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Kiribati, Climate Volatility

Kiribati: Independent Sustainable Future

Here in the United States, if you want to plant a garden, you step outside and plant a garden. If you want a drink of water, you get up and get an ice-cold bottle of water from the refrigerator. There is a huge difference between life in first world countries and life in third world countries. The environment, way of life, and demeanor of the people is unique in both settings. The island nation of Kiribati is experiencing harsh environmental issues that impact their daily life. Things that are second nature in the United States, such as drinking water, planting gardens, driving to work, and eating nutritious foods, are rare luxuries in nations like Kiribati.

Kiribati is a nation consisting of thirty-two low lying coral atolls and one small island, located in the Pacific Ocean between Hawaii and Australia. The atolls are very flat and surrounded by coral reefs. Of the thirty-three land masses, only twenty are inhabited by people according to the Encyclopedia Britannica. The tropical, hot, humid climate is controlled by the trade winds, and experience an average of one hundred twenty inches of precipitation on the northern islands and forty inches on the southern islands. In comparison, the United States, excluding Hawaii and Alaska, experiences an average precipitation (including rain and snow) of 30.21 inches per year (Average Annual Precipitation by State). Year-round temperatures across the islands range from twenty-six degrees Celsius to thirty-six degrees Celsius (78.8 degrees Fahrenheit to 89.6 degrees Fahrenheit). Climate change and global warming are two huge issues that Kiribati is currently experiencing. The rising sea levels have resulted in infertile soil, loss of land area, and little fresh water among other effects.

The thirty-two coral atolls and one small island comprise a total land area of about three hundred thirteen square miles (eight hundred eleven square kilometers). The total land mass of Kiribati's islands would be ninety-seven thousand nine hundred miles. To put this into perspective, this is roughly the size of Kansas City, comprised of both parts of Missouri and parts of Kansas. Of these three hundred thirteen square miles of land, only five-point one percent of it is fertile enough to produce crops, a number that seems to be lowering every day. Some of the major exports include: breadfruit, taro, copra, bananas, papaya, fish, and coconuts. Kiribati has two distinctive growing seasons. The dry seasons are from December to early February and from June to September. During these dry seasons, the most productive crop for Kiribati is copra (form of coconut), it requires at least forty inches of rain fall (Kiribati Climate Change, Land and Crops). The wet seasons are from February to May and from September to November. During these wet seasons, the most productive crop for Kiribati is taro (root plant), which is a vulnerable crop to limited moisture. The water temperature stays fairly consistent at twenty-eight degrees Celsius to twenty-nine degrees Celsius (82.4 degrees Fahrenheit to 84.2 degrees Fahrenheit). The warm water attracts tourist to fishing opportunities, both bonefish and sport fishing. Fishing also helps boost the economy both through tourism and exportation.

Twenty-six percent of the GDP comes from a combination of agriculture, fishing, and forestry. In relation to American agriculture, pork, poultry, and beef are raised as livestock on the islands to support sustainability. According to the Encyclopedia Britannica the thirty-two atolls and one island are home to a

total of one hundred and thirteen thousand people, forty-four-point two percent of whom live in urban settings and fifty-five point eight percent of whom live in rural settings. A typical family dwelling depends greatly on where they live. Rural areas are made up of villages of ten to one hundred fifty houses using local materials, whereas urban areas are made up of homes from more permanent structures such as concrete. Homes are mostly multigenerational, meaning multiple generations live under one roof. They typically consist of five to six children, parents, grandparents, and sometimes even great grandparents. This aids in the continuation of culture and family traditions, both of which are very important to the people. As mentioned before there is very limited space on the islands so homes are constructed very close together. This in turn raises the crime rate and the spread of infectious diseases. Work is not easy to come by for the natives, particularly for the women. The industries and manufactures in Kiribati are more eager to hire educated and experienced foreigners than natives.

The increase in need for foreign labor could be a direct result of the school systems and expectations. In Kiribati, primary school is grades one through six and is free of charge, so if kids can find a way to get to school they will most likely go. During this time, the students learn basic language and math skills. After primary school, students have the opportunity to attend secondary school which is grades seven through eleven and is very expensive and competitive. To attend secondary school students must take and entrance exam, and less than twenty percent of students who attended primary advance onto secondary school. With a limited education, it puts the natives at a disadvantage in the hunt for job opportunities.

Diet and nutrition on the island are also issues. Families are forced to rely on the sea and imports from foreign countries for most of their dietary needs. The imports are mostly rice, sugars, and starches; this has led to a national spike in obesity and diabetes. There is currently no way to obtain a sustainable food source from the island. The Ministry of Health and Medical Services is responsible for the overall health care of the country. Facilities and supplies on some of the islands are very limited, and the services and corporations are publicly funded. The healthcare administration is adequate as of right now, but there could be many improvements to advancing the way people receive treatment. Families face many barriers in leading a healthy lifestyle on the island, some include: little access to healthy foods, freshwater, job opportunities, global warming, and health concerns.

The struggles the people of Kiribati are experiencing are nothing less than devastating. With the warming of Earth's climate comes the need to adopt agricultural practices that will solve some of the pressing issues. The severity of global warming is on the rise, and with it comes a rise in the need for fertile soil and clean water, which is exactly what the country of Kiribati is in desperate need of. Climate change is not slowing down and it has no mercy or prejudices. It affects all people of Kiribati no matter their gender, race, or age. The economy has suffered a great deal because of the few exports and the growing demand for imported products. Every day the islands become more and more vulnerable to destruction, and action needs to be taken now before it's too late.

Efforts are being made to stop the rising sea. Locals have tried planting mangroves along the beaches to help protect the shoreline. Mangroves aid in preventing soil erosion because of their extensive root systems that preserve the deposits. People that can afford it use cement blocks to build barriers to stop the disastrous waves. Sea walls are made with anything the people can find (ex. sandbags and coral walls). Despite their efforts, the waves are sometimes so powerful that they destroy everything in their path including the sea walls, cement walls, roads, houses, among other things. The government of Kiribati has purchased fifty-five hundred acres of land in Fiji for approximately eight million seven hundred seventy thousand dollars. Kiribati President, Anote Tong, purchased the land in 2014. This would be the last resort

for the islands natives. They are afraid that if they must relocate, they might lose their traditions and culture, both of which are huge parts of daily life.

There are other small island countries facing similar fates to that of Kiribati, one being Taro. Taro is located in the Solomon Islands and is identified as a coral atoll just like Kiribati. The island itself is very small, having a total land area of about one hundred and nine acres. It has an average elevation of less than two meters, making it very susceptible to tropical storms and severe flooding. The inhabitants of the island have had to be evacuated many times due to the severity of the damages caused by tropical storms. The effects the people of Taro have faced are very similar to the ones faced by Kiribati: infertile soil, loss of land area, and contaminated water. All these things can and will lead to severe health concerns such as diabetes, heart disease, and obesity, among others. Many smaller third world islands are watching their coasts become swallowed up by the ocean as it continues to grow - just as Kiribati and Taro are. There have not been any very successful solutions to the issues of rising sea levels. However, the people of Taro are considering relocation as it seems like their only option. As discussed earlier, my goal is to make sure the people of Kiribati exercise every possible solution, big and small, to try and save their islands. Relocation can lead to a loss of identity, tradition, as well as significant cost; that is why it should be the last resort of the people. It is not too late for salvation. There are still new ideas and technologies being created every day, some that may even save the nation. My solutions to the issues, all stemming from global warming and rising sea levels, are as laid out below.

I propose that we build floating islands off the coast of Kiribati. The structures would be constructed out of small rafts and PVC (polyvinyl chloride) pipe with reinforced bamboo. This would provide us with our desired buoyancy while using inexpensive materials that can be found locally. Once the structures are built, we would be able to start planting edible, semi-aquatic plants. The structures will be anchored along the coastline. This will ensure that the floating islands are able to rise and fall with the tide. By using these floating islands as small gardens almost, the island people will gain a new way of obtaining healthy food without the aid of foreign countries. Hypothetically speaking these floating island could last an excess of five or more year due to the variables of weather and other stressors. This would reduce the need for imports, currently imperative to a native's diet, as well as, reduce the amount of money spent on imports. With less money going towards those processed foods and goods, more money can be focused on new technologies and materials vital to the implementation of these solutions.

Under their current diet of high starch and high sugar foods, obesity has spiked, but I hope to reverse this spike with the help of the floating islands. The islands, themselves, will act as segregated floating gardens. This solution will also provide a boost in the country's economy by encouraging people to shop local to purchase nutritious, homegrown, foods at reasonable prices. This solution also does not use very much land area, if any. There are a few issues with this solution including possible flooding and monetary concerns, but help from non-profit organizations and the United Nations can make it possible. Community members would oversee maintaining the islands and ensuring their prosperity, and the government would aid in funding. The families and communities are the most important part of this solution. The floating islands will not prosper without daily care and maintenance, so this is where the locals step in. There will be a mixture of paid opportunities and volunteer work to ensure success.

Hydroponics and aeroponics could also be a solution. Both these methods of growing crops do not use soil. They rely solely on the root systems of the plants and water. This solution is favorable for a nation like Kiribati because of the infertile soil and high levels of saturation. Because of the constant flooding, the soil is not optimal for growth of most all plants. Although it will be expensive and require a lot of

energy, I suggest that we desalinate the saltwater from the sea, and use that to water the crops through the hydroponics and aeroponic systems. Desalination will remove the salt from the seawater and leave the water. The necessary technology will need to be purchased for these processes, but it might just save the islands. My idea is that we use shrimp in the water so that the plants can get some of the necessary nutrients normally offered by the soil. The shrimp may also speed up the growth of the plants and increase the yields. The cons of this solution include the cost of the desalination devices, and the amount of freshwater the hydroponics and aeroponics systems will need. This solution will also offer job opportunities, but laborers will need training so that they are aware of how to operate and care for both the hydroponic and aeroponic systems. To make this work the government needs to support continual improvements to the education system so that long-term sustainability is possible. Hiring foreign labor is both a long and expensive process, however, with the suggested improvements to the education system, the number of educated locals hired will increase. The technologies that I plan to implement will need to be maintained and will need continuous improvements so the people operating them must have the best education possible. With the creation of new jobs, the unemployment rates will go down, the quality of life will improve, and the island will become more sustainable.

Solar powered wells could be another possible solution. These wells will allow the people to have a sustainable way to obtain freshwater. The solar panels will be installed to allow the wells to function without the use of electric power. Solar power has continually been on the rise and is starting to become more prevalent in our world. By using an alternative source of energy, we will be able to reduce the carbon footprint left by the island. According to SEIA (Solar Energy Industries Association), “Solar energy is the cleanest and most abundant renewable energy source available...” This means by using this very reliable source of energy we will be able to reduce the damages and effects caused by the severe flooding. Some benefits of the solar powered wells include: no ongoing costs (just installation), easy maintenance, and easy installation. The flooding will still affect the wells if the water rises too much, but it will not cost as much to repair or replace. The government will provide initial funding for implementing this solution. The first step will be introducing it to the idea to the Cabinet. The Cabinet is part of the Executive branch and holds most of the power in making most decisions regarding the country. With the backing of the Cabinet and the President this eco-friendly solution is a great option.

It is no secret that Kiribati, and many more countries around the globe, will face irrefutable destruction if action is not taken soon. I feel that the most pressing issues include rising sea levels, little freshwater, insufficient diets, job opportunities, and infertile soil. The solutions I have proposed are as follows: floating islands, hydroponics and aeroponics, and solar powered wells. Each of these solutions address at least one, or more, of the issues faced by Kiribati. There are thousands of ways to approach the issues surrounding Kiribati and nations like it, but through persistence and perseverance we just might find the perfect combination of solutions.

Norman Borlaug discussed food security when he said, “Food is taken for granted by most world leaders despite the fact that more than half of the population of the world is hungry.” I truly believe in the power of the word we. When people put their minds together for a greater cause, extraordinary things can happen. We may all have ideas in our heads of how to make the world a better place and how to help those who may be struggling, but we must have the courage to act on those ideas. Words are just words without action, so I ask you to join me in the discussion to find ways to sustain our world. We will be the ones who address the fact that nations all over the world, like Kiribati, are experiencing hardships that most people cannot fathom.

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