Country Reports, 1997-2020) With this climate, Cuba may be able to produce more food with an adequate water supply.

Families in Cuba may average around three people whose homes are mainly a one or two-story concrete structure. (United Nations, 2017) A typical family diet might consist of rice, legumes, potatoes, bread, eggs, and meat with the Cuban government pushing its citizens to eat more fruits and vegetables to address health challenges. (Edwin Makarevich, 2018) Water would be essential to their diets to produce, clean, and cook food. Water is also important to clean and maintain their homes. Without proper sanitation, the families may have problems with health concerns that could be from not cleaning their food or their kitchens well.

There are many different types of job opportunities in Cuba. With jobs such as mechanical engineers, nurses, business analysts, and business developments, their salaries may average around 494.4 pesos monthly (for a teacher) which is 18.66 dollars in the United States. (Teleport, 2019) Many of these jobs require water, especially nursing, to ensure the people are healthy. Education and healthcare are provided by the government taking most of their national budget, and some citizens have access to clean water, toilets, electricity, telephones, roads, and local markets. (Ravsberg, 2017) The people enjoy having this access, but many need much more. They are generally an educated population, but lack resources. Their water systems are outdated and sometimes people may go days without access to clean water after an extensive weather event like a drought. (Derks, 2017) Clean water is necessary to produce food as well as consume healthy food. Even clean water is needed to raise animals and plants as a source of food as well as health and well-being for humans. Major barriers faced by families in Cuba, including earning a living and access to nutritious food are

food shortages and continuous water and sanitation supply. “Cuba seems like a water-rich country, with abundant rainfall, rivers crisscrossing this island. But it has struggled to provide enough fresh water for its people.” (Erickson, 2017) The citizens of Cuba continue the challenge as they watch others travel into the country assuming they have sufficient water.

Water and Sanitation can be a significant global challenge for countries without satisfactory resources for advancements and upgrading main systems. Clean drinking water and adequate sewage disposal impacts human hygiene and health. Water is important for most activities and really affects food availability. Some Cubans have access to better water resources and sanitation in the urban areas. (Derks, 2017) They are trying to improve the systems and work to help all Cubans have improved resources. (Kesselring, 2017) Cuba has managed to maintain with its water and sewage system, but the systems are outdated. The rural population is likely affected the most and water limits also hinders agricultural opportunities. Most rural areas are known for raising crops and animals; however, without access to clean water, the rural populations may not be able to farm for food. The people seem

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to work together and help each other. In addition to the outdated water systems in Cuba, the water decreased due to reduced rainfall for long periods. (Grogg, 2018) The citizens should seek to work with the government in gaining understanding of how to improve the use and storage of water. It is noted that there is a lack of a culture of water saving. (Tribune, 2020) As the government has challenges in Cuba, it needs to embrace its own resources including citizens. They need solutions where everyone can play a critical role and build a culture of water security. Cuba’s challenge of water and

sanitation has been recognized by other countries, and there has been some attempts to help. Even the United States has offered to help in the past; but that assistance was not continued. The following solutions have been or are being considered for improvements: (1) Comprehensive supply and sanitation plan to solve losses in distribution of water, (2) increase water waste treatment, and (3) Seawater desalination plants. (Grogg, 2018) There are some strengths to each solution including using reusable resources and natural supply for long lasting improvements; however, there are some weaknesses to each of these solutions including cost, risks of waste affecting the water, and solutions taking too long to implement. Most of these solutions depend on help from others, because Cuba may not have the money or equipment. While Cuba

has a generally educated population, there is a lack of sufficient resources, aid from other countries, and collaboration with the citizens and government to preserve and use water resources in a manner to overcome their challenges that impact food and sanitation.

After looking at the solutions that may have been considered for Cuba and thinking about the current situation the people face in continually getting adequate water and sanitation, I don't believe the solutions listed above will meet all the needs of the population in Cuba. Also, it may take a long time to finish these solutions. I recommend a solution that can help all the Cubans, in rural and urban areas, have some control over the improvements. The country needs a solution where the citizens and the government can develop a collaboration to improve their water supply. I recommend developing a dehumidifier that can extract water near each family's house and filter, sterilize, and store water from vapors that exist in the humid air. This would allow families to have direct access to additional water when they're not able to get water through the government. The solution may not cost as much as a large system, so they may be able to do it sooner to help the people. Since Cuba is surrounded by water with a humid climate, I think there would be water vapors in the air that can serve as an additional source of water. This water would also help with sanitation efforts. If the people have their own source for additional water, they can contribute to the solution of improving food insecurities through better water and sanitation sources.

My solution is to design a dehumidifier similar to one in my house. My family has dehumidifiers to keep moisture out of our basement. Our dehumidifier sometimes collects about one gallon of water a day in one room by pulling water that we can't see out of the air. When it rains, we see more water collected. With the humidity in Cuba and hopefully some

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rain, I think they could have a lot of water to use at their homes. I would make a dehumidifier with at least a five-gallon tank to try to capture that much each day for each house. Some houses may have more than one dehumidifier if they can produce more water. I would design this dehumidifier to have extra settings to sterilize and filter water. This water can be connected to a large tank with pipes so it can be stored near or in the homes and can be used for cleaning and cooking. This water could also be used for growing and producing food like plants and animals. Considering the humidity in Cuba and the technology of a dehumidifier to collect water in a in a damp space, this solution should be a cost effective and efficient way for the citizens to gain water when

needed. There are so many possibilities of using the water from a dehumidifier including flushing toilets, cleaning, and ironing, even without sterilization. (O, 2020) Each family would be responsible for storing their water each day in case they need it during a water shortage and to keep the water from sitting up too long. They would also need to keep the dehumidifier tank clean daily. "Whether water from a dehumidifier is drinkable depends how clean you keep your tank and how long the water has been sitting around." (Joe Schwarcz, 2018) If families decide to grow vegetables in a garden, they could use the water. If families raise animals for food, they could use the water for agriculture.

Since my solution includes a dehumidifier, filter, and sterilizer, I would call it Austin's Filtered Water Extractor. This machine would be unique because of the many functions it provides. I would work with engineers to design it as a project. I would build it small enough for each family to have space for one at their houses. Depending on the families use of the water, it could last them for a day or two. The machine would be designed to be easy to use and comes with instructions so all families can use it. In recent research, I found a "Do It Yourself" method of making dehumidifiers; therefore, the design and materials should not be too expensive or difficult. The machine would have additional compartments to double filter and sterilize the water for use by the families. The families would capture and contain the water every 24 hours so it does not sit up long to build mold. We could design large and small machines to meet the varying demands of families of different sizes. The government could distribute the machines and provide instructions on use and maintenance as well as water storage. Families who choose to use the water for farming should receive larger machines and a government incentive, because their use of the water can help with more than one challenge.

My solution would address food insecurities as we increase the water supply and access to clean water in Cuba. As organizations try to decrease hunger across the world in places like Cuba, access to clean water and sanitation must be provided. Since it may take a long time to update Cuba's water system, my solution could give families a temporary solution to continue to help themselves in getting more food and staying clean. In 2015, Codi Kozacek said "Even when enough food is available, polluted water and inadequate toilet facilities can lead to malnutrition, especially in children." (Kozacek, 2015) Water is so important, and the Cubans would benefit from having an extra source of water to improve nutrition. This solution should not be difficult for the government unless funding or supplies are not supported.

One source to consider managing and leading the project for Austin's Filtered Water Extractor would be the United Nations Development Program. They have funded other similar projects for countries to solve global challenges. (United Nations, 2018) Maybe the European Unions could fund the project based on their interest in helping Cuba with other projects. There is tourism that could also help with funding as a way to support Cuba. Since many organizations now have interest in solving world hunger, I could ask for a group of organizations to fund the project together. The project helps with water, sanitation, and food insecurities with a quicker and affordable process, so I hope many organizations would be interested in helping the Cuban families get these machines for their homes.

The Cuban community should help with the solution by conserving water that is extracted and supporting the new project by cleaning and maintaining their machines. A Water Conservative Policy should be in place to ensure everyone understands and complies so the project can be sustained. The Clean Water Act would be shared with the Cubans to help preserve and keep fresh water. The families would be taught on the importance of clean water and the use of their new machines to help with sanitation and making food available and clean. They would be required to keep the dehumidifiers clean and maintained. In order to assure the water is safe for use, the families need to make sure they follow a regular cleaning and maintenance schedule for the unit, paying special attention to the water collection tank. (O, 2020) An additional way to make sure everyone complies so the project is successful is to set up a law that could fine those who don't intentionally or properly use their machine. The government should give an incentive to anyone willing to help families with maintenance or use the water for production of food. The government should take time to educate the families on the shortage of water, reasons why water saving is so important, and their critical role in the success of the dehumidifiers to provide water.

Cuba, a Caribbean island, has a great need for water and sanitation improvements even though it is surrounded by water. They need an updated water system, and they have had long periods of droughts. These conditions can cause food insecurity in Cuba, in addition to their water and sanitation challenges. Many Cubans are often faced with a lack of water which can affect their health and the economy. Additional water would help Cuba with food insecurities as they can have more food available, including agriculture to raise their own food. I'm interested in solving the global challenge of water and sanitation for Cuba with a project to provide direct water to the people and an opportunity for citizens to be a part of the solution. This solution could be in place while the larger government projects continue to develop for the

overall improvements. Austin's Filtered Water Extractor would address food insecurities in Cuba with additional clean water and sanitation improvements. My hope is to help Cubans have the water they need for consuming, but also enough for personal hygiene, sanitation, and food production and availability. This is my idea to contribute a solution to decrease world hunger and thirst while improving agriculture sources in Cuba, which also help others and apply to other countries across the world with the need for extra water.

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