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Looking at Child Labor Through Agriculture in Education

When looking through the eyes of a child, there should be an innate joy radiating through them, as they learn their colors, or learn a new word. However, for many children in São Tomé and Príncipe, this isn't a reality. Though São Tomé and Príncipe has laws stating that children below fifteen may not work, this is rarely followed, as 22.6% of children aged five to fourteen work (US Department of Labor, 2018). In a country where over 60% of the population are under the national poverty line of \$3.20 per person a day (World Food Programme, n.d.), many children have no other choice but to be put into rough, brutal conditions. However, São Tomé and Príncipe does have laws concerning primary education, with the compulsory education age being 15, with 89.2% of students aged 5-14 attending school, with 24.9% of students, aged 7-14, combining work and school (US Embassy in Gabon, 2018). Though a majority of the children attend school, many of these students, because of their circumstances, are still forced to work. However, with on-site food production available to students, São Tomé and Príncipe would be able to provide their children with nutritional meals that encourage parents to send their children to school without having to balance a job at the same time.

São Tomé and Príncipe is a small archipelago country off of the west coast of Africa, with a population of nearly 200,00 people (World Bank, 2019). It consists of various climates due to the mountainous and volcanic terrain it inhabits. São Tomé and Príncipe also claims the title of the second smallest country in Africa, behind Seychelles, with there being only 964 square kilometers in the entire nation (CIA, n.d.). The average household size was at 3.9 people, with 50.8% of people being under the age of 18, making São Tomé and Príncipe a relatively young nation, demographically (Amazon Web Services, 2014). The official language of São Tomé and Príncipe is Portuguese, with roughly 98.4% of the population being fluent in it, however Forro, Capo Verdian, and French are also widely spoken throughout the country (CIA, n.d.). The distribution of people throughout these areas varies as well, due to 33.8% of the population living in rural areas while 66.2% lives in urban areas (Britannica, 2019).

São Tomé and Príncipe is a unitary republic, where they elect a president who then goes on to pick the prime minister. However, São Tomé and Príncipe remain divided, with Príncipe having its own autonomous region along with a regional government (The Economist Intelligence Unit, 2018). Due to this, the governments of each island operate differently, leading to a significant difference between both islands. Though São Tomé and Príncipe's GDP has grown by 4% this year, due to the institutional deficiencies, erratic aid, widespread corruption, inflation, judicial weakness, and a massive public debt, the government has recently been taking unconditional loans from countries, such as China, to make up for it. Meanwhile, the public debt of São Tomé and Príncipe accounts for 83.3% of its GDP. This has significantly affected the nation, as there is a lack of reform considering open-market policies and there are little to no property rights, with only less than 10% of the land being held by private owners (Heritage, 2019).

São Tomé and Príncipe's economy mostly consists of agriculture, more specifically cocoa beans, tourism, and oil-fueled foreign investment. However, due to the small size of São Tomé and Príncipe, both in

geography and population, it is unable to sustain large amounts of factorial and corporate work. This, in turn, affects its ability to deal with shocks and achieve a balanced budget. Its vulnerability to these crises can be best expressed by its energy crisis in 2018, which reduced energy supply by 75%. Along with this, the limited human capital contributes to the fact that São Tomé and Príncipe is unable to diversify its economy. Another problem arises based on São Tomé and Príncipe's remoteness, as it increases import costs leading to a high cost of public good and a high level of public expenditures (World Bank, 2019).

A significant challenge throughout São Tomé and Príncipe has been its' reliance on child labor. Because of its' small population, with much of the population being under the age of 25, São Tomé and Príncipe has proven to have an issue concerning child labor. Though there exist no children in formal level jobs across the country, in many agricultural sectors, children make up a lot of the labor. The main industries children in São Tomé and Príncipe participate in include farming, fishing, carpentry, construction, street work, working in shops, bars, or restaurants, and commercial sexual exploitation (US Department of Labor, 2018).

Due to São Tomé and Príncipe's location as well, it does not have a lot of immigrants, with there being a net total of -7.9 migrants per 100,000 people (CIA, n.d.). This plays another part in São Tomé and Príncipe's problems, as there is not enough human capital to sustain the growing agriculture, tourism, and oil industries. This leads to need for many child workers, both to sustain their growing industries as well as to provide for thefor own families. Contrastingly, their unemployment rate was at 13.4%, compared to the global average of 6.97% (The Global Economy, 2019). It has been stated that often high unemployment rates can lead to a larger need for child labor as this can help to provide for basic necessities for their families (UIowa Labor Center, n.d.).

However, child labor in São Tomé and Príncipe can also be attributed to the high poverty rates. In a country where most of the population is under the national poverty line, with a high amount of people living in extreme poverty, these extreme conditions force many of these children to have to fend for themselves. São Tomé and Príncipe does not have a legal minimum wage for the private section, leading to many citizens throughout São Tomé and Príncipe to have multiple jobs just to support themselves. (Social Security Administration, 2015). For many of these families, child labor is a more consistent way to earn money.

Child labor in São Tomé and Príncipe normally consists of un Hazardous work, with work in agriculture, industry, and services comprising most of it. Agriculturally, this often consists of weeding, fertilizing, and line and hook fishing. In the industry, carpentry, woodworking, and construction are the most common of industrial child labor. Lastly, many children work in the services industry, which often consists of working in shops, restaurants, bars or street work including begging and street vending (US Department of Labor, 2018). Though these jobs are not hazardous, due to São Tomé and Príncipe's compulsory primary education system, many children are forced to, both occupy a job while attending a primary school. However, there have been some positives to come of this, as the World Food Programme has come to work in São Tomé and Príncipe, with a focus on bringing lunches to those at the schools, helping the students concentrate more on their studies rather than their economic problems.

The challenge of reducing child labor has been largely neglected due to the nation's focus on reducing its poverty rates and economy. For many children, labor is not seen as a challenge but rather a compulsory part of life. However, there are still ways for children to get food while decreasing child labor. In a country with a such a large percentage of its child population working, it doesn't make sense to, at this point, get rid of child labor completely. Nevertheless, contributions to food sources and education has proven effective in countries similar to São Tomé and Príncipe such as Ethiopia and Vietnam (Morrow,

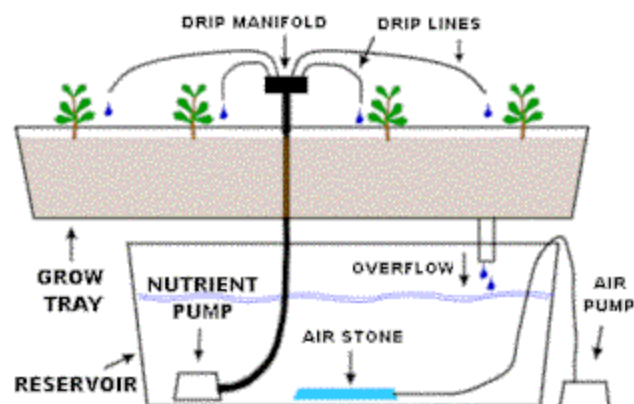
2013). In the intersection of education and agriculture, the use of sustainable plants or animal husbandry needs to be addressed.

In many cases, when parents know their children will be fed during a school day, they are more likely to send them to school. This is especially true in cases where the family itself are not able to feed themselves. However, it is unsustainable for many non-for-profit groups or programs such as the World Food Programme to be responsible for the meals of these students. In a country with a wide variety of geography, São Tomé and Príncipe would be able to sustain agriculture or animal husbandry through schools and education systems. In this way, students would be able to attend school while contributing to their own nutrition.

This has been accomplished in several countries such as Kenya, with the work of Hydroponics Africa, a Nairobi based company that helps feed students with limited space and water. At the publicly funded Moi Avenue primary school, nutritious meals are difficult to find, leading to many students to be employed in illegal child labor. However, the school realized they needed to try something different, and they started growing their own vegetables. They then began to partner with Hydroponics Africa to provide their students with a garden where they could produce their own food. In this way, the school started subsistence farming and began to use hydroponics to grow their own vegetables. In their small area of Nairobi, they were able to teach many of their primary school students the importance of agriculture. Many of these students had never grown their own vegetables, and it taught them a new level of responsibility. They were in charge of their own lunches, and it taught many of the students the importance of providing for themselves. They used these systems to grow nutritious vegetables such as tomatoes, spinach, and collards. Through this, Moi Avenue primary school was able to prevent child labor through their investment in the students. (Securing Water for Food, 2018).

Hydroponics have been acclaimed as a sustainable way of farming, especially in areas with limited space. Hydroponics act by growing plants in a water-based solution full of nutrients. Instead of using soil, of which São Tomé and Príncipe does not have much of, it utilizes the root system by supporting it with an inert medium. This in turn allows the plant roots to come in direct contact with the nutrient solution, while having access to oxygen (National Agricultural Library, n.d.). Due to the versatility of hydroponic systems, pH levels and nutrient solutions are able to be adjusted, leading to a more balanced system of agriculture. Hydroponics also uses less water than normal soil-based agriculture, and it's better for the environment as it reduces waste and soil runoff.

There are six main types of hydroponic systems including the wick system, water culture, ebb and flow systems, nutrient film technique, drip systems, and aeroponic. Though all systems have their purposes, the system most commonly used, especially in schools, are drip systems. The drip hydroponic system works well for São Tomé and Príncipe as it is able to produce a lot of produce with less energy. The only energy has to go through the pump. This pump then drips the nutrient solution to base of each plant. Using a recovery drip system, to conserve more of the nutrient solution, it collects the extra run off and is put back into the reservoir for reuse (Simply Hydro, n.d.).



As São Tomé and Príncipe has such a small population compared to Nairobi, which has three million people, hydroponics is a viable solution to the small area in which they can farm. Hydroponics have been proved to produce 1.7 times the crop yield with the same amount of area (International Journal of Environmental Research and Public Health, 2015). Due to São Tomé and Príncipe's size, which has a very small farming area, hydroponics are best suited to its geography. Hydroponics provides the benefit of using less water and smaller farming area. It has been proven effective in several countries, and it would help many children who rely on their school meals without involving so many foreign NGOs.

Similar to Moi Avenue primary school, these schools would involve children from ages 7 to 17. These students would be able to participate in the growing of their own food while being full-time students. Instead of working in harsh labor conditions, they would be able to work as part of a hydroponics system, with help from the faculty and administration. This would be combined so that the hydroponic system would be on-campus, and the students would be able to count the time spent on the hydroponic system as part of their schooling hours. With the use of multiple students, this would not take more than 20 minutes as day after the construction of the system. This hydroponic system will also prepare them for adulthood by showing them the struggles and upsides to growing their own food.

In the hydroponic system specifically, it would grow foods high in nutrients, such as spinach, collards, and sprouts. These could also include foods specific to the region and more similar to the cultural diet such as black beans, okra, green and broad beans, which are often included in stews or as side dishes in São Tomé and Príncipe (Coerdexocolat, n.d.). This would be better for the students' diets, and it would mean that less food would have to be grown for more people. The substrate needed for the hydroponic system would be lava rocks, which are affordable and commonly found in São Tomé and Príncipe. With São Tomé and Príncipe's high access to water, with 97% of people having access to water, getting water for the hydroponic system would be possible (World Bank, 2019). However, the source of other materials such as PVC tubing or pumps would be harder to get. Because of São Tomé and Príncipe's geography, most manufactured materials have to be shipped over. However, almost any type of tube works for hydroponic systems, meaning that tubes that were supposed to be used for water systems could be recycled or reused to become part of a hydroponic systems. The last major issue concerns trouble shooting in relation to hydroponics. Most of the major concerns with regards to hydroponics are system leaks or proper monitoring. Without proper monitoring, the system might leak, yet there is a simple solution. Every two to three weeks, the system must be checked for leaks and root overgrowth. This way, these schools are able to avoid many problems concerning hydroponics. This can be done by school administrators, who can be the adults responsible for helping with these systems. Though they don't have to be overly involved, they can help in maintaining it. In addition to this, there could be a possibility of community involvement through a hydroponic system where community members check in and help maintain the system in exchange for a small percentage of the fruits and vegetables.

However, a downside to hydroponics is that it relies on electricity, which is not always reliable in São Tomé and Príncipe. Due to its location, electricity is not widely used, and it is very expensive due to the scarcity. This poses a large problem to most types of hydroponic systems as with unreliable electricity, large hydroponic systems tend to fail as they need reliable timers or pumps. However, due to São Tomé and Príncipe geography, hydroponic systems run by solar panels are a possibility. With this, schools would be able to operate with hands on growing systems. Currently, there are not many cheaper solar solutions, yet there is hope in the future for it. As more research goes into hydroponic systems and the use of solar panels, the possibilities of these systems continue to grow. With many people beginning to build

their own solar powered hydroponic system, these effective growing techniques will be helping São Tomé and Príncipe for generations.

Another solution on a smaller scale would be to consider the wick system, as previously mentioned. For many families, child labor is an issue due to their lack of nutrition. Building a small hydroponic system, cheaply and efficiently, would help many of these families. Wick systems are the simplest version of hydroponic systems. Wick systems without pumps require two pots or buckets for the reservoir and plant, strips of material for wicking, nutrient solution, and wick growing material such as coco coir which is abundant on the island (Homehydrosystems, n.d.). These systems are easy to use and are alternatives to a larger system, such as those proposed to be used in schools.



Yet, both hydroponics and solar panels are expensive technologies, requiring a significant investment. In many of these schools, this is not a reasonable investment. However, in partnering with several of the NGOs and organizations, such as the World Food Programme, that work in São Tomé and Príncipe, the addition of these systems would benefit not just São Tomé and Príncipe but also these NGOs. With the investment of these systems from NGOs, São Tomé and Príncipe would be able to expand its sustainable farming market, and it would limit its reliance on outside organization. This would limit São Tomé and Príncipe's need for lunches

With São Tomé and Príncipe's ever-growing oil industry, it remains an investment for large countries such as China and Russia, seeking to export more and more oil every year. However, due to São Tomé and Príncipe's economy, it's much harder to find people who are willing to work in these oil plants. With foreign investments, especially from countries seeking to gain a profit through oil, investing into food for the children will ensure that in future generations, São Tomé and Príncipe has a more stable economic environment.

In looking for a sustainable solution to child labor, providing food security through the growing of fruits and vegetables within their own education environments. With São Tomé and Príncipe's already high education rate for primary students, the development of a reliable food source throughout their education systems will encourage parents to send their children to school and have access to food rather than send their children to work with unreliable wages.

Consequently, though the problem of child labor remains a worldwide struggle, São Tomé and Príncipe can fight against child labor, especially in its most unjust forms. There are many solutions available. Although the problem of child labor will not be eradicated in the near term, São Tomé and Príncipe has the power to reduce it by introducing agriculture in their education practices. Within the use of hydroponic systems, São Tomé and Príncipe will be able to take a step to reducing hunger rates and, in

turn, help reduce child labor. In these small ways, São Tomé and Príncipe can pave a way towards a new type of life for their next generation.

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