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Kiribati, Climate Volatility

Kiribati: The Canary in a Coal Mine of Global Warming

A canary is a domesticated songbird that is a part of the finch family. Kiribati is a struggling island nation that spans 3.5 million square kilometers of the Pacific Ocean ("Kiribati"). Both have alerted people of grave danger ahead. The death of canaries warned coal miners of deadly gases in the mines. Kiribati is forewarning the entire world of the resulting climate change, but this death will hurt millions.

The Republic of Kiribati consists of 108,000 people living on 21 out of the 32 coral atolls and one coral island. Kiribati straddles the equator and international dateline and is the halfway point between Hawaii and Australia. The climate of the nation is marine, tropical, and moderated by trade winds. The people of Kiribati grow coconuts and breadfruit on 42% of 811 square kilometers of land. Kiribati has one-third the amount of land that Rhode Island has. This limited space is split up into three distinct island groupings: the highly populated western Gilbert Islands; the middle, mostly uninhabited Phoenix Islands; and the eastern, sparsely populated Line Islands. Of this population 44.6% live in urban areas which is mostly in the Gilbert Islands. The urban population is especially dense in the capital, South Tarawa with a population density that rivals Tokyo. The people living on the islands adapt their way of life to cater to their unique surroundings. (CIA)

Island nations offer a distinctive way of life. Large families are common in Kiribati because many families rely on subsistence farming and more family equals more hands. The large families are also a little fluid because adoption is normal. If someone's family member is unable to have kids, it is common for a different family member to give one of their children to the barren member. In South Tarawa cement houses are common and densely packed together. On the outer islands, houses consist of a thatched roof, stick walls, and a coral rock floor. Most houses live without refrigerators. Therefore, they mainly eat coconuts, fresh fish, breadfruit, and tea. Nearly all of their food comes from subsistence agriculture except for imported rice, flour, and canned meats. They cook over open flames and fry or bake their foods. Their diet reflects their jobs and way of life ("Kiribati").

As fish is a staple in the diet, fishing is one of the main jobs, but subsistence agriculture rules the majority. People also raise small livestock, make handicrafts, small boats, and fish salting. Large companies lease areas around the islands for fishing. On the outer islands, only the government employees such as nurses and teachers are paid. The government offers free medical services, supplies, and at least one nurse to every island while specialized doctors travel to outer islands for additional healthcare. The economic development of Kiribati is low due to shortage of skilled workers, weak infrastructure, and remoteness from international markets. Low economic development is not the only problem Kiribati is facing ("Kiribati").

Already 94% of I-Kiribati (plural form) have experienced the effects of global climate change such as sea levels rising, saltwater intrusion, and droughts (United Nations University). Most scientists have agreed that the global warming trend that has become an increasingly more serious issue is being caused by the human expansion of the "greenhouse effect" ("Climate Change Causes: A Blanket Around the Earth"). The greenhouse effect happens when certain gases in the atmosphere trap heat, and the gases that are long-lived, semi-permanent, and that do not react to changes in temperature are described as the contributing greatly to climate change such as water vapor, carbon dioxide, methane, and nitrous oxide

("Climate Change Causes: A Blanket Around the Earth"). Water vapor (the most abundant of the gases) acts as a feedback meaning as the atmosphere warms the water vapor expands and increases the possibility of clouds and precipitation, an effect already seen today ("Climate Change Causes: A Blanket Around the Earth"). Carbon dioxide is released through natural processes such as respiration and volcanic eruptions, but humans have increased the atmospheric carbon dioxide levels by more than 33% since the Industrial Revolution through deforestation, land use changes, and the burning of fossil fuels ("Climate Change Causes: A Blanket Around the Earth"). Methane is more active than carbon dioxide but is less abundant and is produced by the decomposition of waste in landfills, agriculture, rice cultivation, ruminant digestion, and manure management of livestock ("Climate Change Causes: A Blanket Around the Earth"). Nitrous oxide is produced through soil cultivation especially organic and commercial fertilizers, fossil fuel combustion, nitric acid production, and biomass burning ("Climate Change Causes: A Blanket around the Earth"). The rising sea levels caused by the greenhouse effect and the climate warming contribute to erosion eating away more and more of the limited, valuable land of Kiribati that is already just small strips (Nalavala). In any other country as the shoreline eroded citizens would move more inland unfortunately for the people of Kiribati this is not an option. Not only is inhabited land eroding, arable land is deteriorating as well which hurts many of the people of Kiribati because they rely heavily on subsistence agriculture (Nalavala). The rising seas cause more frequent and stronger storm surges and king tides which cause millions of dollars in damage (Nalavala). The saltwater intrusion is ruining pre-existing wells and contaminating drinking water (Nalavala). Saltwater salinization caused by warmer waters is killing coral reefs which sustain the coral atolls (Ives). The sea levels are rising at unprecedented rate with Tarawa, the main island, expected not to be habitable by 2050 (Nalavala). The country is working on their own solutions but need worldwide cooperation.

Kiribati has been trying to combat global climate change for over a decade. The World Bank created a life changing plan known as the Kiribati Adaption Program. This program is backed by the governments of Kiribati, Australia, and Japan as well as numerous environmental agencies. The program includes three phases with the first one starting in 2003 and being completed in 2005. This phase was known as the preparation phase in which representatives from each atoll came together to discuss the effects climate change had on the islands during the prior 40 years and the government started planning for the investments for the project ("Kiribati Adaption Program- Phase I). The next phase started in 2006 and ended in 2011. By 2011 the project had achieved planting 37,000 mangrove and 500 meters of sea wall to protect the shoreline, fresh water infiltration galleries were built, guidelines were developed to keep infrastructure safe, adaption measure were integrated into the government, and public involvement and awareness grew immensely ("Adaptation Program Phase II - Pilot Implementation Phase"). The third and final phase started in 2011 and is projected to be completed by the end of 2018. This project has four components that contain the following: improving water resources use and management, increasing rainwater yield, getting more community engagement, increase coastline resistance by building more sea walls, planting more mangroves, and bringing nourishment to the beaches, provide support to the Strategic Risk Management, and monitoring and evaluating new project management ("Kiribati Adaption Phase III"). The program was a great start in Kiribati's war against global climate change, but there were a few drawbacks such as the price tag with the cost being close to \$20 million. The original sea walls were made from sand and when the walls were destroyed the sand added to the erosion of coast (Ives). But these were very minimal setbacks to the fantastic project that improved I-Kiribati's lives. The leader during this era was the now former president, Anote Tong.

The hardest fighter of Kiribati's struggle was Anote Tong. He was president from 2003-2015, helped make Kiribati one of the lowest producers of carbon emissions, and launched the idea that Kiribati was a canary in a coal mine ("Anote Tong"). In 2014, Anote Tong led the purchase of 5500 square acres of land from Fiji for \$8.77 million (Ellsmoor and Rosen). This purchase has been debated heavily. One issue is that there are 500 Solomon Islanders living in a village on an estate owned by the Anglican Church that is on the territory that Kiribati bought (Ellsmoor and Rosen). One of Tong's reasonings was that they could

fit people onto the land if need be (Ellsmoor and Rosen). The issue would arise that Fiji has a strict law that only Fijians can fish (Ellsmoor and Rosen). The diet of the people of Kiribati is mainly fish therefore this law would cause a serious problem. Another use for the land is to use it for additional farming but the plot of land is mostly hills and mangroves therefore it would not be the greatest arable land (Ellsmoor and Rosen). This purchase did attract global attention and got many people to finally listen to the plight that many island nations face, but there are more solutions that Kiribati has and can investigate.

The government has explored other projects including elevating the islands, making artificial islands, and migration with dignity. The Kiribati government has investigated raising the islands or creating artificial ones, but both options are very costly (Nalavala). The government has now started to focus more on their people in hopes of making more resilient citizens that will be able to adapt easily (Nalavala). Anote Tong has tried to get climate change flee-ers the status of refugees (Nalavala). The refugee status would give the fleeing people protection under international law, support from aid groups, the ability to permanent residents of their accepting country, as well as make it easier for I-Kiribati to leave their homeland (International Rescue Committee). Only 26% of island nation citizens believe they have the means to immigrate safely and effectively thus making refugee status seem like the more efficient option (United Nations University). The United Nations turned down the idea of giving climate change displaced persons the status of refugees (Ives). If the UN had allowed for climate change flee-ers to escape, then situation would become increasingly complicated as many regions are or will be experiencing more and harsher effects of climate change. Anote Tong also created the idea of "migration with dignity" which is to become a skilled worker and then leave Kiribati (Nalavala). However, Kiribati already has a shortage of skilled workers so training and sending more away would be tougher. But Kiribati should not be the only country worrying about global climate change.

Kiribati is not the only nation fighting and predicting the results of global climate change. It is estimated that to fix Fiji's vulnerability to climate change will cost \$4.5 billion ("New Report Projects \$4.5 Billion Cost to Reduce Fiji's Vulnerability to Climate Change"). All island nations are fighting for their lives but major cities such as Copenhagen are also experiencing problems. In Copenhagen is facing flooding due to rising sea levels and to fight this they are creating "pocket" parks that will hold extra water when it rains (Peach). The "pocket" parks cannot be applied to Kiribati specifically but that out of the box thinking can help other places at risk. Most of all the climate change is affecting food availability, food access, food utilization, and food stability with the most vulnerable countries being the least developed of the world (WFP). The climate change is definitely not a regional thing therefore it should not be tackled by just one country.

Global climate change should have every country working for the cause. Overall the world must reduce their greenhouse gas emissions. In 2010, 25% of all global gas emissions came from creating electricity and heat production through the burning of coal, natural gas, and oil ("Global Greenhouse Gas Emissions Data"). A greater switch to using green technology such as solar, wind, geothermal, and hydropower for energy would lessen the consumption and burning of fossil fuels. More than 100 cities have reported getting 70% of their energy from renewable resources ("The World's Renewable Energy Cities"). Many of the cities are in Latin America and a majority are powered by hydropower ("The World's Renewable Energy Cities"). Hydroelectric dams do have their downsides with the impact on wildlife such as higher amounts of sediment and nutrients, slower currents, colder waters, higher rates of evaporation, and lower amounts of oxygen in the water ("Environmental Impacts of Hydroelectric Power"). One major upside to hydroelectric dams is that it is renewable and does not cause as emit more gases into the atmosphere as the traditional and non-renewable way of burning fossil fuels. All in all, governments need to start making the switch to renewable energy. Kiribati is already at 35% of their energy coming from renewable energy as well as a few other countries (CIA). The initial switch would be a large investment, but it would be a wise one with current projections showing that renewable energy will become more cost efficient than fossil fuels ("The World's Renewable Energy Cities"). The great thing about green technology is there is

an option for best suited for each environment. Wind power is an amazingly clean energy source and land efficient energy source ("Environmental Impacts of Wind Power"). It has very little impact on the environment and surrounding wildlife with only birds and bats being slightly affected but not too much to cause worry or action ("Environmental Impacts of Wind Power") Many Nordic cities such as Reykjavík, Iceland use geothermal energy for power ("The World's Renewable Energy Cities"). Countries need to move toward green economy and renewable energy. A new industry for renewable energy would create more jobs. Policies would have to be created to keep the cost effective and maximize the benefits for businesses and consumers.

Another major contributor to greenhouse gas emission is agriculture, forestry, and land use with the production 24% of the total global emissions ("Global Greenhouse Gas Emissions Data"). One way to reduce the emissions from livestock is through the harnessing of the methane the animals produce and burning that methane to create energy ("Cow Power"). One organization in California called Sustainable Conservation has used this method and from 2003-2010 has reduced the amount of greenhouse gas emissions from California's agriculture by 12,000 tons-equivalent to taking 40,000 cars off the road ("Cow Power"). This practice could be implemented in numerous farms across the globe thus significantly reducing the production of methane. Forestry has contributed to the rise of greenhouse gases due to the industry taking away the trees that use up carbon dioxide. A solution to this would be forcing companies in lumber industries around the world to plant new trees. The technique of slash-and-burn also contributes to the production of emissions. In many subsistence agricultures this method is used due to lack of space and inability to use the previous space efficiently. Many international organizations are teaching people more productive and land conscience techniques for farming.

The next largest global contributor to greenhouse gas emissions at 21% is industry ("Global Greenhouse Gas Emissions Data"). The root of industry's emissions is energy ("Global Greenhouse Gas Emissions Data"). Industry creates many wasteful products such as plastic. Consumers are powerful people, and they can make small, smart changes by going with more environmentally friendly options and cause the companies of industry to change their ways. Unfortunately, the average person does not want to go out of their way to help something they cannot see, therefore green businesses and groups as well as the government must put large noticeable "obstacles" in front of people to make them break their habits and help the world. One small change that Hawaii and a few cities have is putting a fee on using plastic bags. Less people would want to pay the fee and therefore the production of plastic bags would decrease. It is a hard task with so many industries that must change and will not or cannot. Governments need to find a way to make it more beneficial for companies to go green such as tax write-offs or incentives.

Transportation produces 14% of the world's gas emission through the burning of fossil fuels ("Global Greenhouse Gas Emissions Data"). The percentage from transportation is higher on the United States' national scale with 24% ("Global Greenhouse Gas Emissions Data"). One factor may be due to the vastness of the country and the lack of public transportation in smaller cities and rural areas. This correlates with the American way of life and the need for independence. To reduce the emission caused by transportation the US and other countries need to make it more favorable for people to switch over to electric cars with energy sources powered by renewable energy. The government of Norway offers tax breaks and subsidies to make the technology more affordable as well as give car owners benefits such as cheaper parking, use of bus lanes for carpoolers during rush hour, and exemption from a majority of road tolls (Tsang). The incentives have been a success with 52% of new cars sold this past year running on new forms of fuel (Tsang). Many other nations are making a large push for the switch to more environmentally cars with the United Kingdom and France planning to end the sale of diesel and gasoline powered cars by 2040 (Tsang). Cars that use new forms of energy need to be innovated enough to work well in rural areas as this is a major drawback to electric cars.

The economic sectors that produce the lower amounts of greenhouse gas emissions are buildings and "other" with 6% and 10% respectively ("Global Greenhouse Gas Emissions Data"). Buildings need to

shift to more green technologies and use more renewable sources for energy. "Other" is fuel extraction, refining, and processing ("Global Greenhouse Gas Emissions Data"). When the world relies more heavily on renewable resources this sector should no longer exist and thus stop producing harmful gases.

With climate change being debated by world leaders it makes it difficult to combat it. The more opposed leaders of climate change right that science is not one hundred percent, but the evidence shows that the world is warming too fast and something needs to be done about it. The more developed countries must negotiate seriously with each other otherwise nothing will be done. They need to fight from their home front and not just give funds to the smaller nations. One thing that needs to be done is: the world must cooperate. Without cooperation the world will just flounder and billions will be affected.

The republic of Kiribati has faced numerous challenges such as storm surges, rising sea levels, and ocean salinization. The viable solutions for them are in action currently through the Kiribati Adaption Program made by The World Bank and supported by many governments. Other solutions include building an artificial island and migration with dignity as well as worldwide involvement. Most importantly the world must heed the warning death of Kiribati as coal miners did the deaths of canaries otherwise the consequences may be catastrophic.

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