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Leaving the US I had no fears of heading to Trinidad, but from the very moment that the plane hit the ground in Port-of-Spain, my fears and aspirations all hit me at once. To make a long story short, it didn't take very long for my feelings to subside, so that I could begin to see the beautiful country of Trinidad and all the flora and fauna that it had to offer.

My name is Dana Marshall and I am from Carlisle, Iowa. I was a 2002 World Food Prize Intern in Port-of-Spain, Trinidad and a 2001 Youth Institute participant. Initially, I decided to become involved with the internship program, because of a deep desire that I've always had to give back to the world, combined with my tremendous desire to see the world, the WFP internship program became very important to me.

My project consisted of: "Harmonizing Organic Production Systems: Can the Caribbean meet the world's organic production standards? Furthermore, are organic production systems environmentally and economically feasible?"

My supervisor, Judith Ann Francis, coordinator IICA summer internship programs, assigned this project to me. The project will become increasingly important in small Caribbean Island nations like Trinidad where niche markets are their entire livelihood. After T&T signed agreed to the first round of WTO negotiations Trinidad found itself losing numerous export markets due to an inability to measure up to the full worth of these negotiations and newly established export and trade policies. Organic production systems may not be the answer to ending the world's hunger but it just one way that we can begin to realize the toll that years of improper conventional farming can do not only the soil but the entire ecosystem of an area. The Caribbean Islands are small, fragile ecosystems that are prone to rapid degradation, organic farming of at the very

least more environmentally friendly conventional farming may be the answers to ending this fatal problem.

The purpose of this project was to not necessarily prove if organic farming is right for Trinidad, but instead this project is a way to organize and make information more accessible to farmers in T&T. I began studying this project with an extensive literature review of all organic standards that exist. This enabled me to not only understand organic standards, but to recognize their differences. Following the literature review I began to tour various farms in the area to observe the feasibility of organic farming within their confines.

I have shown through my study that education is needed to show the farmers of T&T the complexity of organic farming. Many farmers have a perception that organic farming is based solely around not using pesticides and fertilizers. This statement is not true. Organic farming is a production system that avoids the use of synthetic chemicals, fertilizers, herbicides, pesticides, and growth regulators, but it is also a holistic system that promotes biodiversity and affects the whole chain not just man and farm as some farmers believe.

The Caribbean does in fact have the means to meet organic regulations if the time is put into organizing a certification agency and a supporting body which will educate, aide and inspire the farmers in their humble endeavors not matter how small they may be. The project was a tangible way for me to move out of my coveted envelope toward a new understanding of agriculture.

Harmonizing Organic Production Standards

It's an early morning and a middle-aged farmer wakes up and heads outside to begin his day's work. He walks a few feet takes in a deep breath and lets out a sigh of amazement as he stares out over the products of his toil. Unreliable income, capricious weather, and long working days that may stretch from sunrise to sunset, are just a few of the daily challenges that farmers have faced since the beginning of time. Life as a farmer is hard and time consuming. For most of its history, Trinidad and Tobago has devoted the bulk of its agricultural resources to producing export commodities like sugar, cocoa, coffee, and citrus. Export agriculture was profitable. The past thirty years has been witness to considerable changes in the agricultural sector (e.g. agricultural GDP has declined, T&T agricultural exports have declined).

Consumers, all over the world are becoming increasingly health conscious and cautious when choosing food to feed their families. A steady growth has occurred in the organic foods market over the past ten years. Granted, organic agriculture may not be the answer to ending the troubles of the agricultural sector, but it may be one small step in rejuvenation in the right direction. As an IICA intern, my task was to complete a research project entitled, "Harmonizing organic production standards, can the Caribbean meet the international organic production systems regulations?" Furthermore, are organic production systems environmentally and economically feasible?

Organic agriculture is the oldest form of agriculture on earth. Farming without the use of pesticides and fertilizers or petroleum-based chemicals was the only option for farmers until after World War II. History books world wide show scientific advances that numerous countries have made during times of war, these advances have effected everything from the medicines that we use to the way our food is grown. For example, ammonium nitrates were used for ammunition during WWII; this later evolved into ammonium nitrate fertilizers. Organophosphate nerve gas production was developed and led to the making of powerful insecticides. These post-war advances have resulted in tremendous economic benefits (optimum productivity/higher yields) as well as environmental degradation and social dislocation. In 1942, a magazine, *Organic Farming and Gardening*, devoted solely to organic production practices hit news stands and was instrumental in launching the organic industry. Other works were published like Rachel Carson's, *Silent Spring*, in 1962; which raised the public's health consciousness and increased the demand for organic products. Organic agriculture is a holistic system that seeks to utilize those advances that

consistently yield benefits (new varieties of crops, precision agriculture technologies, more efficient machinery) while discarding those methods that have led to negative impacts on society and the environment, such as pesticide pollution and insect pest resistance.

In the beginning organic certification was not needed to ensure the quality of an organic product. Originally, farmers exchanged goods through a handshake. This handshake was meant to be a promise that correct production practices were followed. Let's just face it, long gone are the days when people were trusted by a handshake and ultimately their word. As the industry grew in size and profitability, the rules for trade changed. These changes created a need for organic certification. This certification would not only ensure that all organic practices were being followed, but would serve as a means of protection for the consumer. Regulations have become important as governments move to protect consumers from fraud and deception and safeguard health. The consumers must gain cost assurance that they are truly getting what they pay for.

Trinidad and Tobago currently does not have its own organic standards; therefore farmers in this country must rely on international standards from which to base their operations. In order for Trinidad and Tobago and the Caribbean region to meet all international standards for export, they must first determine their markets and then review and adopt or modify the standards to determine their feasibility.

IFOAM, or the International Federation of Organic Agriculture Movements, has provided an outline of basic standards and production principles for organic processing systems. These standards are not considered a final statement, but rather as a work in process that will contribute to the development of organic farming throughout the world.

Codex Alimentarius organic production, processing, marketing and labeling standards, were created as an attempt to harmonize organic standards. These standards are not mandatory and other countries still reserve the right to produce and mandate their own organic standards. The project focused on a review of the IFOAM, Codex Alimentarius, United States as well as one developing country, Costa Rica, is included in this work. A matrix has been prepared of the results of the review.

Comparison of Organic Standards
 IFOAM
 Codex Alimentarius
 United States Organic Standards
 Costarican
 Canadian

The Standards	IFOAM	Codex Alimentarius
Definition of Organic Agriculture	<ul style="list-style-type: none"> ✿ Includes all agricultural systems that promote the environment, socially, and economically sound production of foods and fibers. 	<ul style="list-style-type: none"> ✿ A holistic production management system that enhances agro-ecosystem health including bio-diversity, biological cycles, and soils biological activity.
	United States	Costarican
Definition of Organic Agriculture	<ul style="list-style-type: none"> ✿ Ecological production management systems that promote and enhance bio-diversity, biological cycles, and soil biological activity. 	<ul style="list-style-type: none"> ✿ Includes all agricultural systems that promote the environment, socially, and economically sound production of food and fibers; taking soil fertility as a basic element for successful production while respecting the natural capacity of plants, animals, and lands, to optimize quality in all aspects of agriculture and the environment.

	IFOAM	Codex Alimentarius
Transfer Period	<ul style="list-style-type: none"> * Can be converted over a period of time of step by step 	<ul style="list-style-type: none"> * 2 year conversion period
	United States	Costarican
Transfer Period	<ul style="list-style-type: none"> * 3 year period between use of last prohibited substance 	<ul style="list-style-type: none"> * At least 3 year period between use of last prohibited substance
	Canadian	
Transfer Period	<ul style="list-style-type: none"> * 2-year period from use of last prohibited substance. 	
	IFOAM	Codex Alimentarius
Certification Process	<ul style="list-style-type: none"> * Producer outlines a clear plan of how to proceed with conversion and should cover all aspects relevant to these standards. * An independent certified third party should give written assurance that a clearly identified production or processing system is methodically assessed and conforms to specified requirements. 	<ul style="list-style-type: none"> * Must first meet conversion period * Inspection shall be performed by competent authorities that can verify the labeling of, and claims for, organically produced foods.
	United States	Costarican
Certification Process	<ul style="list-style-type: none"> * A person seeking to receive or maintain organic certification under the regulations must: <ul style="list-style-type: none"> - Comply will all laws and production handling regulations. - Update annually an organic production or handling system plan that is submitted to an accredited agency - Permit on-site inspections with complete access to the production or handling operations, including non-certified production and handling area structures and offices by 	<ul style="list-style-type: none"> * For an agro-livestock product to be called organic, it should originate from a system where the principles and established standards have been applied to the current regulation, transfer period is met, and all Organic Environmental Laws are met in accordance with the transformation of the farm.

the certifying agent.

	IFOAM	Codex Alimentarius
GMO's- materials produced by modern biotechnological methods for altering the genetic constitution of living organisms which do not naturally occur or through traditional reproduction.	* Shall not contain GMOS or residues	* Shall not contain GMOS or residues
	United States	Costarican
GMOS	* Shall not contain GMOS or residues	* Shall not contain GMOS or residues
	IFOAM	Codex Alimentarius
Seeds	<ul style="list-style-type: none"> * Use of organic seeds and plant materials when available. * If organic seeds are not available use chemically untreated conventional materials. * When no other alternatives are available, chemically treated seed and plant materials may be used (certification body set limits) 	<ul style="list-style-type: none"> * Seeds should be from material of plants grown in accordance with the provisions of organic standards. * Other non-organic seeds (untreated seeds of seeds treated with approved products) are allowed if an operator can demonstrate to the official or officially recognized certification body of authority that organic seeds are not available.
	United States	Costarican
Seeds	<ul style="list-style-type: none"> * Must use organically grown seeds, annual seedlings, and planting stock. * Chemically treated seed is permitted when organic is not available. * Other exemptions allow treated seed (See 205.204 of USOS Standards) 	<ul style="list-style-type: none"> * Priority in use of endemic varieties that promote fito-improvement and production of bio-diversity. * Treatment of seeds is permitted with approved substances.
	IFOAM	Codex Alimentarius
Control	* Converted land	* Farm with parallel

Requisites/Precautions	<p>should not be switched back and forth from organic to conventional</p> <ul style="list-style-type: none"> * Certification body shall inspect the whole farm to ensure separation. * Farms with organic and conventional production may not use GMOS on the conventional part. 	<p>production may face unannounced visits during harvest, Etc.</p> <ul style="list-style-type: none"> * A full description of all operations that take place on the farm must be outline during the certification process. * The certification body should have full access to all land, storage units, and records for inspection purposes.
	United States	Costarican
Control Requisites/Precautions	<ul style="list-style-type: none"> * Must have distinct boundaries and buffer zones such as runoff diversions to prevent the unintended application of prohibited substances to the crop or contact with a prohibited substance applied to adjoining land that is not under organic management. 	<ul style="list-style-type: none"> * The producer's entire farm is subject to a control regimen. * Production zones and warehouses should be clearly separated. * A complete description of zones and warehouses should be included in the production plan.
	IFOAM	Codex Alimentarius
Recommendations for Contributions to the Environment	<p>Areas which should be managed properly:</p> <ul style="list-style-type: none"> * Extensive grassland (moorland, redland, or dry land) * All areas which are not under rotations or heavily manured(pastures, meadows, hedges, orchards, edges between agriculture and forest land) * Diversified field margins * Waterways, pools, springs, wetlands, and swamps. 	<ul style="list-style-type: none"> * Recycle wastes of plants and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources.
	United States	Costarican

<p>Recommendations for Contributions to the Environment</p>	<p>No specific recommendations</p>	<ul style="list-style-type: none"> ✿ It is necessary to develop formats for agro-livestock production in harmony with the environment, which conserve natural resources on long-terms, contribute towards preservation of the bio-diversity and does not utilize or generate contaminating environmental agents.
	<p>IFOAM</p>	<p>Codex Alimentarius</p>
<p>Pest Disease & Weed Management</p>	<ul style="list-style-type: none"> ✿ Weeds, pests, and diseases should be managed by a number of preventive cultural techniques which limit their development (suitable rotations, green manure, a balanced fertilization program, early and predrilling seedbed preparations, mulching, mechanical control and the disturbance of pest development cycles. 	<p>Pest can be controlled by any one or a combination of the following:</p> <ul style="list-style-type: none"> ✿ Choice of appropriate species and varieties ✿ Appropriate rotation programs ✿ Mechanical cultivation ✿ Buffer Zones ✿ Flame Weeding ✿ Mulching and mowing ✿ Grazing of animals ✿ Mechanical controls such as traps, barriers, light and sound ✿ Steam sterilization when proper rotation of soil renewal cannot take place.
	<p>United States</p>	<p>Costarican</p>
<p>Pest Disease and Weed Management</p>	<p>The producer must use management practices to prevent crop pests, weeds, and diseases including but not limited to:</p> <ul style="list-style-type: none"> ✿ Crop rotation ✿ Sanitation measures to remove disease vectors, weed seeds, and habitat for pest organisms ✿ Weeds controlled by mulching, mowing, grazing, mechanical cultivation, hand weeding, plastic or synthetic mulches 	<ul style="list-style-type: none"> ✿ Selections of adequate varieties and species ✿ An adequate rotation program ✿ Mechanical means of cultivation ✿ Protection from natural enemies of the pests/insects through measures that would favor them.

	IFOAM	Codex Alimentarius
Contamination Control	<ul style="list-style-type: none"> * In case of reasonable suspicion of contamination, pollution tests should be conducted and measures should be taken to correct the problem. * Plastic mulches, fleeces, insect netting and silage wrapping with a polychloride base may be used to protect the finished products. 	<ul style="list-style-type: none"> * The producer should be provide their name and address, the name of the product, and clearly state that the product is of organic status so that someone may be held responsible for the preparation of the product. * If parallel production occurs on the farm, producer's entire farms should be inspected to ensure that products are separated.
	United States	Costarican
Contamination Control	<ul style="list-style-type: none"> * Inspectors should be responsible for verifying that no contamination occurs 	<ul style="list-style-type: none"> * No parallel production is allowed * Any warehouse/storage without separation in the productive unit is prohibited * Organic products should only be transported to other wholesalers with similar products * Adequate records that show all aspects of production should be kept.
	IFOAM	Codex Alimentarius
Soil/Water Conservation	<ul style="list-style-type: none"> * Clearing of land through means of burning of organic matter, e.g. slash-and-burn, straw burning shall be restricted to a minimum. * The clearing of primary forest is prohibited. * Relevant measures shall be taken to prevent erosion. * Excessive exploitation 	No specifics mentioned

	<p>and depletion of water resources are not allowed.</p> <ul style="list-style-type: none"> * The certification body shall require appropriate stocking rates, which do not lead to land degradation and pollution of ground and surface water. * Relevant measures shall be taken to prevent degradation of soil and water. 	
	United States	Costarican
Soil & Water Conservation	<ul style="list-style-type: none"> * The producer must select and implement tillage and cultivation practices that maintain or improve the physical, chemical, and biological condition of soil and minimize soil erosion. * Manage crop nutrients and soil fertility through rotations, cover crops, and the application of plant and animal materials. * Plant and animal materials should be maintained in a manner that will improve soil organic matter content and does not contribute to the contamination of crops, soils, or water. 	<ul style="list-style-type: none"> * In the case of use of irrigation water, there should be a clear plan for water conservation. * The sources, as well as possible contamination causes should be evaluated under the responsibility of the certifying agency. * Water used for production, transformation and processing of organic products should be free from contamination. * Organic integrity and sanitation of the final product as well as its innocuousness should not be affected by the quality of water used.

The Blush on Organic

“If you don’t think organic farming is a viable business for full-time crop farmers, its time for an update.” “Everyone and his brother are getting into organic,” says Kevin Brussell manager and marketing director of Midwest Organic Farmers’ Co-op in Casey, Ill.

Can the Caribbean meet international organic production standards?

In reviewing the organic standards it was often difficult to first, find the standards and then review them. Many of the standards are not widely available and sometimes ask you to purchase a hard copy for your own personal usage. Not only are the standards very hard to understand, but they do not always address all of the issues that farmer’s face. Trinidad and Tobago by extension the Caribbean should be able to meet the world’s organic production standards with the help of the following recommendations. First and foremost, a supporting agency developed mainly for the purpose of helping the farmers explore their options and develop a production plan if they choose to seek certification should be organized. This agency should also harmonize the critical elements of the international organic production standards into one document. This agency should assist in coordinating, training and well as a certification and inspection office. Costa Rica has moved ahead of the competition and has already formed a set of standards. The country of Costa Rica believes that, “organic agriculture is of much importance for the country in relation to the population’s health, conservation of the environment, generation of employment sources, and improvement of the quality of life for human beings.” It is up to the government of Trinidad and Tobago; more specifically the Ministry of Agriculture to decide if organic agriculture will be a viable means of production in Trinidad and Tobago. A national committee was established to draft an organic policy for Trinidad and Tobago.

Now we will look at the economic sustainability of organic agriculture. Trinidad and Tobago has a land area of 5,130 square kilometers. The country is responsible for a marine area that is more than 11 times its land area. Farmlands account for just 25% (131,572 ha.) of the country’s land area which was calculated in the last agricultural census, in 1982. Land use of the 131,572 hectares of farmland, in 1982, was recorded as

follows: cultivated cropland-62.1%, cultivated grassland-3.4%, resting/fallow land-6.6% and new land being prepared for crops/pastures-3.4%. Granted that this census was conducted nearly two decades ago this information still shows that a considerable amount of land is being left unused in many parts of Trinidad. The market for organic products has increased substantially over the last decade. The desire for quality organic products has increased in upwards of 20-30 percent in developed countries. At this time organic farmers receive more money for their products compared to conventional farmers, but as more producers expand into the market and given the law of supply and demand. This will surely lead to lower prices for the consumers. Questions would then arise as to the economic viability, if high yields at relatively low cost of production do not materialize for organic producer to obtain adequate returns on investments.

The country of Trinidad and Tobago has considerable ecological diversity that includes mountains, plains, forests, swamps and wetland areas, savannas, rivers, and waterfalls, and a rich flora and fauna consisting of species from both South America and the Antillean Islands. The country's marine area includes at least 300 marine fish species, numerous species of crabs, shrimp and lobsters, and up to 200 species of mollusks and the leatherback, green and hawksbill turtles. The ecosystem of Trinidad and Tobago is extremely sensitive and fragile and has faced tremendous degradation from years of improper management from conventional farmers, loggers, and even fishermen. Therefore organic farming seems to be an attractive option for preserving the environment, protecting the wildlife, and most importantly protecting the health of consumers. Conventional agriculture has damaged the environment, caused the loss of wildlife and the habitats' bio-diversity. Crops have hazardous chemicals on and in the soil that leave residue on our food and pollute soil and water sources. Organic farming is dedicated to promoting healthy land and a toxic free environment. It's underlying principle is to produce food of exceptional quality and quantity by using farming methods that co-exist with the environment around it. Also organic foods must be minimally processed to maintain the integrity of the food without artificial ingredients, preservatives, irradiation.

Agriculture in Trinidad and Tobago and the Caribbean has reached a fork in the road, a decision making time. There are two choices. You can choose the path of least

resistance where the Caribbean's ecosystem continues to disintegrate to a point that prices soar for the consumers; or you can the path that may seem more difficult where farmers are rewarded for their toil and live without the fear of living from year to year. As for me I chose the path that will lead to a cleaner environment and grocery stores filled with safe, wholesome foods as the wider alternative. Agriculture is the backbone that numerous countries of the world were founded on. We need to preserve this industry and the environment before it's too late. Research studies should be conducted on organic production systems in Trinidad and Tobago to include cost of production, returns to farmers, and monetary value estimate of benefits, such as health of farm workers, and environmental health (water, soil, air) to determine the economic and environmental sustainability.

Aromatic Rice: A possible Approach to organic Farming for small rice producers.

Rice growing in Trinidad and Tobago has always been associated with small farmers of the East Indian ethnic group. Local production has been difficult to estimate accurately because most of the rice produced is consumed at home. As with other staple commodities, the market prices have continually dropped over the years, leaving farmers searching for new ways to increase profitability. Researchers at Caroni are proposing a new plan that will hopefully give small rice farmers an ability to grow rice organically. The opening of an organic market for rice growers would give farmers significantly higher prices for their products. According to researchers at the National Rice Mill, which is a government owned and operated rice mill, no organic rice farms are registered in Trinidad and Tobago.

The aromatic rice blend may be a possible approach to organic farming for small rice farmers. This variety though relatively new would surpass water problems associated with traditional rice cultivation. Traditional rice cultivation requires that fields remain flooded four to five months for every crop, and water losses through percolation into the soil, evaporation, and seepage are substantial. In practice, organic rice is grown and processed without the use of synthetic pesticides and fertilizers, but the practice is more arduous than simply eliminating the use of pesticides and fertilizers. Management-intensive and long-term, often complex strategies are used to control pests and nourish the crop.

Many variations in rice cultures can be found among organic growers. Most organic rice systems require a fallow season in one out of two or three years to break

weed cycles by tillage or other means. Organic rice in fallow rotation can sustain fairly high annual yields, but average yields over time are less than for other rice systems because of the fallow year. If continuous organic rice is produced yields generally decline in successive years due to the buildup of pests populations, especially weeds.

Organic rice should be sold through specialized markets at a higher price than conventional rice. There are many reasons for choosing to grow organic rice including the price premium, reduction of off-farm inputs, and a philosophical desire to create harmony within the natural environment.

Farm Visits

For a little over a week, I explored the rich countryside of Trinidad and Tobago stopping at a few farms that considered themselves organic. A worker on one farm stated that, “We use no herbicides and fertilizers, we are organic.” There is a large misconception in the agricultural sector that to be considered organic all you need to do is end usage of fertilizer and insecticides. This statement only proves the need for an agency that can assist farmers in their work to produce organic commodities to meet the international requirements for trade.

Farm A: Organic Rice Field

Observed a rice field with numerous plots of rice, the field looked very good and the rice was very healthy. I observed numerous problems though, there was no way of controlling or monitoring the water quality. Across the field not more than a couple hundred yards away a cow was tied down to graze. In order for this field to be certified organic, an assurance of the quality of the water must be obtained through water samples.

Farm B: Organic Field in Santa Cruz

Observed a small field in Santa Cruz that is known to be organic. We could not visit with the farmer because the farmer was not there, but three mean looking dogs greeted us when we tried to enter the property. Since we were unable to walk inside the property we were forced to observe the field from the fence line. From the fence line, It was easy to see the flaws in the acreage. The edges of the fields were very overgrown with grasses that are a definite habitat for numerous insects as well as a good source of further weeds to be spread throughout the farm. There were also bags of what appeared to be compost piled against a tree.

Farm C: Sugar Cane Feed Center

The sugar cane feed center is a 60 hectares plot fully integrated farm that is involved in operations ranging from crop production and aquaculture to a broiler unit and a fully operational dairy. I was particularly interested in SFC production of organic compost. At SFC compost production is compiled from feed refusals, manure and bagasse for use in potted plants, seedling nursery and vegetable production. The SCF may be an optimal location for organic farmers to obtain compost for their fields.

Food Security and Trinidad and Tobago

The FAO states that food security exists when all people, at all times have physical and economic access to sufficient and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Organic farming makes a contribution to the food security of Trinidad and Tobago by increasing the sustainability of agriculture in Trinidad and Tobago by preserving the environment and working towards reversing or minimizes the damage that conventional farming practices have caused in the past.

Its hard to put into explain in words the impact that this experience had on me and the way that I view the world and food security. Initially, I thought that food security was simply a measure of how much food a country has. Granted, I was right to an extent, but more importantly food security deals with the quality of food produced and works to create an equilibrium between year to year variability's in food quantities within countries like Trinidad and Tobago. The impact of this internship taught me very simply that people the world over are just people. It doesn't matter what race, creed, or religion a person may be, we all require the same needs to survive. This trip has helped me realize, that I look forward to traveling to other countries and working with other agriculturists to help preserve the industry of agriculture throughout the world. I would like to thank everyone who helped make this internship possible for me. I will never forget all of the memories I gained and the lessons that I learned along the way.

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