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 Trinidad and Tobago, Factor 6: Sustainable Agriculture

### **Sustainable Agriculture in Trinidad and Tobago**

Trinidad and Tobago are small islands in the southernmost part of Caribbean, being just seven miles of Venezuela's north eastern coast. The total population is a little over 1.175 million (Yelvington, 2001). The total area of Trinidad is 1,864 square miles and Tobago is only 116 square miles (Ember and Ember, 2001). The many ethnicities included Africans (Afro-Trinidadians), East Indians, Chinese, Caucasians, and people of mixed ethnicities (Ember and Ember, 2001). Immigration has played a major role in the issues affecting agriculture, "the large outflows to metropolitan countries have generated more academic interest, possibly because of the concern aroused among policymakers and the public in receiving societies. It has been estimated that the Caribbean suffered a net population loss through international migration of 4.3 million people between 1950 and 1980. Had large-scale immigration not taken place, population growth in the Caribbean would have been about 80 percent greater than it actually was" (. Typical diets differ from ethnicity to ethnicity. Typical Creole dishes consist of stewed chicken, white rice, red beans, fried plantains, and homemade ginger beer. Indian food includes curried chicken, potatoes, channa (chick peas), white rice, and roti, an Indian flatbread. Chinese food is typically chow mein. Crab and dumplings is said to be the typical Tobago meal (Ember and Ember, 2001). Upper class families often have multiple generations. For many working Afro-Trinidadians, women are often the head of the families. There is an available national health service, but private medicine also serves a large part of the population. Drugs and AIDs are a very serious problem, as the country has one of the highest rate of AIDs in the world (Ember and Ember, 2001). Free education is offered at the primary and secondary levels and compulsory for six years. Many parents and kin make great sacrifices to be able to send their children to college and reach their educational goals. "In the past, training for white-collar professions was favored and emphasized, and titles and diplomas were fetishized" (*Countries and their Cultures: Trinidad and Tobago*). Many citizens with higher education are trained abroad and permanently emigrate. There are many colleges including Queen's Royal College, and University of the West Indies St. Augustine. There are 476 primary schools. The countries literacy rate is 97.9% (Yelvington and Dridi, 2001). 8.4 % of the population live in an urban area, with a negative 1.2% rate of change. 95.1 % of the population has improved drinking water. Crops grown are cocoa, rice, citrus, coffee, many vegetables, dasheen, tannias, eddoes, rice, breadfruit, bread-nut, sweet potatoes, cassava, bananas, plantains, and Irish potatoes. Other industries include cement, food processing, cotton textiles, petroleum, chemicals and tourism. There has been many integration of technology into daily life. Censuses show that there are 425,00 television sets, and four channels. There are 14 radio stations, and the total population with internet access is 100,000.

The history of Trinidad is rooted in Spanish exploration, as it was first claimed by Columbus for Spain. While in control by Spain, Trinidad became French inn orientation. It was captured by the British in 1797. Tobago, however, developed separately. Spanish, French, Dutch, English, and Courlanders all claimed the island at many different times.

Land use in Trinidad and especially Tobago is a large issue. "Land use policy will be in the public domain well into the future as some may believe that expanding the cultivated area is not necessary but being better at what we do is the key. The idea is to be agricultural intensive and not extensive. Agricultural intensification is necessary to meet rising demand but this approach will, to some extent, reduce deforestation, environmental destruction and global warming since less land is brought into cultivation" (Maharaj). The major issue with land use is zoning. More and more land in Trinidad and Tobago is being developed from farm land to urban houses, high rise office buildings and road ways. As stated above, the combined areas of both islands is 1,980 sq. mi. It should be that industrial areas, homes and highways be

built on poor soil and then grow the crops on suitable soil. But, the exact opposite is happening. Land suitable for grow is being built on, and land with poor soil is being grown on. An example of this is the location of National Breweries, which is situated on some of the best soil in the country. This has given rise to major problems, including uneconomic land use and pollution of the sea, lakes and rivers. An estimated 20 to 25% of the most fertile soils have been used for nonagricultural use. As a result, a lot of capital has to be expended on keeping farmers on low quality soil. A simple fix for this is to establish a committee to evaluate the existing zones establish new ones for both agriculture and homes and businesses. Along with this, the committee should establish a rule or law for future zoning. A soil map of Tobago shows the best soil on the coasts of the island. The inner soil being only useful for growing coconuts. For example, cocoa, one of the main exports, grows best in good soil structure that is permeable and deep with humus or organic material. The best location to grow cocoa is the inner low lands of both islands. These locations are already home to some plantations, but other areas have been developed into cities and housing developments. Along with this, 72% of the land holdings are 1-9 acres, meaning many small growers are contributing to the islands production as a whole.

Another issue affecting food needs is that the country is importing more than exporting. The production of rice in the country is not keeping up with the demand. The projected demand for rice in 1985 was 117.9 million pounds, when the country could only produce 99.6 million pounds. For yams it was project for 22.3 million pounds when the country could produce 14.4 million pounds. This is partly due to limited land space, after all, it is an island. The other factor is crop research. While there may be no way to fix the land issue, there are other ways to increase crop production. There has been no research done on other types and varieties of crops. A quick fix would be vertical gardening. A prime example of this is already being used in Lebanon, on walls and roof tops. These gardens help with pollution, isolation of building, and require less water than traditional gardens. Vertical gardens have also been implemented under bridges in New York City. Vertical gardens can be built almost anywhere. They cost anywhere from \$30 for a pallet garden, or \$80 million. It all depends on the level of sophistication.

Overgrazing is a serious problem not matter where it is. Iowa State University has done extensive research on the factor affecting the health of animals. Overgrazing is not so much an amount issue, as it is a management issue. Management consists of moving animals to correspond with vegetation growth (Price, 1999). This leads to animal eating a pasture down to bare ground. Bare ground then leads to less favorable quality vegetation. This is why many of the fields in Trinidad and Tobago are covered in thistles, burdock, dock weed, and golden rod. Goats are one way to combat this problem. Goats have the reputation to eat everything. There are only six plants that goats will not eat, none of which are native to either island (Pfalzbot, 2015). Along with this they can be used for milk production. When the pastures have been cleared of weeds, they can be reseeded. Then it is time to let new, wanted vegetation “rest” (Price, 1999).

Sometimes, however, letting livestock graze is a good thing. A questionnaires was sent out by University of Nebraska Lincoln researchers to 108 farmers to ask why some do and don't let cattle graze on unused fields. 39% of them did not graze, 39% let their own cattle graze, 16% rented theirs, and 6 % rented and let their own graze (Potter, 2016). When asked why, 41% charged \$11-15 an acre to let cattle graze (Drewnoski, 2016). 93% of the farmers that grazed and 63% of those that did not said they thought it would have no impact of the crop the following year (Drewnoski, 2016). The main reason not to graze was inadequate fencing or fear of the ground being compacted (Drewnoski,2016).

Crop research also needs to be done to find new varieties of crops and new crops in general. There has been some research done on types of tubers, but there are many other crops that will thrive in the Trinidad and Tobago. One plant that fits this hardness zone is not even a vegetable, the Anthurium. A small flower that is typically used in the gardens of Caribbean gardeners. It has a long shelf life, and is slowly becoming a key export among Caribbean nations. There is even a color of this flower called *Trinidad*, which is an off white color. It has the same growing conditions as any other tropical plant, making it easy

to start growing almost immediately. Taro is another tuber grown in the region. It, along with yams, are more nutritious than more widely known tubers. It takes about 8 to 12 months to reach maturity, unfortunately it only has a two-week storage life. Taro would grow perfectly in the wet, humid environment of Trinidad. It is commonly chosen as the first rotation after clearing brush, and responds well to applications of nitrogen, phosphorus, and potassium. It can be planted as a main crop, or grow as ground cover in banana or plantain plantations. Coconuts, which are grown here but not widely, can be grown on dwarf trees. They have a short average production life span of 30 years. Producers typically intercrop with bananas to save space. They can even be used as borders to mark territory. The soil in Trinidad and Tobago is ideal for growing dwarf coconuts. They need a space that is 30 x 30 feet, compared to 40 x 40 feet for tall varieties. Peppers, specifically hot peppers, love the humid heat of Trinidad and Tobago. The heat and sun make hot peppers even hotter. Not to mention they are commonly used throughout the Caribbean. Hot peppers alone could be enough trade to enable the country to import most everything else. Avocados have been slowly entering the market in Trinidad. Most varieties are from the West Indies. It is not native to the island, therefore, the only name for it is known locally as “zaboca” (Storey, 1986). It is not yet grown commercially, only in back yard gardens. “An interesting characteristic of the West Indian race of avocado in this climate is that its flowering and fruiting cycles are influenced by the alternating wet and dry seasons, rather than by changes in temperature or by any influence of photoperiod” (Storey, 1986). There are a few downsides to avocados. Because they are not native, they have not adapted to the soil, temperature, and weather conditions of Trinidad. Leading the fruit to have a bland flavor due to the amount of oil. Also, the trees have a very short production life in this climate, only 10 to 15 years. These problems can be solved with genetic research to produce a crop that can overcome these issues, even though to industrialize the food crop it would take a 950% increase in production and efficiency.

Every country needs to do research on disease resistant crops. Disease in crops accounts for 10% to 20% of crop failures in third world countries. “Representative members of pathogen-resistant strains have been bred selectively to increase their ability to withstand infection. Some plants are inherently immune, making them better able to resist infection; others acquire immunity by surviving specific pathogens” (Michaels, 2012). In all cases, disease free is a good thing. There has already been plenty of research done throughout the world. In countries where there are no disease resistant crops, there is heavy reliance on pesticides and fungicides (Michaels, 2012). There are many crops already developed to resist disease. “In 2010 European Union (EU) researchers published a study in which they identified a plant-immune mediator called a pattern recognition receptor, or PRR. A PRR can recognize a pathogen and defend the plant against it. It is believed that reinforcing the activity of the PRR will markedly improve overall resistance to a variety of pathogens—a belief supported by study data. The EU researchers plan to use genetic engineering to transfer PRRs into a variety of important crop plants to determine whether they improve disease resistance across different types of crop plants” (Michaels, 2012).

Now let's talk about meat production, and sources of protein. One issue regarding meat production is the lack of education for veterinarians, which is a simple fix, offer advanced veterinary courses at the college in St. Augustine, Trinidad. Other issues are the prices of meat and milk. Again the issue of space plays a key role in this. Most animals are raised on small, private farms; leading to low exports of meat, and more imports for those living in cities. It is strange, however, that Trinidad and Tobago exports more than it imports, but mainly oil and petroleum products. Goats and buffalo are two new animals to introduce to Trinidad and Tobago. As mentioned above, goats feed on less quality foliage, not only can they be used as meat, but also dairy. Same with buffalo, they originally feed on prairie grasses in the Midwest, and their milk is drinkable. The only downside to buffalo is the amount of space they take up and how fast they eat. They can clear an acre of land in a couple of days. The amount of meat they produce can offset this disadvantage. Almonds is also a great source of protein, one cup has about 20 grams of protein (*Self Nutrition Data*, 2014). Almonds can also be turned into milk, and can grow in the climate of Trinidad and Tobago.

These techniques have already been applied around the world. There is no need to look for new, ingenious ways to fix the food issues inflicted upon Trinidad and Tobago. The only steps that need to be taken are about how to adapt programs and research in other countries to help countries with different characteristics. Many of these changes will take time, money and effort. The money is the hardest part to overcome, but, when you are talking about a country that gets most of its earnings from oil, it becomes less complicated. Even if the country puts a large sum of money into any of these solutions, it will begin to see a turnaround within a couple of years.

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