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Dominican Republic: Increasing Yields with Genetically Modified Crops

When most people think of the Dominican Republic, they think resorts. Resorts are one of the biggest employers in the country. People think of relaxation, lying on the beach, or a boat ride. What people don't think of is a nation that is struggling to feed its citizens with 1/3 of its population malnourished or of an island where 34% of the people are below the poverty line (The World Factbook, 2009).

Genetically modified crops are one way to boost this country's economy, put her people to work, and put food on the plates of Dominican families. Changing the type of seed that is planted allows the plant to be drought resistant, and yield higher. Genetically Modified (GM) crops will allow small family farmers to have higher yields, which will provide more food and income for them. Higher yields will require more people to harvest the crops, which offers job possibilities for the citizens of the Dominican Republic.

The typical rural Dominican family consists of six members, two parents, and four children. The man will spend most of his day working in the field, while his wife takes care of small animals, like chickens or any other pets the family has. Women also take care of the house and prepare meals, which usually consist of rice and beans. It is also common to have chicken, turkey, or duck with the rice and beans. Higher-class citizens mainly eat meats like beef and pork.

While the adults are working, children attend school. The Dominican Republic has public schools in cities. In rural areas, the only schools are the ones provided by World Vision and other charities. The World Vision schools hold classes two days a week, four hours per day. Education makes up 2.2% of the Dominican Republics GDP (The World Factbook, 2009). Most children spend about the same number of years in school as a student from the United States, about twelve years. On average girls spend thirteen years in school while boys spend eleven years in school. The Dominican Republic has an 87% literacy rate, which is very high for a third world country (The World Factbook, 2009). Haiti, for example, has a literacy rate of 52% (The World Factbook, 2009).

Dominicans have universal health care. There are three tiers of care. The bottom tier is the lowest level of coverage. It provides minimal care. The highest tier is for the government employees and the rich citizens. A difference between health-care in the Dominican Republic and in the United States is that before being treated you are required to pay, unlike the US, which treats people and then asks for payment. Even with health insurance, huge payments are required before treatment is given. The use of Vitamin enriched crops in the Dominican Republic will keep the population much healthier.

The agriculture industry employs 17% of the Dominican Republics working population (The World Factbook, 2009). Cotton, rice, beans, potatoes, corn, bananas, sugarcane, cacao, and tobacco are some of the crops grown in the Dominican Republic. The Dominican Republic is very well known for its sugarcane production, it is the fourth largest producer of sugarcane in the world. The sugarcane farms have some permanent workers, however, most of the workers are temporary and only have work when it is time to harvest the sugarcane. This leaves workers unemployed in the off-season, which makes it very difficult for a field laborer to feed their family. The Dominican Republic also grows and exports large amounts of coffee. Coffee production is also seasonal and a large percentage of the workers are Haitian. In the United States some immigrants will do the jobs that are undesirable. In the Dominican Republic, the Haitians are employed in a similar manner. The Haitians are not stealing the jobs; they are simply doing the work nobody else wants to do. Cacao is another major cash crop. The Dominican Republic

exported \$66 million of it last year (Vistisen, 2011). Most of the cacao is never processed into cocoa before leaving the island. Processing the cacao is relatively inexpensive for the return that it provides. Locally processing the cacao would also open up a multitude of factory jobs for seasonal workers as well as other Dominicans. The Dominican Republic also exported \$23 million dollars worth of tobacco (Vistisen, 2011). One of the best things about tobacco is that it is harvested year round, which means all of those employed in this industry will have consistent income and stable work for their families.

Price declines have caused some farmers to grow some untraditional crops such as ornamental plants and winter vegetables to be sold in supermarkets. The Dominican Republic also produces citrus fruit, tropical fruit, spices, and nuts. Most of these nontraditional crops are exported to the US or shipped to the many resorts within the Dominican Republic.

The average family farm is roughly 16 acres. Most farms hire two permanent workers and will also hire temporary workers when it is time to harvest. A general farm laborer will make a little over \$12 per day while sugarcane workers make slightly over \$9 per day (Acevedo, 2011). The farm economy depends highly on the United States, where 2/3 of all crops grown in the Dominican Republic are shipped (Vistisen, 2011). Most crops are shipped to the United States because they have a demand for the product and are willing to pay the highest price.

Farm laborers have the lowest wages in the country. The highest paid laborer makes only \$12 per day for some of the hardest work on the island. An unskilled construction laborer makes upwards of \$20 per day (Vistisen, 2011). Another problem that keeps people from earning a livable wage is the fact that most farm work is temporary. One of the good things about the Dominican Republic is that there are roads going into the farm villages, which allows food to be transported.

There are many barriers that prevent agriculture from improving. One of these barriers is water shortage. With no water it is very hard for plants to grow. One of the worst things about water shortage is that it can't be fixed quickly. Had water on the island been conserved earlier on this wouldn't be a problem, however, now that the rivers are shrinking and there is no precipitation, this is one of the biggest agricultural burdens in the Dominican Republic. Severe storms in June through October can also cause problems with the crops. Hurricanes, although rare, can knock out an entire crop. They can also destroy the fields used to grow crops. The Dominican Republic will also flood at times. A flood is able to wipe out an entire crop. The floodwater washes large quantities of topsoil away. This topsoil has been known to make its way to the ocean and it is damaging the coral reefs. The biggest environmental problem is water being received when it's not needed, and in quantities so large that the plant is damaged, and drought when water is needed the most.

Genetically modified (GM) crops give farmers the amazing ability to take the best qualities of different crops and put them together to make one plant that is drought resistant, yields higher and requires less fertilizer. Dr. Norman Borlaug said, "We need sophisticated scientific technology to boost our production." Dr. Borlaug was referring to GM crops. Dr. Borlaug believed that the only way to feed the world was through genetically modified crops. Without advancements in crop technology farmers won't have the yields that they need to feed a family, or there won't be enough crop to sell to buy food for a family. Genetically modified crops have vitamins in them that normal crops can't provide; this makes for a much healthier country.

There are currently no approved GM crops being used in the Dominican Republic. The government has not approved the use of the crops and they have not yet been tested in the Dominican Republic. The fact that there are no GM crops in the Dominican Republic is hurting its citizens. There was no improvement in the number of people who were malnourished this year compared to last year.

Using GM crops in the Dominican Republic would benefit the Dominican Republic's economy, and would help to feed the families of farmers, farm workers, and others within the community. GM crops would increase the yields. When the yields are increased, there is more to harvest. More to harvest means that more people must be hired to harvest. This is how the economy would be benefited. The farmers are going to be yielding more and will have to hire more help. That help will then use their pay to buy food from a street vendor who will then spend the money to buy their child clothing. It's a never-ending cycle; it's the trickle-down effect. Once one person receives the money; it will continually move from hand to hand within the community supporting many workers. The use of GM crops in this country will also help the people who own the stores where the farmers are shopping. The farmer may also need some farm equipment; if more equipment is bought, the farm supply store has to hire more employees, who will spend money to buy their family clothing. The cycle never ends and it's amazing to see how changing the type of seed planted can change a country's economy.

More food production will allow for more food to be exported. Transporting the food requires people to put the food onto a plat or bin; the food then has to be put onto a semi, which requires a driver, creating another job. The semi will then go to the nearest port, where the produce will be loaded onto a ship. All of these jobs are caused by higher yields. One farmer changing to GM couldn't cause this many jobs, an entire town switching to GM crops couldn't create this many jobs, but an entire country switching to GM crops would provide thousands of jobs to Dominicans. With 30% of the Dominican Republic being suitable for crop production, creating several thousand jobs would be very easy, and with a 15% unemployment rate, it would stimulate the economy and provide more employment. (The World Factbook, 2009).

GM crops will also help lower the price of food. Higher yields equal more food, which lowers the demand for food. Less demand will lower the prices. Low priced food means that less people will be going hungry. Higher yields will also provide an abundance of food for small family farms that are struggling to survive.

Crops can be genetically modified to have more vitamins in them, creating a healthier consumer. One example of adding a vitamin was in 1990 when scientists at Baylor University added vitamin A to a grain of rice. This advancement helped people all over the world where rice was a staple of their diets. This positively affected the poorer families who ate mainly rice. This is just one of many examples of GM crops helping disadvantage people in poor countries. Genetic modification is not limited to crop production, but it could also help the livestock industry.

Issues like climate change, water scarcity, energy demand, or pollution won't affect GM crops. GM crops are designed to be unaffected by things like climate change, or drought. With higher yields, crops can be grown in smaller areas, which will allow for population growth. Any type of plant helps to reduce pollution by purifying the air. The small villages where farms are located have very little energy demand.

Bananas and coffee, the Dominican Republics major exports, have already been genetically modified to meet the needs of consumers. Once GM crops are introduced to the Dominican Republic it will be up to scientists to tweak the seeds to create the best fit for this country. Since every country has different climates and growing seasons it is important to modify the crop that will best serve the farmers and the consumers. At this time there is no research underway on GM crops in the Dominican Republic.

There are three main steps that must be taken to stop hunger in the Dominican Republic. Start the use of GM crops in the Dominican Republic. Using GM crops which yield more will help put people to work and help more people put food on their families plates. The second step is implementing good conservation practices. One of the biggest problems in the Dominican Republic is soil erosion. This

erosion is damaging the reefs, which in turn affect the habitat of aquatic life, which are an important food source. Education is also a very important part of implementing GM crops.

No GM crops are currently approved for use in the Dominican Republic. This needs to change. This third world country would benefit greatly from the use of them. The citizens of the Dominican Republic need to start using these crops. With almost 1/3 of the country malnourished, change needs to be made and genetically modified crops are that change.

Genetically modified crops aren't allowed into the country because the government hasn't approved them. The government won't approve the crops for two reasons. The first reason is fear of the crops affecting the country's genetic pool. The government also fears a monopoly where Monsanto controls the majority of the crops grown in the country. Some farmers are also against the use of GM crops. After the earthquake in Haiti GM seeds were distributed and some of them made their way to the Dominican Republic, which upset many farmers.

The government approval problem can only be fixed with more research from the current companies that manufacture GM crops to prove their safety and also by new companies entering the GM market to create less of a monopoly. The farmers need education. They need to see the research that proves the safety of GM crops, they need to see and taste foods that have been made from, the farmers need to look at and walk through a field planted with GM crops to see how much more food its producing when compared to a non-GM field, Farmers need a chance to use GM seed.

In addition to GM crops, farmers must utilize good conservation practices to solve the erosion problem. Not only is fertile topsoil being lost, but it's also harming the fish in the ocean, which is a major supplier of food. Cover crops would not only keep the soil from being eroded, it would provide even more food. Oats could be feed to cows or pigs, or eaten by the Dominicans. Education will also be needed to fully implement good conservation practices.

GM education programs will be similar to the USDA's NRCS program, however it will be much smaller. Funding for this program will come from the foreign aid already being spent on this country. Another education option is through the companies that provide the seed, such as Monsanto. The NRCS program would be able to continue after the US has removed the foreign aid and will be funded by taxes paid by the farmers. The NRCS workers will be in the larger farming communities while the program is starting and will be able to work their way to smaller communities as time passes. The farmers will also be able to teach each other about proper conservation practices and use of GM seed.

One final item that must be taken into consideration is infrastructure. The Dominican Republic has the infrastructure to produce and transport its crops however because of the increased transportation there will have to be more upkeep of the roads. Heavy trucks driving from farm to farm will take its toll on all roads. The funding for new roads will come from taxes that will come from the sale of the seed and the crops that are grown.

Three main groups of people will be needed to fund the implementation of GM crops in the Dominican Republic. Those groups are the governments of the Dominican Republic and the United States, representatives from major seed corn companies, and the local farmers. These three groups working collaboratively will make certain that within the next two years, nobody in the Dominican Republic is hungry.

The government's job in this is to provide the funding and regulate how the crops are distributed. It would be unfair if one farmer received more seed than another farmer. The government would also have to be responsible for how much seed each farmer is given and how much it will cost them. The seed company

representative will be responsible for providing the farmers with the seed. Most companies dispose of seed not used by the end of the year. If this seed could be given to the Dominican Republic it would help lower the farmer's input costs. Major seed companies would also be able to give the government bulk rates. The seed corn representatives would also be responsible for educating the farmers. The education would include proper planting methods and land and water conservation techniques. The education will help farmers to maximize yields and profits. The farmer's job is to listen and plant the crops. With the combination of the governments funding, the seed company's education and seed, and the farmers drive to feed his family. The Dominican Republic will be hunger free by 2015.

The funding for the education of the farmers and the purchase of the seed will come from the current aid the US government is giving the Dominican Republic. Last year the Dominican Republic received over \$22 million in economic and social aid. Instead of being used for food, this money can be used to buy seed, which can feed the country and doesn't have to be purchased yearly if some seed is left for planting next year. The use of GM crops will also make the country healthier as a whole, which will decrease this countries dependency on foreign aid.

In South Africa GM crops have significantly helped the small farmers. Insect resistant cotton and herbicide resistant maize was given to farmers to try. If the farmer was happy with how the crop turned out they had the option to but the seeds the next year. Because of this introduction of GM crops over 60% of maize is GM and close to 100% of cotton is GM (Palfreman, 2001). GM crops have changed this country for the better. This country also had an education program provided by Monsanto and other local seed companies.

A country like the Dominican Republic has the potential to be a Caribbean agricultural giant. The country also has the power to feed all of its citizens. With the use of GM crops both of those things will happen. On my recent mission trip to the Dominican Republic I saw the potential in this country. Some countries are incapable of transporting the food from farm to market. Even the small villages have roads; some are even paved. The land is also relatively flat, which is perfect for growing crops. GM crops are the boost this country needs to start providing food to its citizens.

If this country would implement the use of GM crops, educate the farmers, and use good conservation techniques, more people would have jobs and less people would be wondering where their next meal was coming from. The best part about using any GM crop is that it's no different than any other seed the farmers are already used to planting, and the returns are much higher than a non-GM crop.

The future of this country depends on the use of GM crops. It's such a simple change that provides huge results. More crops create more jobs, which equals more spending which creates a better more stable economy, all by changing the type of seed that gets planted. With the combination of the governments funding, the seed company's education and seed, and the farmers drive to feed his family. The Dominican Republic will be hunger free by 2015.

One seed, one plant, one farm, one community, one country at a time.

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