Eric Persoon, Student Participant
Pleasantville High School
Pleasantville, Iowa

Global Warming's Effects on the Caribbean's Agriculture

The Caribbean consists of thirteen sovereign states, two overseas departments and twelve dependent territories, majority of which have ties with the European Union, spread out amidst the Atlantic Ocean. It is known for its beautiful tropical lay out and great tourist attraction, but tourism is only temporary. For the people who live there it is an awful place for agriculture growth and development, and with current climate changes in the already hot tropical area isn't getting any better. With the raising temperatures come severe changes in the tropical Caribbean's weather. Droughts, floods and severe storms are caused do to global warming. Humans as a whole have caused enormous amounts of damage to the environment.

The Caribbean's population is around 37.7 million people. The main products of agriculture in the Caribbean islands consist of: bananas, plantains, sweet potatoes, cassava, sugar cane, pineapple, spices, cocoa, tobacco, coffee and a variety of citrus fruit. The land is an estimated 61 million hectares 25%, of which is under agriculture, and 11% of it is arable land. Larger plantations use majority of the arable land, leaving the small subsistence farms with less land and majority of it not suitable to raise crops. According to P. Umahran, PhD. "The conglomeration of seed companies into larger companies has shifted focus from niche breeding to breeding for larger countries and territories. The lack of regional efforts of breeding and seed production has also placed the region in a seriously disadvantageous position." The warmer climates currently and in the near future have provided a suitable environment for pest and disease causing wasting of the plant. These pest and diseases are most harmful to the small clustered farms. The water supply is miniscule and competing over this short supply makes it so smaller farms don't get a necessary supply for a large amount of crops. The large deforestation of land leaves the land barren and erodes the hills. According to UNICEF, "Centuries of deforestation and ecological degradation of the highlands intensify the effects of the storm."

Climate shift has drastically changed the weather. If raising temperature trends continue, this region would be devastated due to its current warm climate. All areas near the equator especially will be hit the hard. The hydro cycle will be changed as well, due to the ocean warming, and cause droughts. This will severely harm the water supply in the region. The water supply in which is currently reaching shortages due to difficulties with waste disposal and isolation from other islands. On top of that, water supplies are competed over because of their short supply and large demand. Even beyond the lack of water, more devastating weather can occur. More hurricanes have happened since the raise in temperature and more deadly hurricanes at that. According to Stephen Rahmstorf, "The current evidence strongly suggests that: (a) hurricanes tend to become more destructive as ocean temperatures rise, and (b) an unchecked rise in greenhouse gas concentrations will very likely increase ocean temperatures further, ultimately overwhelming any natural oscillations. Scenarios for future global warming show tropical SST [sea surface temperature] rising by a few degrees, not just tenths of a degree"(1). Within the years of 1995-2005 the Food and Agriculture Organization of the United Nations (FAO) raised $21.4 million dollars towards hurricane disaster relief in the Caribbean, and if trends like this continue even more destruction of the land will follow. The pure annihilation of the land and people from the brute gale force of a hurricane isn't the only problem; drought is also a negative repercussion of the climate change. The water supply problem is already in piffling amounts that a drought would completely devastate the area. Changing rainfall patterns and rampart deforestation and desertification brings upon drought. The deforestation of the

Caribbean land leads to more soil degradation in the mountainous regions in the Caribbean. The desertification, caused by overgrazing, alkalization and over irrigation of the soil. This affects the soil's minerals rendering the soil ineffectual. Rainfall patterns are currently changing caused by the warming of the ocean and thus changing the hydro cycle in its entirety. According to Ingrid Brown, " If the climate gets drier in some areas, this will obviously affect crop production. Increased irrigation can mitigate against this, but water for irrigation is already scarce and will become even less available if rainfall decreases " (1). The effects of this change could mean a drought or the complete inverse effect of flooding. Flooding would also constrict the usable water supply. The intrusion of the salt water and pollutants could contaminate their water reserves. The entire agricultural environment would be damaged, the land becoming overrun with water and land becoming non-arable. Higher temperatures will also cause change in the growing season. Higher temperatures only benefit a limited amount of plants, and those plants have a limited growing season.

All of these destructive after effects of climate shift will leave the environment blighted. The land becomes less arable as well as inhibiting supplies and resources. Drought and floods destroying the land and leaving the water supply either shortened to a further extent or making it inaccessible and unusable. Climate shift also causes hurricanes to be more destructive and more often, thus making the land unusable and costing large amounts of money in relief that could go to other resources for furthering the area's agriculture need. In addition to hurricanes destroying the land, deforestation causes an abundance of erosion.

What can be done to prevent all of this obliteration of the Caribbean's land and resources? It is not simple. Now farms, agriculture as a whole and even the way of life, are either ineffective or harmful. Recent studies by the Rodale Institute show that organic farming, or "regenerative" farming, in one year can remove up to seven thousand pounds of carbon dioxide in one acre of farmland. According to Timothy LaSalle PhD. and CEO of the Rodale Institute, "If we turned all of our farmland in this country to organic and regenerative methodologies, where we're putting basically cover crops or compost back into the soil and not using chemical fertilizers, we could mitigate 25 percent of our emissions in this country alone." The lower emission levels caused by organic farming would help lessen the blow of global warming. Using synthetic fertilizer destroys the minerals in the soil causing the release of carbon from the soil. Current farming also uses environmental hurting chemicals polluting the ecosystem as well as releasing more emissions into the air. In addition, LaSalle also adds, "… in very wet conditions or in very dry conditions, it will out-produce conventional practices. So, it will have a better shot in the stresses that climate crisis will bring." Furthermore, cost of organic farming is lesser than current conventional farming means. Grass mulching in accordance with drip irrigation for drought mitigation will improve the condition for the current environment as well as lessen cost for the destitute people of the Caribbean. Making new trenches, building triangular bracing to reduce strong wind damage from the intensified hurricanes and help protect infrastructure to causing less salt to corrupt fields and water supplies. To help prevent crop lost as well, start harvest earlier. Around hilly or mountainous areas, use flood terracing to prevent erosion. An economic advancement will be to run the market for farming like a Co-Op. This will help ensure the farmers with more products to help cause more consumers to ensure business and a constant steady income.

In a complete opposite view of organic farming, is to create more genetically modified plants. Though it sounds a little like science fiction, as Dr Wendel Parham, executive director of the Caribbean Agriculture Research and Development Institute (Cardi) states, "Biotechnology should be used to conserve and systematically exploit these genetic germplasm resources for overall benefit of the region. Biotechnology should also be used to strengthen our quarantine

services so a s to sensitively detect intruding novel pests and diseases as trade within the region or from outside is pursued." The current pests problem should be quarantine so the outbreak of disease as well as harm pests will be isolated. This is in counteraction of the increase of disease and pest due to the raise in temperature. To also eliminate the threat of all crops dying due to specific conditions or disease, more diversified crops should be grow together. Another counteraction to the raising temperature would to genetically modify plants to become more heat and drought resistant. This will eliminate the problem of dying crops do to the increasingly harsh climate change. The problem of flooding is in the salinization of the water supply and soil. Genetically modifying plants to become more salt-resistant. To aid against the hurricane problem, Dr. Parham suggests that the idea of securing plants reserves would help immensely. Another genetic modification that would be helpful is to alter plants to have a longer "shelf life." Planting more indigenous plants will also help the environment to have plants that are naturally accustomed to the climate and ecosystem.

Reforestation is a way to prevent erosion and help with the water supply shortage. The trees will keep the soil in place and prevent heavy storms and floods from taking it away. Creating better rainfall catchments and water storage will help in times of drought. Better ways of water conservation as well as informing farmers on better means of healthier farming methods will decrease intake and disputes on water. Building more groundwater reserves will also increase the amount of water, planting more drought resistant plants will save water as well. Planting more trees will help prevent the advancement of global warming because trees absorb the carbon dioxide is the harming the ecosystem. The water retention in the soil is greater with a large amount of trees, allowing less water to be used. The fragile ecosystem is substantially healthier with planting of trees and other life.

The Caribbean is greatly affected by the current climate shift, due to its location as well as it geographical features. The mountains causing erosion as well as the tropical area near the equator. Global warming hits the already fading agriculture of the region and the limited water supplies due to isolation from other countries. With the raising severity of hurricanes, floods and drought inclining, many precautions should be exercised. Organic farming can help reduce carbon released into the atmosphere, preventing harm to the environment. In addition, making a more efficient and less costly means of farming, saving water supplies and gaining more money for the farmers. Genetically modifying plants and planting diversity in plants will help keep a constant supply of produce. As well as building more plant seed reserves, in cases of mass destruction of the plants. Building more water storage and collecting units will provide more water in case of drought. Planting more trees will help prevent the drastic change in climate as well as prevent erosion. All the ideas are burdensome labor but to provide a greater living style for today as well as the future, some intense measures will have to be take somewhere.

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