

**THE WORLD FOOD PRIZE SUMMER  
INTERNSHIP  
2001**

**INTER-AMERICAN INSTITUTE FOR  
COOPERATION ON AGRICULTURE  
TRINIDAD AND TOBAGO, WEST INDIES**

**EMILY CLARK**

## **Introduction**

After participating in the 2000 World Food Prize Youth Institute in Des Moines, Iowa, I, Emily Clark, knew without a doubt that I would love to go overseas on an international internship to work in an agricultural research center. Through the World Food Prize, I had stumbled upon one of the greatest opportunities to possibly combine three of the things I truly love: science, agriculture, and traveling.

Last fall on my way to the World Food Prize Conference and Youth Institute, I wasn't sure what to expect. I thought perhaps I would encounter some heated debates on the effects of genetically modified organisms, or maybe I wouldn't; however, I was hoping the experience would be a valuable learning tool. As I left the conference I carried back home with me so much more than I ever anticipated I would. I was given a whole new perspective on the world outside of the corn and soybeans of Iowa. I believe that here in Iowa and other parts of the United States we are spoiled because we don't truly understand what it's like to wonder where our next meal is going to come from. We just don't realize how fortunate we are because we are surrounded by the vastness of acres upon acres of many varying agricultural commodities. It doesn't really occur to too many of us that over half the world's population, over three billion people, go hungry each day. What's just as sad is that so few people realize just how fortunate we are to live among the acres of corn and soybeans here in Iowa.

Compared to my hometown of Algona, in north central Iowa, I consider Des Moines a "big city." In Des Moines, unlike Algona, I have to lock my car doors, pay to park most anywhere I go, and I wouldn't consider walking down the street at midnight by myself a safe practice. But after talking to one of last year's World Food Prize Laureates,

Mexico's Dr. Evangelina Villegas, I was taught first hand just how fortunate I am to be able to live in such a great place. Dr. Villegas couldn't help but comment on Iowa and Des Moines and its beauty and peacefulness. I would never really consider Des Moines peaceful or beautiful, but to the eyes of someone who is used to much different circumstances, we need to realize what an amazing gift is available to us.

After listening in on forums and debates at the World Food Prize Conference, I began to value more and more of the richness of Iowa and the bounty of food that we Americans have. It is so easy for us to head to the kitchen cupboard when we're hungry to simply pull out a snack, but so many people in the world are unable to have that luxury and have never even come close to experiencing such an extravagance.

Knowing I would love nothing better than to go work at an agricultural research facility in a foreign country, I was inspired to apply for an international internship after my experience at the World Food Prize Youth Institute. I was accepted for the international internship program and was placed in Trinidad and Tobago at the Inter-American Institute for Cooperation on Agriculture-Caribbean Regional Center (IICA-CaRC). When I got this message I actually had no clue where Trinidad and Tobago was located. All I really knew about the small island nation was that it had an Olympic team, but in time I would come to learn about the gracious Trini people and the culture that I would have the opportunity to live in and experience for two months while working with the people at IICA.

### **Port of Spain**

At the time I left Iowa the average temperatures were hovering around fifty degrees Fahrenheit as the Midwest was experiencing an unseasonably cold summer. My summer

quickly changed from one end of the thermometer to the next. I can still remember stepping off the plane in Port of Spain, Trinidad (Port of Spain is a city in Trinidad, not the European nation of Spain) into the unceasing heat of the Caribbean. Even more vividly, I can remember the joy of finally reaching the place I had long awaited to work in, and the anticipation of longing to find out just how similar Trinidad was to the books and brochures I had read.

Driving from the airport to my guest house, I soon learned that driving in Trinidad is a very frightening experience, but my driver seemed to know what he was doing. (Even after two months, I still didn't fully understand Trinidad's driving system.) My driver did eventually get me to the guest house safely, and along the way I noticed many of the same brand names that we have in America. As we whizzed by Nestle, the driver, Edwin, asked me if we had Nestle in the United States. Once I was able to get past his heavy Trini accent to understand what he was asking me, I was able to let him know that we too have Nestle. However, I quickly learned that the Nestle Corporation is not too well liked among the Trini farmers. I was informed that Nestle is a monopoly for buyers of fresh milk in Trinidad, and therefore is controlling the dairy industry in Trinidad. This didn't give me a great impression of the corporation.

Along the way I continued to see familiar American sights. There were at least two big malls that we passed, along with plenty of ATM's (or ABM-automatic banking machines- to them). But along the way, I also saw many things much different from the Midwestern atmosphere in which I am so comfortable. Probably for the first time in my life I saw ramshackle houses along the roadside that were flimsily held together and looked like they would topple over if someone were to merely cough too hard. For the first time in my life I saw homeless people sleeping under business canopies on discarded cardboard. And for the first time in my life, I saw first hand what it is like to live in a third world country.

So this was it. Trinidad would become my home for the next two months. What was in store for me was going to be an experience like none other, an experience that would without a doubt be remembered for a lifetime to come.

### **Challenges Facing the Citrus Industry of Trinidad and Tobago**

My first day at IICA involved getting to know the staff, the other interns, and learning what exactly my project would involve while working in Trinidad and Tobago. The staff at IICA was very friendly and welcoming to us all. On the first day I also met the other interns I would be sharing an office space with for the next two months. While sharing this space, Elizabeth McLean, Phillip Tate, Jermaine Walker, Sarah Holtz, and I would build friendships to last a lifetime. Even though we all came from different places we all shared a huge love of agriculture.

My official project title, the Challenges Facing the Citrus Industry of Trinidad and Tobago, was assigned to me, by my supervisor, Ms. Judith-Ann Francis. I was a little nervous with the whole citrus topic. Coming from Iowa, I obviously didn't have too much background in the world of citrus. I'd visited citrus groves in Florida, but that's just not quite enough information to get by on when working with it in depth in a country so dependent on the citrus industry.

I welcomed the challenge of working with something so foreign, but it meant taking what you could call a "crash course" on citrus. I really enjoyed the opportunity to learn about a crop I otherwise probably would have never come in contact with so in depth.

## Citrus 101

A big thanks goes out to all the people who helped teach me about citrus. So many people helped me to better understand citrus in general, and the industry of citrus in Trinidad and Tobago. Their patience with me, who was so unfamiliar with the world of citrus, was incredible, and without them I would have never learned so much in such little time as I did with their help.

There are several varieties of citrus grown today. Citrus has five main categories. They are oranges, grapefruits, lemons, limes, and mandarin (hybrid oranges). Citrus is grown best in warm, subtropical climates. It typically grows best a few degrees either north or south of the equator. This makes Trinidad and Tobago a prime place to grow citrus, as Trinidad is just eleven degrees north of the equator.

One of the most surprising things I discovered in Trinidad is that they eat their oranges quite differently than we do in America. First of all, they cut it in half and just eat it right out of the rind, and secondly, they eat it when it's a pale yellow with some spots of green. As American consumers, we are used to choosing the oranges that are a nice orange color because we like to purchase produce that exhibits a nice color. We get this nice orange color due to the "chemically de-greening" process. Processing plants use this process because fruit must be picked off the tree while it is still in the green stage to allow time to get it into the stores before it over ripens, but consumers are not going to buy green oranges. Therefore, the processing plants use ethylene gas, which breaks down the chlorophyll and allows for the skin color to look ripe. Although the fruit looks ripe on the outside citrus can no longer ripen once picked so there is quite a margin of difference in quality of taste of a truly fresh picked orange and one that was picked early and then "de-greened" to meet consumer demands. Real-tree ripened fruit is best,

but I guess sometimes you just have to settle for the next best thing-fresh produce from the local grocery store. And remember, when selecting an orange, heavier is better because heavier means juicier.

## **Nutrition Facts**

Citrus is a very crucial component of daily nutrition requirements, and recent studies have shown that it could be a critical element in fighting cancer, heart disease, and birth defects. I think most of us are familiar with the age old adage that orange juice is an excellent source of Vitamin C, but it is also rich in folate, dietary fiber, and potassium, and all citrus fruits are sodium and cholesterol-free.

It takes just one eight ounce glass of orange juice a day to meet the daily requirements of Vitamin C. In fact, it sometimes provides more than 100 percent of that daily requirement. Scientists believe that Vitamin C is a valuable antioxidant, which counteracts the harmful molecules known as “free radicals.” Free radicals are believed to help contribute to the onset of many major diseases. Vitamin C also helps contribute to the repair of damaged human body tissue because of the maintenance of collagen.

Besides Vitamin C, oranges also commonly contain folate, which is a B vitamin also common to green leafy vegetables. It is speculated that folic acid helps reduce the risk of certain birth defects. According to the Food and Drug Administration (FDA), women of childbearing years can dramatically reduce the risk of having a child with birth defects such as spina bifida and anencephaly by consuming plenty of fruits and vegetables to maintain adequate levels of folate.

Since citrus contains dietary fibers that aid in digestion and elimination, oranges and grapefruit are excellent sources in the fight of cancer and heart disease. As the saying goes, “you are what you eat,” it just may be a good idea to eat a few more citrus fruits a day to combat cancer, heart disease, and possibly some birth defects.

### **The Citrus Industry in Trinidad and Tobago**

The citrus industry has been identified as being a key component of the food and agricultural sector of Trinidad and Tobago. This sector is a very important link to the socio-economics of the nation, as it is a major provider of employment in rural areas and provides raw material for a key agro-processing company, the Co-operative Citrus Growers Association (CCGA). Another major contributor to the citrus industry is Caroni (1975) Limited. When it entered the industry, it provided an incentive for growth of the industry and has continued to do so for the past decades.

It is projected that the agricultural sector has the potential to enhance the productivity of the agricultural industry and could possibly make significant contributions to the economic development of Trinidad and Tobago. However, the industry has its own weaknesses that need to be improved if the industry is going to continue to make progress. Solutions need to be found in order to minimize losses at the production level, information needs to be distributed to the public as well as the farmer, and technical assistance is needed to ensure the viability of the citrus agricultural sub-sector.

In Trinidad and Tobago there are 1,124 citrus farmers, with 9,884 acres in cultivation in the northern, central, and southern ranges of Trinidad and Tobago. The majority (75%) of



farmers farm on less than twelve acres of land. Seven percent of the citrus farmer's farms on acreages in size from twelve up to twenty-five acres, and only two percent of the farmers have acreages greater than twenty-five acres.

In the 1998-99 production year the country produced approximately 460,000 crates of citrus, which included oranges, grapefruit, limes, lemons, and hybrids. The size of a crate varies between varieties of fruit but the average orange crate holds ninety pounds of fruit. Most of this fruit was sold on the domestic market with CCGA being the largest buyer of oranges and grapefruit for their processing plant. The remaining fruit is sold at places similar to farmer's markets and other local market places, such as grocery stores.

In Trinidad and Tobago about 87.2% of the citrus farmers are male, and the range in age of citrus farmers spans from age 20 to age 70. Only 3.5% of the total citrus farmers fall within the age group of 21-30 years of age.

Although the industry is fairly healthy there are many challenges that face the industry as a whole, and that is what I investigated there on my two month internship.

### **The Challenges Facing the Citrus Industry of Trinidad and Tobago**

There are many challenges that currently restrict the citrus industry in Trinidad and Tobago from capitalizing on their potential for even larger production years. For the purpose I will highlight only a few of the major problems that I picked up on when talking with farmers, industry experts, and local agriculturists. I have grouped the challenges into three areas: environmental, the markets, and a miscellaneous category.

## - **Environmental**

Perhaps one of the biggest environmental challenges for the citrus industry is the emergence of the Citrus Black Fly (CBF). This environmental pest is one of the most serious pests of citrus. This tiny pest is only one-sixteenth of an inch long, but it causes drastic reduction in yields, weakens the tree, makes it susceptible to attack by other pests and diseases, and may even kill the tree outright. The CBF also encourages the onslaught of an unwanted fungus known as sooty mold, which covers the leaf surface and prevents photosynthesis from occurring.

The Citrus Black Fly is relatively new to the industry as it was introduced less than five years ago in 1997. Being that the CBF is so new to the industry; farmers have to be educated about its presence. It is important that farmers get educated so they are able to identify infestations of Citrus Black Fly, and distinguish CBF from sooty mold. Proper identification is key so that insect infestations can be treated properly and sufficiently.

Pest and disease identification can be a challenge for the farmers in and of itself. The Ministry of Agriculture in Trinidad and Tobago offers some very beneficial resources to reference when in question about a pest or disease; however, this service often goes unused by the many farmers in Trinidad and Tobago. It is reported by a survey that only 3.5% of farmers ask for confirmation of pests and diseases from the Ministry of Agriculture Land and Marine Resources (MALMR), while a combined percentage (28.5%) of farmers do the confirmation themselves or have it confirmed by a field worker. The remaining percentage of farmers either didn't know or chose not to respond. This service is a great aide to farmers, but it is crucial that they first learn to utilize the service if they want accurate confirmations of pests and diseases.

Once the farmer has confirmed a pest or disease the next step is to control the problem. The number one solution farmers turn to for control is the use of chemicals. 47.4% of farmers

use chemicals as a control method. As a whole, the farmers of Trinidad and Tobago spend over \$624,660(TT) out of a total \$3,493,282(TT) in current expenditures on the use of chemicals for pest and disease control and fertilizers. A great deal of the cost of production goes toward the purchase of chemicals, but there are other means to control pests and diseases that aren't necessarily so spendy and are more environmentally friendly.

Biological controls are currently getting great amounts of attention in the region of Trinidad and Tobago; however, this is primarily in the research sector. Not enough farmers are aware or utilize the availability of biological controls. *Amitus hesperidum*, and *Encarsia perplexa* are used to control CBF. It is the preferred method by researchers, but only 16% of citrus farmers exploit the use of biological controls. When talking with farmers and researchers that support the use of biological controls, I received great feedback to the success of the *Amitus hesperidum*, and *Encarsia perplexa*. Biological controls are a great alternative because they are much cheaper, more effective, and are environmentally friendly. Again, farmers need to be educated to the benefits of using a biological control.

Many other pests and diseases affect the production of citrus which can lead to any of the following: tree "die back" and dying trees, defective fruits, dirty fruits, and difficulty in harvesting. But overall, citrus farmers identify that pest and diseases are a major problem, and realize that they can greatly affect the production of their citrus.

### **-Markets and Financing**

It takes a substantial amount of money to start a citrus grove from the ground up, but the mere cost of running a citrus farm is also very expensive. The cost of labor is by far the most

significant component of the total expenditure. Labor cost alone on the whole for Trinidad is \$2,108,298(TT) out of a total \$4,016,210(TT) in expenditure costs. That breaks down to 52.5% of all expenditures are going to cover labor. When over half of the expenditures must go to labor it limits where the farmer can spend money elsewhere.

When I spoke with farmers in the citrus industry they reported that it is necessary to hire out labor because the work load is just too much for them and their family to handle by themselves. So the farmers are very dependent on the labor and more or less accept hiring out labor as a fact of life. It also goes the other way because around harvest time many citizens turn to the citrus industry to be hired out part time to help bring in the crop. It's hard to say if much can be done about the high percentage of the cost of labor. It is obviously something that is very much needed so not a whole lot of complaining is done when it comes to hiring extra help at the time of harvest.

As I mentioned earlier the age range of farmers span from age twenty to age seventy. However, a very small percentage of the farmers are at the lower end of the age group, while the majority is near the higher age range. This creates a problem because so many of the younger people are getting good educations (high school and college level) and then going on to higher paying jobs than what a farmer may receive. But another reason why the younger people aren't going into farming is because of the high cost to start up their own farm. For someone to start up their own grove it would more than likely require a decent sized loan. However, banks don't readily give out loans to people without the collateral, but a start-up farmer is unable to gain that collateral until he or she has an established grove that is bringing in money. Farmers are grudgingly battling this dilemma. The industry encourages the younger generation to get

started, but the younger generation isn't going to start up a farm when they have an opportunity to make more money than what is available when starting a farm from the ground up.

From what I could gather Trinidad and Tobago produces a substantial amount of citrus (1998-99 industry total of oranges, grapefruits, and hybrids was 10,748,862.5 lbs); however almost all of their produce stays on the domestic market. On the domestic market there is a high demand for the fresh fruit and for processed and canned juices, but I think they have a supply large enough to meet the demands of an export market as well. I don't have any exact figures but I know a very small portion of citrus is exported to other Caribbean areas. From a first hand experience I can say their product (fresh and processed) is of a high quality. I think it would be feasible for them to sell their product on a larger scale. The largest processing plant, CCGA, has a quality product and is also in the process of being ISO 9002 certified. This would surely give them the means to be able to market their product on a foreign scale, and on a whole would get Trinidad and Tobago better known in the citrus industry around the world.

### **-Miscellaneous**

A very common challenge facing all farmers is the theft of citrus out of their groves. The act of praedial larceny was a commonality shared by all farmers. It is very easy for thieves to steal out of a citrus grove merely due to the size of the groves. It's next to impossible for a farmer to monitor their grove at all times and in all places. It's hard to determine just how much of a crop is lost due to theft, but it's very frustrating for the farmers when they know it is going on. I heard first hand from the farmers that first of all it is very difficult to catch the perpetrator, but if they do catch the person, getting back the product is quite a challenge. I heard countless

stories on how officials would take the citrus into custody as evidence, but then the farmer would usually never get the fruit returned. Either the fruit would spoil before the case was completed, or due to corruptness the officials would take the citrus fruit for their own personal use. Overall I gathered that it wasn't just the number of fruit lost from theft that upset farmers, but it was more or less the frustration farmers faced at seeing so little done to justify the actions of the thieves.

Finally, it was clear that a big challenge the farmers faced in their groves was the lack of organization in their fields. When visiting the real groves I was shocked at the overall disorganization seen among the fields. Along with the disorganization in the fields came a lack of record keeping, and from all of this came a second project for me. My supervisor at IICA asked me if I would help with an experimental project involving the mapping of citrus groves. I jumped right in, but once it came to starting the actual task I really wondered what I was getting in to.

## **Mapping**

Just looking at the scattered, disorganized fields was one thing, but to try to plot out these fields was another thing. Thankfully I had the help of Vine, a member of the Cooperative Citrus Growers Association. Vine did a lot of work with farmers, much like what an extension worker would do here in the states, except he was focused primarily on citrus. So together we undertook the task of attempting to map out some very disorganized citrus groves.

Most farms had their groves separated into blocks, and within these blocks was typically a certain type of citrus; however, there were many exceptions to this case. These blocks allowed

us to split up the groves to work section by section. Ideally we wanted to be as accurate as possible, which would mean measuring from tree to tree and row to row. However, this was very time consuming, and time was of the essence. So instead we took preliminary measurements in each block to get an average of the spacing between each tree and among each row. Then it just became a matter of plotting the trees onto graph paper. This sounds easy, but when the land was difficult to walk on and the trees really weren't in a row pattern the task became quite the challenge. The process was slow and tedious, but eventually we had created a decent map of the grove.

It is my hope that these maps get used and that others use this example to start mapping out their individual fields. Right now the farmers keep a map of their groves in their head, so with a map it allows them to have a visual idea instead of just a mental idea. Also, the hope is there that the maps will help to start better record keeping. As it is now little to no record keeping is done on the groves. With a map it would be easier to pinpoint where what was, and depending on how detailed one would want to get with their maps they would be able code each dot on the map to identify the type of citrus fruit and the variety of that particular fruit. When knowing where what is, it would be easier to keep track of chemical applications, location of pests or diseases, and mark trees that have died out. Record keeping is very important because it can identify patterns of growth and production that allows forecasting and planning for possible future occurrences of many situations. The hope of my supervisor and myself is that more farmers follow this example and start mapping out their own fields.

Although the mapping was truly a challenge the experience was unbelievable. The person in which I worked with, Vine, taught me so much about the agriculture, people, and culture in Trinidad and Tobago. He taught me some of the most basic principles of citrus. It was

him who taught me how to simply identify a orange tree from a grapefruit tree when there was no fruit on the tree. He identified for me several of the most common pests and diseases that effect citrus, and he just pointed out to me other vegetation that found its home in Trinidad and Tobago. I always looked forward to our meetings because I knew I would learn so much from him each day. Vine also taught me the places to stay away from while in Trinidad because they just weren't safe, and he introduced me to green coconuts and doubles (a spicy food they eat any time of they day). It was Vine who also warned me as to what foods to stay away from, and what to look for to ensure that certain foods were safe to eat. And it was Vine who taught me so much about life on our trips across Trinidad to work with the farmers.

## **Closing**

Before I knew it my time in Trinidad was almost gone. I just couldn't believe how the two months flew right by. Here I had just gotten used to my day to day routine, and now it was time to go. Soon I would be leaving the country I grew to love. Their laid back way of life, the beautiful mountain ranges, the clear blue ocean, and the amazingly diverse people all made it so easy to just want to stay longer; however, I knew I had to leave Trinidad, but I would never leave behind the memories.

My experience with IICA in Trinidad proved to be everything and more I had ever hoped it to be. I gained so much knowledge about agriculture, about a different culture, about my self, and about life in general. As I strategically packed my suitcases I realized that it wasn't the



material items that made the trip so great, but rather it was everything that didn't go into a suitcase that made the experience one to be remembered for a lifetime.

### **Acknowledgements**

Thank you to the Iowa Council for International Understanding, including Lisa Fleming and Jan Davis, and the World Food Prize for making this internship possible. Thank you to IICA and IICA's Dr. Chesney, Ms. Judith-Ann Francis, and Lavern Haynes for supporting me at the center this summer and providing me with so many resources. Also thank you to Mr. Sieudeth Vine for taking me out to the farmers and teaching me so much. I thank Mr. Nichols and Mr. Ties for the use of their citrus farms and their generosity to me, and for all of the questions they helped me answer. To Mr. Lennox Andrews and Dr. Bridgemohan with Caroni (1975) Limited I express deep thanks for educating me on the world of citrus. I thank the local interns Elizabeth McLean, Phillip Tate, and Germaine Walker for exposing me to Trinidad and giving me endless support. Finally, thank you to my family and friends for the unending support and encouragement to seek my dreams.

## Works Cited

- Caribbean Industrial Research Institute. Survey of the Citrus Industry of Trinidad and Tobago. CARIRI, 1998-1999.
- “Citrus Facts.” 1998: 4 pag. On-line. Sept. 26, 2001. Available: <http://home.tampabay.rr.com/proshot/ctg/cfacts.htm>
- “Citrus Facts.” Creative Citrus Services. 1997: 2 pag. On-line. Sept. 26, 2001. Available: <http://home1.gte.net/crcitser/facts.htm>
- “Florida Citrus Personal Wellness Plan.” Florida citrus. 1997: 3 pag. On-line. Sept. 26, 2001. Available: [www.floridajuice.com/floridacitrus/helath.htm](http://www.floridajuice.com/floridacitrus/helath.htm)
- Ministry of Agriculture. The Citrus Blackfly (CBF). Trinidad and Tobago: Ministry of Agriculture, Land, and Marine Resources, 2000.
- “Trinidad and Tobago.” Food Market Reports. 1997: 5 pag. On-line. Sept. 26, 2001. Available: [www.tradeport.org/ts/countries/trinidad/fdmarkt.html](http://www.tradeport.org/ts/countries/trinidad/fdmarkt.html)
- “Trinidad and Tobago: Island Market for U.S. Exports.” FASonline. 1998. 3 pag. On-line. Sept. 26, 2001. Available: <http://www.fas.usda.gov/ifo/agexporter/1997/trinidad.html>