

Brooke Bradford
Clinton High School
Clinton, Arkansas
Puerto Rico, Sustainable Agriculture

Depend on Our Own Soil

Sustainability is especially important to me because I learned firsthand from a tornado how hard it is to recover after a natural disaster. Seeing the devastation of the tornado that tore through Arkansas on February 5, 2008, changed my life. On that particular day, if my grandmother had simply gone to her interior bathroom to seek shelter from the storm, the tree that was uprooted and thrown into her home would have crushed her. Instead, she sought safety in the basement of her neighbor's home and her life was saved. Her home and our entire neighborhood were flattened. Our neighbors and the community began the recovery immediately. Not once during this recovery did anyone in my community worry about food or being hungry.

It took eleven days for the electricity to be restored after the tornado in my hometown in Arkansas. It took 11 months for the power to be restored to Puerto Rico after Hurricane Maria struck on September 20, 2017. It was the longest power blackout in U.S. History. (Lliveras 1) In Puerto Rico, the citizens were already importing 85% of their food before the hurricane. During the recovery, that number jumped to 95%. Hurricane Maria wiped out 80% of the farmers crops. (Robles and Sadurni 1) Carmen Yulin Cruz, the mayor of San Juan, the capital of Puerto Rico, said after Hurricane Maria, Puerto Rico had enough food for one week. With the electricity grid destroyed, roads demolished, and ports closed, for the first time in recent history, U.S. citizens found themselves susceptible to starvation. Learning from these disasters is the key to building sustainability in Puerto Rico. Sylvia DeMarco is a collaborator of the Puerto Rico Resilience Fund, an effort to help rebuild the island's struggling farms. She said, "After the hurricane, even people who didn't care about food started to care. It really opened people's eyes: that we must depend on our own soil, not shipping containers." (Adler 2)

Puerto Rico is a self-governing commonwealth, and a territory of the United States with a population of 3.41 million people. It lies 1,150 miles off the tip of Florida. Puerto Rico is roughly the size of Delaware. Puerto Ricans enjoy a tropical climate with an average temperature of 80 degrees. The geography includes lush mountains, coastal lowlands and a karst area with rugged limestone creating over 2000 caves. With this climate and geography, the number one industry is tourism with 79% of the workforce in the service industry. The average farm is 43 acres. (data gathered from U.S. Census Bureau and CIA.gov World Factbook)

Puerto Ricans are U.S. Citizens by birth. The average size family is 2.81 persons. Its residents eat a diet of rice, beans, chicken, and fish. (data gathered from U.S. Census Bureau and CIA.gov World Factbook) 43.5% of the residents live at or below the federal poverty level compared to 12.7% in the U.S. The average household income from 2011-2015 was \$19,350 which equals about one-third of the U.S. average of \$53,889. Unemployment is estimated at 10.1%, which is double the U.S. overall average of 4.1%. (Michaud and Kates 2)

About 43 percent of Puerto Rico residents rely on benefits for food and medicine. The funding is provided by a block grant from the U.S. federal government which provides food-stamp and Medicaid programs. The food-stamp allocation in Puerto Rico is 40 percent smaller than those in the states. (Stein and Dawsey 1, 2)

Presently Puerto Rico is rebuilding from Hurricane Maria, which was the worst natural disaster in their history. They are still very vulnerable to food scarcity in the face of future natural disasters. After Hurricane Maria, Orlando Carlo, from Mayaguez, Puerto Rico, rationed food, eating what he called the “hurricane diet” consisting of canned pasta or sausage and rice. Christa von Hillebrandt-Andage, from the same town, said she and her teenage daughter survived on one gallon of water per day. They learned to live without cell phones and electricity, but not without water. As of February 2019, residents are still driving over an hour for drinking water. (Glavinskis 30) The hurricane forced the citizens to reevaluate their dependence on food imports. Now, they are looking for answers to avoid a future food crisis.

One of the first solutions to improve agriculture in Puerto Rico is implementing best practices. Best practices can provide invaluable resources for teaching new and rebuilding farmers the best practices for their climate and geography. Experienced farmers know which crops and structures can survive a category 5 hurricane. (Penuelas 1) They can also provide hands on teaching for new and rebuilding farmers with proven local practices. Puerto Rico can utilize its existing farm brigades to help repair and restore farms. Many of the farm brigades promote agroecology, an approach to farming that promotes diversity through crop rotation and livestock integration and uses natural systems to attract insects and keep pests under control. The most valuable resource of agroecology is farmers’ knowledge of local conditions. Under its practices, farmers can be self-reliant without the need for imports to support their farms. Knowledge-sharing among farmers will be indispensable to the future of Puerto Rico farms. (Lim 6)

Crop selection will be another important decision to revive Puerto Rican agriculture. Frequent storms and drought make the island susceptible to loss of topsoil. Hurricane Maria completely eroded the topsoil from most farms. To avoid this problem in the future, farmers can focus on techniques that better protect the topsoil like no-till farming procedures. Also, by adding greenhouses and aquaculture farmers can avoid issues with erosion. Every year, Puerto Rico is prone to extreme weather so they also need crops that can grow quickly after a hurricane or drought like lettuce and tomatoes with a 45-day grow period. (Acevedo 2) Other crops can strengthen farms, such as amaranth, which insects will eat instead of other crops. (Holpuch 2) With tourism being the largest industry in Puerto Rico, farmers can add crops needed for the hotel and restaurant industry with farm-to-table style food in mind. Surveys after hurricanes in Cuba, Chiapas, Nicaragua, and Honduras have shown that diversified, small-scale farms suffer less damage than bigger farms practicing conventional agriculture (Penuelas 1) So, future farmers can start these smaller type farms with the benefit of the knowledge gained from other recovery efforts in similar regions.

As with the rest of the world, Puerto Rico needs to encourage and recruit new agriculturists. According to the United Nations by 2050 there will be 9 billion people on the planet. In the next 40 years farmers will need to produce more food than they have in the previous 10,000 years combined. The average age of the American farmer is 57 years old. Encouraging youth and students to explore careers in agriculture is one of the best investments Puerto Rico could make to support future food sustainability.

The costs of these programs and improvements will vary greatly. Many best practices can be shared for free or minimum costs at local workshops, by entities such as the Puerto Rico Agriculture Extension Service, farm brigades and non-profit organizations. As farmers fund their re-building efforts, they can choose to invest in equipment and materials that prevent erosion and support diversified and short-term crops. The costs for this effort would obviously be the difference in the price of re-building exactly as before the storm versus the costs of the improved practices. 4-H and FFA would be two great resources for encouraging students to pursue careers in the agriculture industry, and in turn, find solutions to the food sustainability issues. These are two groups that are already in place and active in Puerto Rico, with no new associated costs. Other improvements would have considerable costs as farmers consider changes to their farming practices.

Another solution for improved agriculture in Puerto Rico comes from the legislative branch. Policy makers can reach their goal of reducing imports to 70% in several ways. (data from USDA.gov) They can provide incentives like exemptions from sales and use taxes to purchase new equipment, tools, irrigation and rainwater collection supplies, seeds, and greenhouse and aquaculture components.

Some of the greatest challenges Puerto Rico faced after Hurricane Maria was the destruction and failure of the electrical grid and transportation challenges. Solutions to these issues is imperative to ensure food sustainability. After Maria shipping containers full of goods sat undistributed in port. Without electricity all the paperwork had to be done by hand. There were not enough drivers or diesel fuel to deliver the goods inland. Many roads were impassible. Once goods were delivered, distribution centers struggled to keep the perishable items from spoiling. (Domonoske 3 and 4)

Almost two years after Maria, the island is still experiencing power outages that last as long as 24 hours. Congress approved \$20 billion in recovery aid to Puerto Rico, but as of March 1, 2019, less than \$14,000 of that aid has been spent on reconstruction. About \$18.5 billion of the hurricane relief funding is caught up in the bureaucracy of the planning requirements and grant agreements. (Madrid 2) The citizens of New Orleans faced this same frustration after Hurricane Katrina. Streamlining this system would greatly benefit all states that face natural disasters and our territories as well.

Another problem facing Puerto Rico is its lack of representation. They do not get to vote for President unless they re-locate to one of the states. They do not have Representatives or Senators in the U.S. Congress. Benjamin Torres Gotay, deputy editor and columnist at El Nuevo Dia, Puerto Rico's largest newspaper said, "We're talking about a fundamentality poor island, with a tremendous inequality problem and a government that has its hands tied."(Viglucchi 7) That lack of representation results in inequality problem. "Maria survivors in Puerto Rico received an average of \$1,800 for repair assistance. In contract, survivors of Hurricane Harvey in Texas got \$9,127."(Viglucchi 3)

Puerto Rican residents will need to elect local representatives who will make these issues their priorities. Otherwise the commonwealth will be in a never-ending cycle of natural disasters, electrical shortages, and transportation failures. Corruption is another issue plaguing the territory. Since Maria, Puerto Rican prosecutors have charged six former government officials with embezzling \$15 million in hurricane reconstruction money. (Mazaei 1) Obviously, these will be long-term projects for the island which will require much strategic planning and budgeting. In the meantime, residents and elected officials can work together for immediate solutions.

Policy makers should include local farmers in emergency planning to avoid future food shortages and waste in the next natural disaster. Authorities can work with farmers to identify the most vulnerable spots for food shortages and give farmers in those areas priority when roads are cleared to deliver their food before it spoils. In doing this, the crops that survive the next storm can get to the people in need and, in turn, farmers can continue to sell their harvests. After Hurricane Maria, Rebecca Feliciano Bras, a produce grower in Aibonito, Puerto Rico, watched her crops spoil because there was not a plan in place making it a priority to get her food to people in need. She said, "Open the way for me because I can feed the people." (Acevedo 3)

Puerto Ricans will need a plan to pay for the cost of the implementation for these programs. The tourism industry is thriving in Puerto Rico. The World Travel and Tourism Council estimated a recovery time for Puerto Rico after Maria to be sometime in 2021-2022. However, 2019 is on track to be a record-

breaking year with \$445 million in tourism revenue reported through the end of May. The island has welcomed 1.67 million visitors through its airports in the first few months of this year. That is the highest number of airport arrivals in the January to April timeframe in the island's history. (Caribbean News Now 1)

Puerto Rico can capitalize on the booming tourism industry by adding taxes to the services most used by tourists like resort, beach and diving services, as well as hotels and restaurants. By adding a 2% tax to the \$4.09 billion annual income from the tourist industry (Mantanez 1), Puerto Rico could create an additional \$98 million in tax revenue. The average costs for a week of accommodations, food and entertainment in Puerto Rico is \$1,151.00 per person (Budget Your Trip), so the 2% tax would amount to only \$23.02 per person per week. This type of tax is not likely to deter tourists, but it could help generate the revenue needed for food sustainability in Puerto Rico.

With food imports at 85% Puerto Rico had good reasons to want an agriculture revolution before Maria. (Penuelas 2) Unfortunately, sometimes it takes a disaster with extreme conditions, before people act. When Puerto Ricans waited in long lines to walk down supermarket aisles that were empty, they finally understood the urgency of their situation. Many depending on FEMA and non-profits for food for weeks. After Maria, Puerto Rico has even more reasons and a sense of urgency for an agricultural transformation to take place. The territory still has many struggles as it faces its second hurricane season after the wrath of Maria. Many residents are still using tarps for roofs almost two years after the storm. But the people who chose to stay and rebuild in Puerto Rico can set an example for the Caribbean about food sovereignty. Puerto Rico can stop living off shipping containers and depend on their own soil.

Bibliography Page

- Acevedo, Nicole. "The push we needed: Puerto Rico's local farmers step up efforts after Hurricane Maria" *NBCnews.com*, www.nbcnews.com/storyline/puerto-rico-crisis/push-we-needed-puerto-rico-s-local-farmers-step-efforts-n875491
- Adler, Tamar. "The Young Farmers behind Puerto's Food Revolution" *Vogue*, www.vogue.com/article/rebuilding-puerto-rico-farms-agriculture-vogue-july-2018
- Budget Your Trip, www.budgetyourtrip.com/puerto-rico
- Caribbean News Now, Puerto Rico Reports Highest Tourism Revenue and Visitor Numbers, www.caribbeannewsnow.com/2019/07/05/puerto-rico-reports-highest-tourism-revenue-and-visitor-numbers/
- CIA, *World Fact Book*, www.cia.gov/library/publications/the-world-factbook/
- Domonoske, Camila, The Two-Way, *Play Live Radio*, September 28, 2017
- Glavinskas, Vanessa. "After the Storm" *the Rotarian*, February 2019
- Holpuch, Amanda. "The story of a recovery: How Hurricane Maria Boosted Small Farms" *theguardian.com*, www.theguardian.com/world/2018/aug/07/the-story-of-a-recovery-how-hurricane-maria-boosted-small-farms
- Lim, Andrea "Can Farming Save Puerto's Future" *theNation.com*, www.thenation.com/article/can-farming-save-puerto-ricos-future/
- Lliveras, Lauren. "Puerto Rico has not recovered from Hurricane Maria" *theconversation.com* <http://theconversation.com/puerto-rico-has-not-recovered-from-hurricane-maria-103288>
- Madrid, Manuel "With Hurricane Season Looming, Billions in Disaster Recovery for Puerto Rico Remains Unspent, The American Prospect, April 15, 2019, Prospect.Org
- Montanez, Ana Marie Rios, International tourism revenue in Puerto Rico from 2005 to 2017, *Statista 2019*, www.statista.com
- Mazzei, Patricia, "Puerto Rico Ex-Officials Accused of Steering \$15.5 Million in Contracts to Consultants, *New York Times*, July 10, 2019
- Michaud, Josh and Kates, Jennifer, Public Health in Puerto Rico after Hurricane Maria
- Peñuelas, Michael & Nierenberg, Daniella. "Growing an Agriculture Revolution in Puerto Rico" *Foodtank.com*, <https://foodtank.com/news/2017/12/time-allow-puerto-rico-feed/>
- Robles, Frances and Sadurni, Luis Ferre', Puerto Rico's Agriculture and Farmer's Decimated by Maria, www.nytimes.com/2017/09/24/us/puerto-rico-hurricane-maria-agriculture-.html
- Stein, Jeff and Dawsey, Josh, Puerto Rico Faces Food Stamp Crisis, *Washington Post*, March 25, 2019

Viglucci, Andres, Puerto Rico: The Forgotten Island, Miami Herald, September 19, 2018

United Nations, www.unitednations.org

U.S. Census Bureau, www.census.gov

USDA, www.usda.gov