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### **Addressing Land Use in Puerto Rico with Respect to Food Security**

Food insecurity impacts many communities and countries globally, and too often the issue of food insecurity is thus met with a “one size fits all” approach. In reality, every region, country, and community will have different experiences with any given issue, but especially food security, which is so often tied to not only disposable income for an individual, but the way that community-wide wealth contributes to the accessibility of vital resources. Food insecurity is when food is not reliably available, accessible, or utilized effectively (10 & Contributor, 2017). Given that the issue of food insecurity is not simply about agricultural output, but also adequate distribution, the tactics used to approach it must in turn become more nuanced, encouraging a focus on ensuring food security on smaller scales.

One particular area that experiences significant rates of food insecurity is Puerto Rico. In 2020 43.4% of Puerto Rican citizens were considered to be in poverty with the median household income being \$21,058 (U.S. Census Bureau, 2021). While the focus of this paper is on land usage in agriculture and the trade dynamics that shape the availability of different crops, it is also important to note that Puerto Rico has also experienced food insecurity due to the legacy of American influence and natural disasters. Natural disasters always have the possibility of disrupting food supply chains, but this is particularly common in tropical areas and places like Puerto Rico often experience the consequences of crop loss and infrastructural damage due to hurricanes. Puerto Rican cuisine and diets are diverse, but rice, beans, corn, and seafood are common in many dishes. Although no data on the exact average farm size could be found, they are usually family run. This presents both an interesting challenge of having low support systems as the farms crucial to food production are likely not backed by large companies and are more subject to changes in the economy and changing labor demands. The family-owned farms also provide a unique opportunity for community outreach and a deep understanding of the needs of local people and environments. More traditional methods may be encouraged, but the current era provides an opportunity to introduce new practices or a shift in land usage between or within the agricultural sector as younger farmers are starting to take over their family farms and they may be more open to new ideas or adaptations.

Puerto Rico is an interesting case as far as foreign policy as Puerto Rico is not actually a country on its own, but rather a United States territory. This status only intensifies the impact of international trade, which is already of heavy importance due to the limitations of Puerto Rico’s geography as a small tropical island. This exact challenge to agriculture, is also part of what makes Puerto Rico an “ideal tourist destination”, but that poses the challenge of how agriculture and industry are balanced on a relatively limited space. As Puerto Rico is considered a U.S. territory, there are some complications in governance and distribution of financial and social aid, including the island being under a separate food security program than the rest of the United States. Instead of the Supplemental Nutrition Assistance Program (SNAP), Puerto Rico operates on the Nutrition Assistance Program (NAP), which is said to have less generous benefits as it has a distinct federal cap (Keith-Jennings, 2020). This is despite this fact that, groceries prices in Puerto Rico are higher than almost anywhere else in the US (Lakhani, 2021). This perfectly demonstrates the complicated way in which territories are treated and how they can be underrepresented in the distribution of federal funding despite being technically part of the United States. This is also reflected in the international trade of Puerto Rico as some of the biggest sectors of Puerto Rico’s economy are tourism and cash crop export, both of which are dependent on consumption from wealthier areas such as the United States. They are also both a result of the very tropical environment that increases the risk of natural disasters, yet little reliable relief is provided by the federal government. On

top of an economic dependence, there is also a reliance upon the U.S. for food imports as most of the food consumed in Puerto Rico has to be imported. This places the issue of trade in the center of the food security issue, particularly as the reliance on foreign trade limits the options available for land development as the demands of trade must be met to keep a stable economic situation.

Two possible approaches to international trade in food find themselves directly opposed in Puerto Rico, creating a unique situation where two of these approaches have the possibility of decreasing food instability, but only one may be implemented at a time. One approach would be to directly encourage agriculture for the purposes of growing food crops to make food more available on a local scale and increase the ability of communities to produce their own food. This would encourage a decreased amount of trade through exportation of cash crops like sugar cane and coffee, but also a decreased reliance on imports from the US for food. This approach would allow for more food sovereignty and would also mitigate some issues created by supply chains during events like the COVID-19 pandemic as local communities and government would likely have a greater focus on supplying food than larger foreign companies who are focused on economic gain and necessarily the health of individual communities. A shift towards local agriculture has already been started by some Puerto Rican farmers who committed to producing food for their communities following the devastation seen in 2017 when Hurricane Maria prevented ships from being able to dock at ports that were damaged during the storm (Lakhani, 2021). Due to the fact that 85% of food consumed in Puerto Rico is imported from other regions, the lack of shipments created a decrease in food availability and accessibility, especially in areas that did not have local farms to turn to (Philipp, 2022). The lack of regular exports may be a disadvantage in emergencies however, as 37% of Puerto Rico's farmland was destroyed in the same storm that disrupted the ability of trade ships to dock (Philipp, 2022). Another drawback of a shift to total self-reliance is that, since Puerto Rico is quite small, there is a definitive limit to the amount of arable land that may be developed for farming and the population may at some point extend past the physical limitations of the island. While this may sound as if it would be damaging to the environment, initial developments in this movement show a tendency towards agroecology. Agroecology is a form of agriculture that is meant to be sustainable, reliable, affordable, and syncretic with the environment. This would also provide more jobs, of which there were said to only be one million left in 2013 (Unknown, 2015). A primary focus of agroecology is finding a balance to increase food production without the use of products or practices that could be damaging to the environment through rotation of crops, a shift away from fertilizers, and a harmonious approach to help find crops best suited for individual climates (Unknown, n.d.). Even the most harmonious approach will still require some adaptation and conversion of land, especially to achieve true food sovereignty, and would require a lot of labor. One way to help gain support for this movement would be through community building actions, and possibly the temporary aid of non-profits or volunteers to help with the initial planting, especially of slow-growth plants, like fruit trees. This could help contribute more to self-reliance than other farming methods because permaculture is an important part of agroecology that has a high initial labor investment, but a relatively small long-term maintenance requirement as it focuses more on old-growth development and planting crops that are already adapted to thrive in a given environment. The conversion of land raises some concerns about damaging other national income sectors such as tourism as well as some concern over the destruction of parts of the landscape that may be historically significant to the Taíno people. True agroecology, however, would be able to be almost ubiquitous, appearing in backyards, community gardens, and street corners, and could help reduce the amount of deforestation that is typically associated with large-scale food production.

The opposite approach to this issue would be to import more food and reallocate land and resources to the development of the tourism industry. By increasing the amount of foreign import through international trade, more land could be conserved and thus put towards the advancement of ecotourism, which may be more effective for sustaining local plant and animal species. Puerto Rico's agricultural sector also survives through a reliance on cash crops instead of foods that can be sold locally and thus, by fueling an agricultural focus, there could be a greater focus on cash crops, leaving the accessibility of food crops less

subject to the relatively volatile weather patterns. Larger, mainland-based food production is usually less subject to hurricanes as farms are usually located further inland and are thus more sheltered from the effects of hurricanes. By relying on larger, more established food sources, Puerto Rico's food supply may become more reliable, and prices may be reduced. This could also allow for greater access to food in urbanized areas that do not have arable land to grow food on. This system is also more compatible with the existing financial aid program in Puerto Rico, NAP, as it recently switched to not providing a cash withdrawal option (Keith-Jennings, 2020). The reduction in the accessibility of locally grown foods for people on financial aid means that realistically the most vulnerable populations would still rely on larger chains that are capable of accepting forms of payment other than cash. To supply food for these larger chains, larger farms and corporations from outside of Puerto Rico would likely be employed, and thus international trade policy would need to adapt. An alternative source of income to cash crops could be found in tourism. Tourism could be encouraged through increased quality of infrastructure and tax breaks for those involved in the development of the industry.

While from an agricultural standpoint both of these solutions are credible, in implementation there is a concern that thus far has not been brought into account. That concern being: any issue of food sovereignty is inherently linked to political sovereignty. Thus the political nature of economic and food-based independence must be considered, especially when both agricultural goods and tourism have been a way for an extranational body and corporations to extract wealth from the environment and labor of a dependent nation. Given that Puerto Rico is one of the few Latin American countries that is still under a foreign rule, where is not represented in Congress or in presidential elections, there is a certain degree of caution that must be taken in any discussion of independence (Reichard). While some current states, such as Hawaii, were able to gain statehood and qualify for some benefits of representation and access to federal programs, it is a potentially dangerous request and could be seen as an act of rebellion. On the other hand it is even less likely that the U.S. would have any reason to let go of territory, especially one that holds such a favorable balance of trade for them, even if many believe it would be better for Puerto Rico long-term. Because of this delicate situation, it is important to acknowledge that even encouraging widespread food-sovereignty could be a challenge to the near-mercantilist system of agricultural trade and reliance between Puerto Rico and the U.S., and statehood has thus far been denied, so any mass agricultural movement must be supported and able to support a population that could immediately be subject to trade embargos.

Food insecurity is always a complicated and highly individualized issue to different areas, cultures, and economies. So, while Puerto Rico's agricultural sector is highly limited by the geography of the area and is subject to volatile weather patterns, the trade arrangements that limit the availability and accessibility of food should also be considered. Puerto Rico finds itself at a considerable advantage for tourism and thus tax breaks focused on encouraging tourism could help provide more income with which to export food, but alternatively the land could be used directly to promote food sovereignty by encouraging agroecology to help produce food in a local manner and decrease dependence on international trade altogether. Before implementing any widespread policy, first the individuals who are most heavily impacted by food insecurity should be able to provide feedback on what would work best in their communities, but the development of land for agriculture or for tourism could also be considered. All that is definite is that the current system is leaving thousands of people without food, and they cannot be left as the cost of American industry.

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