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## **Jamaica's Response to Food Insecurity**

In the next thirty years two more billion people must be fed. 842 million people are hungry now, and only 6% of the world's surface is suitable for growing food, and that number is shrinking. Agriculture no doubt is facing a huge problem. How is a growing world going to feed itself? Recently there has been another factor has arisen; climate change, reducing the ability to produce food were it once flourished. This demonstrates the necessity of considering the environment when planning to feed the world.

These issues have been on the minds of many different researchers, and scientists. New technology have been able to create hybrid and genetically engineered crops to solve these issues. Food producing plants have been tested, altered and retested to get the plant to be drought resistance, be able to grow closer together, improve production yield, and the list just goes on. But the question is how much more can a plant be manipulated? Biotechnology as it is called has its limits and no one knows really what these limits are, or what the long term effect is going to be by altering these plants. What's known is that food insecurity exists. The people who are malnourished or starving need a way to sustain themselves by growing their own food. Biotechnology can help, but for people who live in areas that are constantly in threat of extreme weather are constantly at risk of food insecurity.

Jamaica's food crops for an example are constantly under a threat of being destroyed by extreme weather conditions. With flash floods on the northeastern side and water shortages in the southern coastal plains in addition to hurricanes, the small island of Jamaica cannot just rely on biotechnology to help. Jamaica needs a way to sustained themselves. The agricultural sector needs to focus beyond the traditionally thinking of just getting higher yields.

Jamaica needs a sustainable way to grow food in an environmental volatile region. One answer could be hydroponics. Hydroponics is a way to grow plants inside a environmentally controlled greenhouse, without the traditional soil. With soil erosion, extreme weather and limited land for agricultural production, hydroponics could offer an alternative way of growing food crops, and boost the agricultural industry.

In Jamaica education is free up to eleven years of age. In rural areas there has been an increase in enrolling young children (ages 3-5) in school. This is because then children can receive more schooling for free. Elderly people in rural areas have a low literacy rate. Rural males between the age of twelve and eighteen are the least likely to be educated with only 19.94% attending school. That percentage has been shrinking since families have to pay for higher education and the current tough economic time leads families to keep children home and increase household income.

Tough economic times have also limited families to eat one meal a day rather than two or three. Today 11% of Jamaica's population is undernourished. Additionally, Jamaica has inequality in food consumption contributing to a high level of food insecurity. The wealthiest one-fifth of the country consumes about 45.9% of the total consumption rate in Jamaica. The average Jamaican spends a maximum of 55.7% of their income on food in 1990-1991. In 2000 the average DES (Dietary Energy Supplies) was 2,680 Kcal/day.

The agricultural industry in Jamaica is small accounting for only 7% of the country's GDP, but is still an important sector in this country's economy. 20% of the population depends on the agricultural sector for employment. 82% of the farms in Jamaica are small farms of only 1-2 hectares, practicing

traditional agricultural methods. These small farms only make up 16% of the total agricultural industry, and most are run by elderly people.

Jamaica is an island nation with a tropical climate. The tropical climate allows for the growth of such traditional crops as: sugarcane, bananas, coffee, cacao, citrus, pimentos. In addition there are some non-traditional crops, such as root crops, yams, sweet potatoes, exotic fruits, vegetables, herbs and species. The two primary crops grown in Jamaica are bananas and sugar. These two commodities contribute a significant portion to Jamaica's economy. In the 1999/2000 crop year 216, 387 tons of sugar was produced and 42,025 tons of bananas; down from 88,917 tons in 1996.

But small to medium producers are being forced out of business as they can't compete with global competition, and preferential trade agreements. Other larger scale businesses are forcing the smaller producers out of business as they have the technology needed to produce the food more cheaply. These factors are a significant blow to the rural Jamaica communities, as they can't keep pace with the competition.

The small rural farmers mostly live in the north eastern part of Jamaica. The north eastern side of Jamaica is the hilliest and is most susceptible to soil erosion. This is due to the farmers being able to only farm the hillsides, most in watershed areas. They are in a direct path of trade winds and receive the highest amount of rain about 3,300mm annually. Farms here plant mostly row crops which has minimal soil coverage. With minimal soil coverage, wind and water and year after year of planting row crops quickly depletes the soil, of all necessary nutrients and minerals. With the rising cost of fertilizer (it's doubled in the past year) and many of the small rural farms living in poverty (69.3%) they can't afford to purchase fertilizers or let the soil have a 'rest' period to replenish. As a result production levels are down; plants are more vulnerable to diseases due to insufficient nutrients. Many people depend on these small farms to sustain themselves. 43.9% of Jamaica's population lives in a rural area, most can't be access very easily.

Seventy-five percent of the country's land can't be used for any agricultural practice. Only 3% of the country is considered usable for farming with no limitations. The farmers of Jamaica have to find a way to keep pace with global competition as well as improve the environment and sustainability of their agricultural practices. Climate change has also taken a toll on Jamaica's agricultural industry as it has changed weather patterns blowing in hurricanes and other severe weather more frequently. Heavy winds, torrential rain and other extreme weather can flatten and destroy food crops in mere seconds. Jamaica is also threatened by land loss as the ocean has been rising from the unusually warm weather melting glaciers.

On the southern side of Jamaica in the eastern plains farmers are struggling with water shortages and droughts which also interferes with agricultural productivity. Jamaica has different issues in different regions, but all regions could become more sustainable and productive by implementing hydroponics.

Hydroponics as stated before could offer Jamaica's agricultural sector many benefits. Growing food in a hydroponic or controlled environment system is a sustainable way of producing food in non-arable regions of the world, or regions that have large populations with limited space. In Jamaica, urbanization is projected to increase 70.3% by 2030. Growing hydroponically can also help with Jamaica's soil erosion as plants such as row crops would not have to be planted outside were it leaves soil open to erode away. Areas that have row crops now could be planted with erosion control plants to protect and replenish the soil. This would also improve soil and waterways as fertilizers and soil would not be washing into drinking water.

Growing plants inside of a greenhouse would also protect food crops washing away in from extreme weather. Farmers would not have to worry about crops washing away in a heavy rainstorm. Another advantage to hydroponics is the ability to control the environment. Plants can be grown indoors where their environment is ideal to thrive, leading to higher production levels of the plant in a less time. For an example, hydroponically grown tomatoes supply about 60-300 tons of tomatoes compared to field grown which only produces five to ten tons in the same amount of land. If a community were to establish a small number of greenhouses enough food could be produced to sustain the community and provide surplus for Jamaica.

In the south eastern plains of Jamaica hydroponics could counteract the drought and water shortages. Hydroponics is a good way to conserve water as it consumes 10-30 percent less than traditional farming practices. A hydroponic system recycles or reuses the nutrient solution fed to the plants waste is limited. In soil more fertilizer is leached away then plants receive, plants are “frequent competitors for the essential elements (nutrients) in the soil solution with other organisms present in the soil” (Jones, 10)

Jamaica could greatly benefit from hydroponically grown food. The increased food production will benefit families and communities in a sustainable fashion. It would help reverse environmental damages by replanting erosion control plants and resting the soil in areas of the worst degradation. Food quality would not be sacrificed to implement hydroponics; hydroponics would provide fresh and nutritious food. Jamaica, been unable to grow enough food, has to import food each year. It has been shown fresher foods is more nutritious. Hydroponically grown food prevents contamination or growth of soil borne disease. ‘E. coli’ outbreaks are a concern today; research has shown that ‘E. coli’ develops in manure contaminated soil. Traditionally grown food uses manure as a natural fertilizer, as it’s cheaper than purchasing synthetic fertilizers. In a hydroponic system the composition of the media which that plant is grown is known. In the field the composition of the soil is not completely known so it’s hard to prevent contamination or growth of diseases.

Establishing hydroponics is expensive but quickly pays for itself in crop production. United States companies such as Cropking, Hydrofarm, and Polytex could help establish hydroponic by designing greenhouses to suit Jamaica’s environment or donate greenhouse products. Jamaica’s government and other organizations like the world food prize could help raise money to buy and build the greenhouses. There is also many researching companies that pay and give producers new greenhouse products and medias to test out for them, such as Sure To Grow. Having help from companies and organizations to help install greenhouse could greatly help out rural communities in Jamaica and other poverty stricken parts of the world. Hydroponics could help ensure food security in communities.

Hydroponics has a bright future in food production. It has the ability to feed people where agriculture is sparse because of climate, environment, or geography. Jamaica as well as other communities and individuals could benefit from hydroponics and become sustainable. Many people today are living in poverty and are starving or undernourished. With help people could be given a chance to become sustainable and learn how to grow their own food.

Jamaica’s current problems could be helped by the implementation of hydroponics. The lack of competitive edge farming in Jamaica and the degradation of the environment is a problem that can be solved. Small subsistence farmers in Jamaica will be able to compete against big producers if they band together in a community to produce food hydroponically. Helping the rural community establish hydroponics is a step to solving these problems.

By using hydroponics to improve their environment and how they grow their food will help. Concentrating growing hydroponically will help the depletion of soil by letting it rest and rebuild it by planting soil erosion control plants. Meanwhile plants can still be grown to feed rural communities and

surplus could be sold to help provide an income. Families could be able to have more meals a day and afford to send their children to school for a higher education. Improving rural communities in Jamaica will ultimately help the country as a whole in both the economy and improving educational and poverty rates.

Hydroponics is still a growing industry, but has about forty years of experience. So far hydroponics has proven itself competitive in the food markets, and continually improves each year. With the help of governments and various organizations and companies establishing hydroponics in the rural communities of Jamaica and in different regions of the world will help increase food security. Rural subsistence farmers can't help the food insecurity or their situation alone. But with help they can fight their different issues.

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