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 Costa Rica, Factor 6: Sustainable Agriculture, Factor 9: Water & Sanitation

Costa Rica: Pineapples are problematic for the environment and people

In my many visits to Costa Rica, I have seen firsthand, how the pineapple industry continues to damage the people and land. It is devastating. The first thing I learned about pineapple production, is that the people and the country does not have the luxury of eating their sought after fruit.

My family comes from the small town of Rio Claro in the southern part of Costa Rica only about an hour and a half drive from Panama where there are very few pineapple plantations. Banana production populates the southern part of the country, pineapple plantations mainly dominate northern areas where the plantations employees working in the fields are made up of 70% of migrant Nicaraguan workers. After visiting family friends, in Upala, the northern most part of Costa Rica, we have repeatedly seen and heard about how the pineapple industry causes deforestation, creates pollution. The more our knowledge grew the picture became clear of the unfair wages and working conditions that exist in the profitable industry. Pineapple production is the leading export of Costa Rica, but the profits come at a tremendous cost to the rich Costa Rican land and vulnerable people.

Costa Rica is the leading exporter of pineapple, in the world. The inputs considerable due to the size of the crop. Pineapples need large amounts of pesticides, about 20kg of active ingredient per hectare, per cycle; that is the equivalent of 18 pounds of active ingredient per acre. The soil is sterilized; biodiversity is eliminated. Fourteen to sixteen different types of treatment are typically needed, and many have to be applied several times. They use chemicals that are dangerous for the environment and human health. (Lawrence). Of the pesticides used on plantations, 80 percent are classified as Highly Hazardous Pesticides (HHP) (Bananalink). One of the 16 chemicals used frequently in pineapple production is Paraquat. According to the United States Environmental Protection Agency (EPA), paraquat can be fatal to humans, even a small dosage (EPA). In the U.S., paraquat is for restricted use, meaning only individuals with license can use the herbicide. The result of this concentration of chemicals affects the health of the workers and renders the soil virtually sterile. Biodiversity is eliminated in one of the most biodiverse countries frequented by travelers, 500,000 different species of exotic animals and home to a population of 4.875 million people.

The pineapple industry directly employs 250,550 workers in their production cycles of which 70% are migrant workers from Nicaragua, non-citizens of Costa Rica. Due to their migrant status, the workers are exploited. They work for half of what is considered a living wage (Lawrence). Since the majority of migrant workers are not citizens of Costa Rica, and nearly none of the workers has any official paper or documentation, they are not protected by citizen rights.

HHP chemicals have left many negative effects on the people who work on these plantations. Workers who interact directly with pesticides have experienced nausea, vomiting, rashes, vision loss, male sterilization, reproductive issues, hormone disruption, birth defects, problems associated with the central nervous system, respiratory and bronchial disorders. These are some of the many reactions associated with pesticide exposure in general and are exacerbated by improper use and handling. "Twice I was poisoned," said a field worker. "The symptoms included vomiting, nausea, and physical weakness, lack of energy and skin irritations.... I was taken off the job with chemicals for 15 days and made to do other work, but I didn't get any time off to recover – I had to be back to work the next day".-This statement was

made by a former employee of a farm that is a supplier of one of the most prevalent pineapple corporations, Del Monte.

The pesticide challenges did end with workers, they are present with the general populous as well. The public has shown to have many negative health issues as a result of the HHP runoff. According to the CIA, in rural Costa Rica, roughly eight percent of the population already lives with poor sanitation facilities, but additionally poor drinking water facilities. Rural families in Costa Rica do not have the same accessibility to clean drinking water as families in urban communities; under one percent of the urban population has poor drinking water facilities. Pesticide runoff is very common. “The reality is that many people are sick because of pineapple.” (Lawrence).

Four communities in the Limon province (Caribbean), have rightfully accused Hacienda Ojo de Agua, a supplier to Del Monte for being responsible for the pollution in their water. More than 7,000 people live in this region where clean drinking water is delivered in tankers (Diego Arguedas Ortiz). While a shipped in water source offers consumable and unpolluted water, a new problem arises with the infrequent deliveries. These Tankers are unreliable and are not sustainable for these small towns. For example, some towns had to wait over four or more days to receive clean drinking water (Lawrence). The tankers give no notice for arrival resulting in missed opportunities by community members to obtain their ration. As a result the people resort to drinking polluted water. Availability and access to clean water should be a basic human right, but the people and communities in the Limon province are being robbed of this as a result of the pineapple industry.

Xiana Briceno lives in Milano, manages the local community water board, and has witnessed the water problem. She said “While the truck used to come every day, now it comes every other day. And when it breaks down, or there’s an emergency in some other place, or it’s a holiday, people go without drinking water for up to four days.” The pineapple industry has caused 7,000 people to go without clean drinking water for too long. “As of next August we will have been dependent on the tanker truck for eight years.” Her reality is cruel. Water should not be a privilege. People living in rural towns deserve a right to have clean drinking water and improved sanitation.

The challenges Costa Ricans face are real, -but given the availability of genetically modified organisms (GMO) crops and the effectiveness of taxation, solutions are available. Using GMOs will decrease the use of pesticides. GMOs are able to alter if a crop is more resistant to insects or certain diseases thus cutting down on the use of pesticides. If this tool could be used in pineapple production, a GMO version of the crop genetically modified foods are a way to sustainably feed our world, on a broad scale, while keeping our farmers and workers safe.

A soil bacterium called *Bacillus thuringiensis* (Bt) has revolutionized the farming industry in North America and many countries around the world. Scientists have been able to isolate a gene from this bacterium and incorporate it into crops like corn and cotton, among others. When in the plant, the gene produces a protein that is fatal to certain insect pests. If this would be done in pineapples, the amount of insecticide applied could be reduced. Bt proteins were shown to have lethal effects on insects consuming the bacteria in the soil, so researchers were able to use this to their advantage in corn. This may be a precursor to the pineapple industry toolbox of solutions as well (GMO Compass). As with Bt, other genes pulled from native and non-native sources can be leveraged in crops. Companies like DuPont Pioneer and Monsanto sell GMO products that contain various defense mechanisms against crop pests. Overtime the

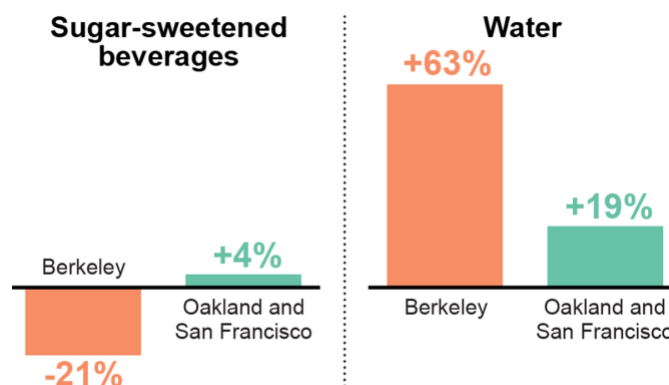
biotech industry can be urged to develop and commercialize new crops, such as pineapples, with traits that will reduce the amount of chemical application needed.

The use of GMOs in pineapple production could create a safer means for the environment, public and workers. Workers would minimize their exposure and use of pesticides. A pineapple that is pest resistant and disease resistant would require less chemical application thus controlling the pollution and minimizing health related problems.

Recently Del Monte created an FDA approved GMO pineapple that is pink and sweeter. "(Del Monte's) This new pineapple has been genetically engineered to produce lower levels of the enzymes already in conventional pineapple that convert the pink pigment lycopene to the yellow pigment beta carotene. Lycopene is the pigment that makes tomatoes red and watermelons pink, so it is commonly and safely consumed" (FDA). The company plans to grow the pineapple in Costa Rica. Del Monte has created the "extra sweet pink flesh pineapple" and this pineapple can be the precursor to the next generation of pineapples that will cut down the use of pesticides. When the new GMO pineapple is commercialized, education about the safety about GMO crops will be important. The public will likely have hesitations in consuming in this new GMO crop, but with the right effort it can be a new stepping stone in public education in GMO safety and transformation of the production of the crop.

GMOs and other methods in the biotech field are an approach to beginning to abate and fix the issues in the pineapple industry. Other methods with direct government leadership also exists, for example, taxation. Taxes could be placed on HHPs and other harmful pesticides. In the United States, we have placed taxes to limit or lessen people consumption of a certain item, for example cigarettes or the soda tax.

In 2014, researchers followed several communities within Berkley, Oakland, and San Francisco after the first big soda tax passed. After the first four months of the bill going into effect, a study found that sugary drink consumption dropped by 21 percent (New York Times) in Berkley communities but rose by four percent in the other two. The American Journal of Public Health found that water was consumed in place of sugary drink consumption.



The graph above was taken from The Philadelphia Inquirer, and even though the tax was defeated in Oakland and San Francisco water consumption still increased by 19 percent. The results of this study was consistent with those of Mexico where in 2014, a nationwide soda tax was passed resulting in the sales of

sugary drinks falling by 17 percent (New York Times). The taxes that were placed on soda is exactly what needs to happen in Costa Rica but for pesticides. The study conducted in Berkley, Oakland and San Francisco is a prime example, when taxes were placed on an unhealthy item, a healthy alternative was used instead.

Taxes placed on certain pesticides could regulate the usage and decrease the consumption of pesticides. Taxes could lead to new ways and a healthier, safer mean to farm and produce pineapples. What we have seen globally, is that many countries have already started adopting this ideology. For example, Sweden, Belgium, Denmark, Netherlands, Canada, Finland, France, Norway, and the USA (Louisiana) have all placed taxes on pesticides. “Belgium introduced a pesticide tax on five active substances based on health and environmental risk criteria” (Taxes on Pesticides and Chemical Fertilizers). What the industry has seen is that low tax rates and taxes on every pesticide will not be as effective as selectively high tax rates. Take into account that Denmark, Norway and Sweden, for example, have only found success with high tax rates on pesticides alongside strong policies and urging the use of more sustainable means, like crop rotation. By mandating the use of more sustainable means like crop rotation and insect scouting to apply insecticides only when needed, governments are able to show growers that farm profitability can increase through practices like Integrated Pest Management. By default, this also increases sustainability from a health aspect as well.

Denmark started an action plan to reduce the use of pesticides in 1986 due to the major increase in pesticides and a negative impact on the environment. There have been multiple on going plans throughout 1986-2015. As a part of the 2010-2015 plan in Denmark, taxes were placed on selective pesticides through a process. Selective taxes were placed depending on certain pesticide’s effects on health and the environment. The Danish Food and Agriculture Council (Association of Farmers and Food Industry) found it positive that the taxes were based on health and environmental effects and that pesticides with the highest load (most harmful to health and environment) were more expensive. This implementation made it easier to find, acquire and apply pesticides that are not as harmful to the environment and human health (Danish Ecological Council). Some of the fears of the implementation of taxes were that the industry would lose competitiveness and that job loss would result. However, no significant changes have been reported. These actions plans have taken 29 years with five different action plans and the process is still ongoing. In Costa Rica, it would be the same, to figure out a plan that works best for the country and change it every few years if necessary. If taxes are placed on selective (highest load) pesticides, and policies are implemented, the pineapple industry will have no choice but to create a more sustainable ways to produce pineapple.

In Costa Rica, pineapples are a \$700 million dollar industry employing nearly 250,550 workers and negatively effecting the health of nearly 7,000 people (Diego Arguedas Ortiz). Pineapples are the main export of Costa Rica, and there is no reason pineapples cannot be produced sustainably. To create a culture of sustainable agriculture in Costa Rica and the pineapple industry, high taxes could be a game changer and a lifesaver when placed on pesticides. GM pineapples that are insect resistant as well as disease resistant should be looked to as one of many possible solutions. Less pesticide use will in turn reduce HHPs in drinking water. These two solutions will not only decrease the use of pesticides, but also promote the health of workers, the public and the environment.

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