Hostos Community College

Food Studies News

Food Studies
Hostos Community College

Volume 6 - June 2020

Contents

A Year to Remember

Halfway through the spring semester of 2020, we, as students, faced a challenge like no other in our generation, the Coronavirus pandemic --an event that brought social unrest, economic collapse, hunger and death, on all levels of social strata. We adapted to the changes in the best way possible: teachers continued teaching and students continued learning on virtual platforms. For many, however, the challenge was insurmountable. At the moment, we are still in the throes of the pandemic, asking ourselves, how can we cope with the challenges presented to us while we continue educating ourselves and teachers educate a new generation? Is there time to think and plan the next steps? Do we have access to all the possible variables? When will we return to normalcy, or near normalcy? These and other questions came to our minds as we looked at the closing academic year. We do not have all the answers yet, but we are hopeful that things will get better, while we also know deep inside that our lives have been forever changed.

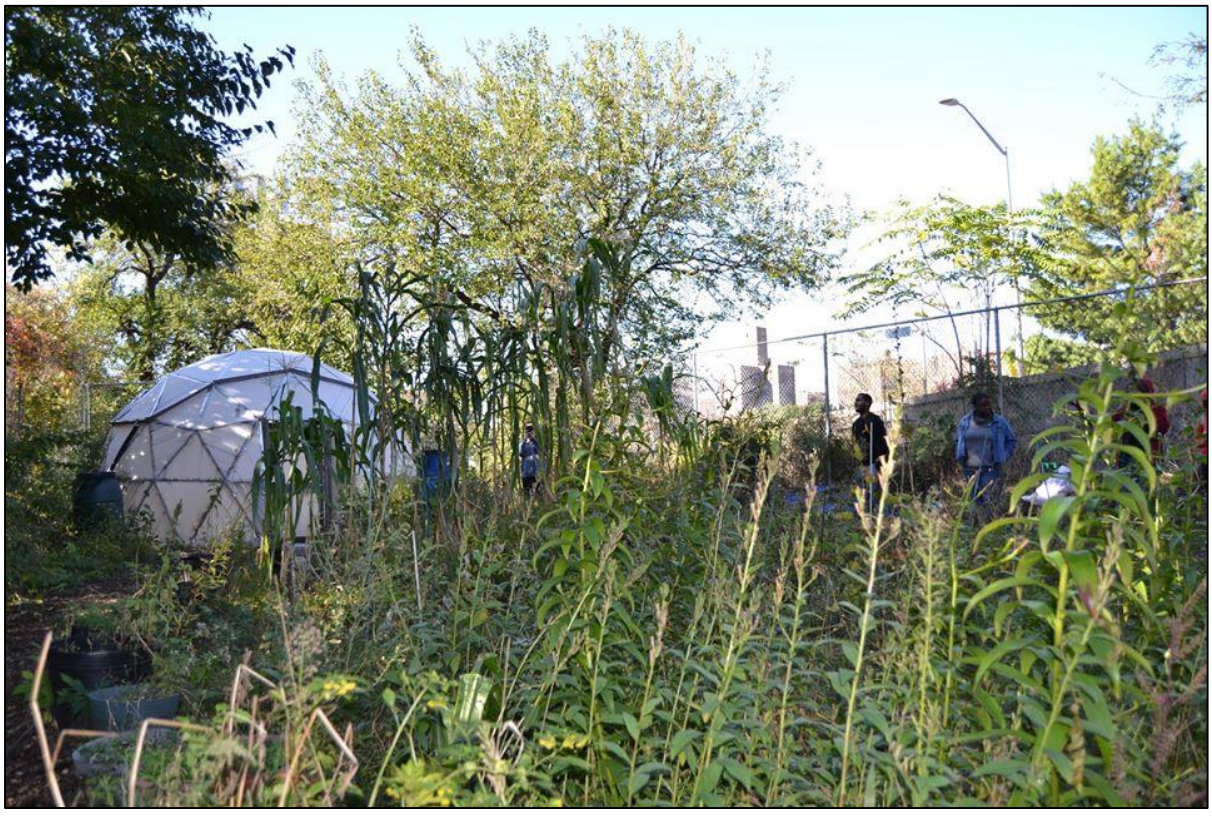
In this edition of the newsletter we are looking back in time, when there was a sense of relative stability. June of 2019 Professors Henderson, Cardona, and Delgado took the message of the Food Studies Program to the Northern part of the country, Anchorage, Alaska, where they joined faculty and students from universities across the country during the Annual Meeting of the Association for the Study of Food and Society and the Agriculture, Food, and Human Values Society. Later that summer, a pilot project in collaboration with La Finca del Sur Community Farm was in the works. Both experiences were one more step forward buttressing food studies education in the regional and national arenas.

Left to Right: Kathleen Delgado, Flor Henderson and Felix Cardona

During the fall semester, several projects were initiated in the hydroponic lab. Student Alexandra Pisano, conducted her capstone research project. Under the guidance of Professor Kathleen Delgado, Alexandra conducted observations to determine the effects of variant light exposure periods on plant development. Professor Marcia Ribeiro and her student Michael James compared leafy greens growing in different substrate media, organic soil, compressed organic pellets, and rockwool. Professor Henderson, in collaboration with Emilio Pena and Karin Contreras piloted projects comparing nutrient solutions with standard nutrient used in hydroponic farming. These early efforts are aimed to prepare experiences available to Food Studies majors during semester-long periods, and to spark curiosity while enhancing research skills using innovative tools. We look forward to continue our work when normalcy returns to campus

This spring, Professor William Suarez continues providing academic enrichment opportunities to his Food Studies students in spite of the circumstances. He organized virtual conferences with professionals from as far as Michigan, Georgia, New Jersey, Puerto Rico, and New Haven. The guests addressed issues ranging from history, the dairy industry, the cattle industry, to that of food safety and regulation. These initiatives were well received and greatly appreciated by the students. We hope this trend will continue since this level of exposure reinforces the professional formation of students and helps expands personal views about the array of areas of specialty in the fascinating field of Food Studies.

Professor Kathleen Delgado and Professor Elyse Zucker's students connected course work with the situation we are experiencing as a structured society. Their students researched to analyze the chaotic and disruptive effects of COVID-19 on the way food is produced, transported, and supplied to consumers. They also focus on agricultural issues connecting crop production and society.



The Dome at La Finca del Sur

2020 Students' Awards

BY KATHLEEN DELGADO

Food Studies Award 2020 - Alexandra Pisano

Alexandra Pisano completed, December 2019, her A.S. Food Studies Degree at Hostos Community College, under the Food Policy track. She has shown leadership and commitment to the field of Food Studies by building a diverse set of skills through her academic performance and active participation in extracurricular affairs at Hostos. She took on the responsibilities of President of the Food Studies Club and created events on campus like the Food Studies Movie Night that brought food issues to the forefront on campus in an accessible and entertaining light. Her diverse interests in food issues are also characterized by her passion for urban farming, and her capstone project featured work conducted with Hostos' aeroponic tower gardens where she measured and determined differences in plant growth in response to exposure to different amounts of light. This work was inspired through her internship with New York Sun Works, a non-profit organization that builds innovative science labs in urban schools. We are incredibly proud of her accomplishments thus far and know we will see great things from her in the future.

Natural Sciences 2020 Environmental Stewardship Award – Jeraldine Santiago

Jeraldine Santiago has shown leadership and commitment to the field of Food Studies through her academic performance and active participation in extracurricular affairs at Hostos. She took on the responsibilities of President of the Food Studies Club and continued events on campus like the Food Studies Movie Night that brought food issues to the forefront on campus. She has actively volunteered her time in supporting the Hostos Aeroponic tower gardens and her passion for helping others was present in her collaboration with La Canasta on campus. Jeraldine showcased environmental awareness through her capstone experience with Randall's Island Urban Farm which expanded her knowledge on urban farming, and her capstone project reflecting this collaboration. She also participates with the Hostos Student Leadership Academy on campus on several projects. Her commitment to Hostos and the college community truly set her apart and we are proud to honor her with this meritorious distinction. We are incredibly proud of Jeraldine and hope to see her accomplish many more great things in the future.

Capstone Projects

Timed light flashes effect on hydroponically grown plants growth rates

BY ALEXANDRA PISANO

In August of 2018, I obtained an internship with New York Sunworks. New York Sunworks (NYSW) is a non-profit organization that builds hydroponic labs in New York City schools as part of their current initiative called "The Greenhouse Project." The goal of the organization is to improve environmental science education in New York City through the use of hydroponic technology, teacher training, and a customized curriculum. A long-term goal of the organization is to "empower students to make educated choices about their impact on the environment."

Hydroponics is the practice of soil-less agriculture. Plants are grown with their roots suspended in a pH neutral medium. The pH of the plant's growing environment is very important because the pH effects what nutrients the plant can take up through its roots. Macro and micro nutrients require a certain pH to be soluble and move easily through the water and plant roots. If the pH is too low, the plant can take up too many micronutrients, and if it is too high the plant will have trouble taking up both micro and macronutrients. Each nutrient has a different pH that is optimal for its solubility, but in the middle of the pH scale at 5.5 - 6.5 is where the maximum amount of nutrients are soluble (General Hydroponics, n.d.) Nutrient rich water is misted or dripped onto the roots. Soil-less agriculture requires 1/5th of the total square footage of and 1/20th of the amount of water than conventional farming. The plants grow faster, are healthier, and are less prone to pests and diseases than conventional grow plants (Sardare, 2013).

Some hydroponic systems are called vertical farming systems (VFS). The technique of vertical growing is promising for urban environments because it requires much less square footage. The yield per square foot is much higher when using a VFS (Touliatos, 2016). Both NYSW and Hostos use a model of VFS called the tower garden in their operations.

Lab work on introductory botany

Having a hydroponic lab allows students to grow leafy greens, herbs, and vegetables even if they do not have access to an outside growing area. NYSW has labs in all 5 boroughs of New York, often located in low-income neighborhoods in food deserts or areas that are experiencing food apartheid. The students become active participants in food democracy, as they have direct access to foods that grow themselves and decide what to do with. Classes will often have cooking classes with their harvests, take their plants home with them, or organize a school farmers market.

I used this internship for my required internship for Food Studies 225. In June of 2019, NY Sunworks brought me on as a part-time employee on the Maintenance team. While I was an intern, the tasks I was responsible for were wide ranging. I accompanied an employee to two or three schools every Friday, and I would test the nutrient levels and the pH levels of the water in the hydroponic systems. If the nutrient concentration was low I added nutrients, and I used the substances pH+ and pH- to adjust the pH of the water to be close to the optimal pH for all the plants in the system to facilitate absorption of the nutrient. The optimal level is 6.3. I also pruned the plants, cleaned the systems, helped students harvest, and planted seeds. As an employee, I am responsible for about 8 school labs in Manhattan. I provide technical support and training to the teacher responsible for the lab. Technical support can range from fixing leaks to planting seeds to troubleshooting plant diseases and pests.

The tasks I completed both as an intern and an employee helped me to become comfortable enough with hydroponics to develop this experiment. This project was inspired by a student experiment recommended in the NYSW curriculum, "the carnation experiment" In this experiment, the students observe the growth difference between carnations exposed to differing amounts of light. Half of the carnations are exposed to LED light for 12 hours a day, and the other half is exposed to light in 15 minute "flashes" every four hours. If the experiment is completed properly, the carnations that are exposed to the 15 minute flashes grow more quickly than the ones exposed to light for 12 hours and off for 12 hours (New York Sunworks, 2018).

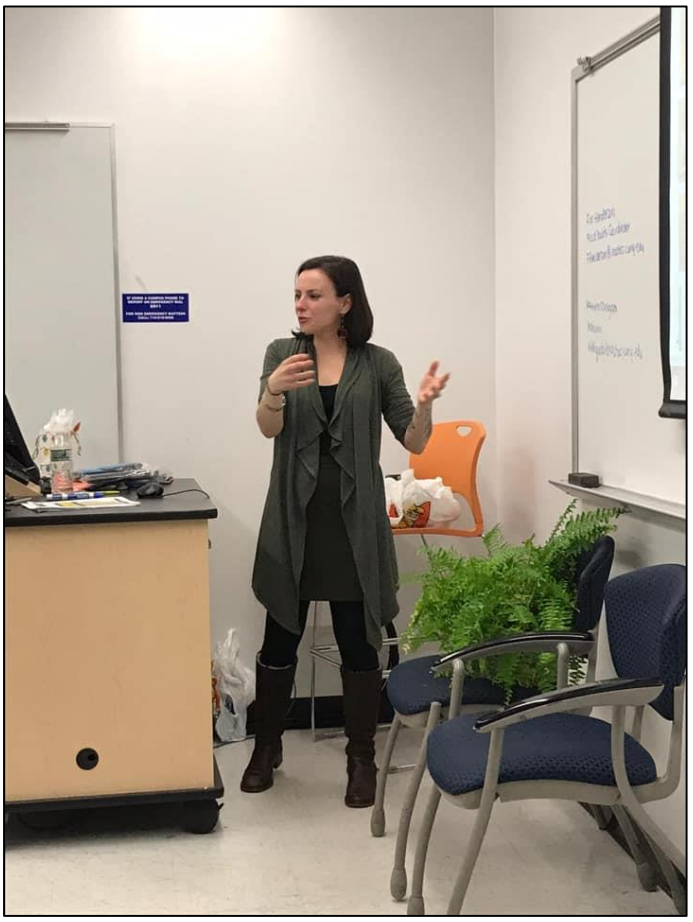
Basil plants at week 5

Plants that are grown under LED lighting have a greater accumulation of biomass, exhibit faster growth, and produce more yield than plants grown with natural light (Namgyel, 2018). In addition, when plants are exposed to light in flashes they have higher production rates of a CO2 receptor than when they are exposed to continuous light, allowing them to take in more CO2 and photosynthesis at a faster rate, which can lead to a faster growth (Zelitch, 2012). In a native setting, plants do not have constant, direct sunlight; the light fluctuates throughout the day. The same fluctuations can be simulated by flashes of light after a period of darkness. When plants are subject to fluctuations in their light exposure, they have an optimal level of light use efficiency, or how much light energy they can convert to biomass (Schumann, 2017). This

information supports the experiment's hypothesis, that growth rate of Tower 2, followed by Tower 3, will be faster than the growth rate of the control, Tower 1, because it will be exposed to timed flashes of light over 24-hour period.

The purpose of this experiment was to determine if the growth rate of hydroponically grown plants increases when exposed to timed flashes of light over a 24-hour period. Growth rate was determined by the surface area of the plant, the number of leaves on the plant, and plant height. Timers were used to control the fluctuation of LED lights on 3 tower gardens, data was recorded over 5 weeks, and that data was analyzed in order to determine the difference that the frequency of light fluctuation makes in plant growth rate. Additionally, pH of the water solution was recorded each week. It was hypothesized that if the plants in the 2 experimental tower gardens receive timed light fluctuations throughout the day, then their plant growth would be faster than in the control tower garden with one prolonged light exposure per day. Tower 1(light exposure 17 hours on/ 7 hours off in 24-hour cycle) had the highest percentage change in the surface area of the romaine and the basil. Tower 2 (light exposure 6 hours on/ 6 hours off in 24-hour cycle) had the highest percentage change on surface area of cilantro, number of leaves on the cilantro plant. Tower 3 (light exposure 30 hours on/ 30 hours off in 24-hour cycle) had the highest percentage change on romaine number of leaves on a plant, purple basil leaf growth, and purple basil height. Through the data collected, it was determined that light exposure in timed flashes (Towers 2 and 3) yielded higher rates of growth than in one prolonged exposure (Tower 1). The data collected indicates that all of the light exposure cycles, 6 hours on and 6 hours off in a 24-hour cycle (Tower 2) produced the highest rate of growth. This data collected can be used to optimize plant growth during a short range of time with maximum yield.

The experiment was conducted with some assumptions made because of constraints due to being conducted in a school environment. It was assumed that the nutrient level of the systems was maintained and at an optimal level across all 3 towers. This was monitored and adjusted by the lab technician and was not measured or adjusted as part of this experiment. Another assumption made is that the models of lights used would not make a difference on plant growth. Because of resource constraints, Tower 1 had a newer model of lights that are on flexible arms and can be adjusted to accommodate plant growth. Tower 2 and Tower 3 have an older model of lighting where the lights are held on a cage surrounding the system, and are not movable. It was assumed this variation was inconsequential, as the only difference is the ability to move the lights and not voltage or quality of light. Finally, it was assumed that the method of calculating the plants surface area was simply to multiply the length of the leaf by the width of the leaf. In reality it is much more complex and requires a specialized computer program to calculate. Because of resource constraints, the observer did not have access to such a computer program.



Final presentation of Capstone project

There were two variables that significantly affected the results of the experiment and possibly skewed the data. At some point during the experiment, someone started to prune the plants. This occurred because the towers were housed in the same room that houses other tower gardens being used for separate classes at Hostos. The person who pruned assumed that the experimental towers were to be pruned with the rest of the towers. On the final day of data collection, the observer witnessed this happening and made note of it. Labeling the towers more clearly with a "do not touch" sign or housing them in a separate room could have avoided this mistake from taking place. This affected the data gathered significantly because it altered the number of leaves on the plant and possibly removed the larger leaves that would have been important to the results.

Because the experimental towers were housed in the same room as other towers set on Hostos's typical lighting cycle of 17 hours on and 7 off, the towers were significantly affected by the ambient light present in the room when the experimental towers were off. Because of this the plants were not in true darkness. Plant features indicative of etiolation, such as a pale color, long stems, and a low rate of leaf growth were observed in the early weeks of observation. Etiolation is defined by *A Dictionary of Plant Sciences* as "the state of plants that have been grown in the dark: they are not green, having little or no chlorophyll, and have very long internodes and rudimentary leaf growth." [DK1] Etiolation results in plants appearing to reach towards the light. Because the plants on the experimental towers did not have light directly on them but there was ambient light in the room, the plants were trying to stretch out to absorb some of that light. However, these signs of etiolation dissipated in the later stages of the experiment. If this experiment were to be conducted again, the experimental towers should be isolated from light except that coming from the tower's lighting fixture. If this variable was isolated, the energy the plant expanded into trying to reach the ambient light would be put towards plant growth instead and perhaps yield different results.

The most challenging aspect of this project was how to interpret the data. There were so many variables present that it was difficult to sift through to determine what was important. I didn't have a lot of experience executing scientific experiments or interpreting data, so this was a new experience for me. If I were to do this project again I would only focus on one plant species instead of four. Because the plants were different it was hard to compare 4 completely different species and expect the results to be conclusive and the same across all species. I'm excited to present this to NYSW and see if they want to implement any new procedures based on my data.

Moving on in my education and conducting more experiments in the future, I definitely learned not to be too enterprising. I took on a lot and ultimately that made the project harder than it had to be. I learned that sometimes in science, keeping it simple is the best approach.

Towers in the Hostos Aeroponic Lab

A Summer and Fall with RIPA Urban Farm

BY JERALDINE SANTIAGO

Interning at Randall's Island Park Alliance (RIPA) Urban Farm I did various things that relate to the lifestyle of a farmer, but at an urban farm in the city of New York. I can point out what I did on my very first day interning at RIPA's urban farm -- deadheading lettuce. Before I started deadheading lettuce on that day, my manager, Christina asked me if I ever deadheaded lettuce. I told her that I had not and she said, "come let me show you how to deadhead lettuce". I had never heard of this until I began interning at RIPA's urban farm. I remember noticing that some of the lettuce had a white liquid coming out when being deadheaded. I was very surprised to see this liquid and thought that this lettuce wasn't any good. Shy person that I am, it took me a few minutes to highlight this observation to Christina, as I was nervous to do so. I didn't want to give the impression that I don't know anything about farming. I felt that a lot of the farm duties were different from what I was used to as a food studies student who specialized in indoor farming with aeroponic and hydroponic towers at my campus, Hostos Community College. I appreciate my professor for highlighting events that relate to the food system and advocacy about food. Going to those functions trained me to maneuver my way through my summer internship at RIPA's Urban Farm. After my professor took the FS120 class of FS120 on a field trip during the spring semester to a local community garden named "La Finca del Sur", going on that field trip always came to mind when I used to do a new task for the first time at RIPA's urban farm.

I thought about that class field trip early on another Friday morning. There were fifty fifth graders who came to RIPA's urban farm from PS 180 in June 2019 for a class field trip from ten in the morning to noon. As the students were arriving, Ciara told me that I would be shadowing one of the groups of students. They had a lot of fun harvesting carrots, cutting vegetables for a cooking demonstration, and then eating them at the end. When it was time to eat the veggies, the students were hesitant, but when they tried it, they thought that they tasted good. There was a student that said "it's nasty, I don't like it" and she seemed bothered. When I heard her saying that to her classmates I thought to myself "it's okay not to like something, but be nice about it". About five to ten minutes later the same student was spitting up, claiming that the food made her sick. Her teacher was telling her to behave and the student repeated herself to her teacher.

RIPA's Urban Farm view from the RFK Bridge

From the very start of my transformation of becoming a food studies student I have learned a lot in my Food Studies classes with Prof. Delgado. I first got introduced to food studies terms when I was in FS 101 and learning healthy eating. Sadly, to share something about myself, who grew up in a food desert in New York City, I always used to wonder about fast-food restaurants that I did not see. For instance, I remember hearing/seeing "Jack in the Box" for the first time in a

movie named *Selena* that Jennifer Lopez was in. I haven't seen a Jack in the Box, Dick's Drive-in, Fatburger and many other food chains in the tri-state area. However, on the same note, I feel that the tri-state is very diverse in culture and small owned restaurants. I enjoy the fact that I can eat Brazilian, Cuban, Trinidadian, Turkish, and all the other amazing meals from restaurants that I have access to as a New Yorker. Although New York City is known to have authentic cuisine restaurants, the city is also buried with fast-food restaurants in urban communities. The book named *Gastropolis Food and New York City* by A. Hauck-Lawson & J. Deutsch highlights restaurants in New York. This book sheds light about the over crowdedness of fast-fast restaurants on the streets of Harlem. At that moment, I truly came to the terms that black and brown individuals are at a huge disadvantage compared to other race groups when it comes to their health and well-being. I learned that the food that we consume and the atmosphere have a close relationship.

Tending new harvest

I learned plenty of new food studies vocabulary words from Sage in the book named *Environment and Food*. One of many terms that stayed with me is "food miles". RIPA's Urban Farm made it possible to reduce those miles and students could taste good food grown locally. I also learned through E. Millstone and T. Lang the amount of premature deaths from coronary heart disease (CHD) globally. Countries that are industrialized have a high rate of individuals being diabetic and obese. In developing countries heart disease is also becoming more common as fast-food eateries are opening up worldwide. I think that it's quite easy to conclude that there is a pattern to fast-food restaurants damaging people's health. The relationship between fast-food eateries and humans' health is a very toxic one. This connection between them should be best kept at a minimum.

When I reached the next level in my food studies courses I became familiar with food policies. I had not thought of myself as being involved behind the scenes when it comes to food. Nonetheless, learning what I have learned in FS 101 and learning about food policy in FS 200, gave me a spark to think about becoming a spokesperson for food desert communities. Reading the book called *Food Policy* by T. Lang, D. Barling, M. Caraher as well as working on a project to update food policies opened my eyes to focus on many other things. As an aspiring dietitian/nutritionist I realized that I will need to do more than talk to my future clients to change their eating habits. I believe that it goes beyond just advising individuals on what diet to follow; the root cause of it all is how to change the eating environment for people in the food desert neighborhoods. I am comfortable pointing out that once we start changing a lot of the landscape and food policies, minorities all over will start experiencing better health.

Being at RIPA's urban farm played a solid role in providing me with a better understanding of farming. I have learned a lot through my food studies classes about food and how the food system works. I comprehended from my internship that reading about the food system is a completely different experience compared to physically doing it by firsthand from the very start to the finish line. Over a year or so majoring in food studies, the topic "food systems" was emphasized from the first food studies class, being "FS 101" a class for novices. I did not know and didn't put

much thought into the procedures that it took for the food that we consume before reaching our plates. Thinking about food it amazes me that I did not have the back story about how food arrives on our plates. Learning about the seven food system elements have cleared that up. Food production, distribution and aggregation, food processing, marketing, markets & purchasing, preparation and consumption, resource and waste recovery are all necessary aspects of and steps in this process.

Throughout my life I have lived in many communities that are hit the hardest when it comes to health problems in these neighborhoods, blacks and Latinos don't have easy access to fresh fruits and vegetables that they can afford. Most of those families live in working households and in some cases may be living below the poverty line. Some may ask, "well what do they have access to?" There is a simple answer, which I like to call the mother land of processed junk food, sugary drinks, fast-food restaurants, and a whole bunch of "liquor stores" and ninety-nine cent stores. As a result, it is almost impossible to avoid the poor eating habits that blacks and Latinos follow. My question is: "who wants to be overweight and have a number of underlying health conditions?" I believe no one does. I also feel that families who live in the food desert are at a huge disadvantage when it comes to their health compared to individuals who don't live in urban communities and who are above the working-class level.

I grew up in a working-class household that had over five children up including myself, siblings, nieces, and nephews. I remember when I was attending elementary school, my mother and I stopped at a fruit market one evening. I asked her if she could buy me a fruit salad bowel/cup. My mother looked at the price and felt that it was over her budget. There was an MTA worker that decided to buy it for me. Although I was a child, I was grateful and slightly embarrassed at the same time. The sad part is when I brought the fruit salad to my school the next day to share with my classmates during lunchtime. My classmate named Angelica instead of selecting a fruit to eat, said "ew, kiwi" and then threw it on the floor. I didn't say anything, but it bothered me a lot. To begin with, she didn't know what kiwi was and didn't even try it. Out of all the fruits in the salad I was really looking forward to eating the kiwi the most. This experience helped shape my thoughts around the tasting at RIPA, and I saw how these reactions could impact someone else's opinion of a food.

Harvesting ripe tomatoes

My mother would always bring fruit and bags of fortune cookies home when she used to visit Chinatown in lower Manhattan. I used to enjoy it whenever she brought plums and fortune cookies from the city. I also remember my mother always carrying a backpack with her as she would grocery shop in Manhattan. What I realize as a food studies student is that my mother is not the only person who had to travel long distances to get fresh produce at a lower price. Many families fall into the traps of those fast-fast restaurants for many reasons including access to food and their income. While there may be places that are starting to build community gardens in urban neighborhoods, we have a long way to go to improve the health of individuals who live in food deserts.

Having gone through my experiences as a child who grew up in food desert communities and my studies in

food studies, I believe that there are a couple of things that can help the urban neighborhoods. The first is to start building rooftop gardens all throughout New York City. Secondly, to have monthly healthy eating lessons where children will be taught about and introduced to different varieties of fruits and vegetables at school.

RIPA's Urban Farms' crops

I feel that the creation of rooftop gardens in the food desert will lower the price of fruits and vegetables by a lot. Not only will working-class families have affordable fresh produce available, but also rooftop gardens will lower food miles in a high volume. The other benefit to making rooftop gardens is that those crops will have a much longer lifespan as they will not travel too far. New York City already has the first basic tool which are the buildings. There are a total of more than three hundred New York City Housing Authority (NYCHA) developments throughout the five boroughs.

New York City is known to have the largest number of public schools in the United States of America. There are a total of one-thousand and seven hundred public schools in New York city. With these two things combined, there could be over two thousand stations producing crops. New York City is an amazing city, but I do have a major concern that families will not have fresh produce year-round. Living in the northeast part of the country has its perks as we get to fully enjoy all four seasons, but it does present a downfall in colder weather as crops will not be able to survive in those seasons. Hence, my second proposed project will also include aeroponic and hydroponic towers in public schools. The benefits to this are that children will have access to fresh vegetables year-round and taste the difference of local grown crops compared to those that travel many miles. Another benefit from hydroponic towers is that crops grow much faster compared to growing fruits and vegetables on land.

In conclusion, my childhood, Prof. Delgado, and RIPA's urban farm all helped shape me into the updated individual that I am today. I ate differently compared to most people that were around me. I have felt that the discipline of wellness has always been a calling for me, but having been a student at Hostos Community College and interning in RIPA's urban farm have left me to believe that I have a much bigger calling to fulfill. My consideration is that I may need to be the voice of the people that can't defend themselves from the masterminds like fast-food restaurants, and those in power who seem not to do much about it. I never pictured myself getting involved in policy changing until being in Professor Delgado's FS200 class.

RIPA's urban farm has provided me with the knowledge and skills to farm in the food desert. With what I have learned and the things that I continue to master, I will someday put all these ideas into action, sooner rather than later, for the sake of my community's health.

RIPA's Urban Farm Chickens

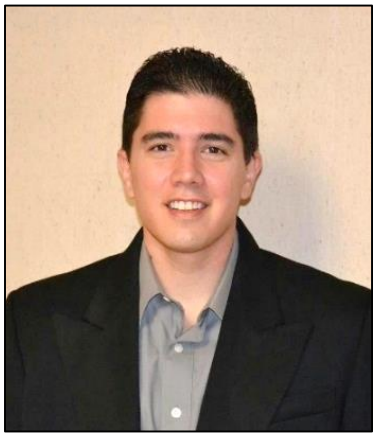
Virtual Guest Speakers

HOST, DR. WILLIAM SUAREZ
FS 220: Food, Health and Environment

FS 220: Food, Health and Environment examines the interactions between food production and consumption, health, and of environment through environmental and food justice lenses. Building early course foundations, it explores topics such as public health disparities and their structural causes, environmental toxins in the food system and their impact on workers and consumers, as well as policies that have or could impact these outcomes, in both historical and contemporary contexts. Together, students will apply classroom knowledge to investigating food security and health at the neighborhood level in NYC. One of the highlights of the course experience is the inclusion of field trips and/or guest lectures.

This spring, FS 220 students had the opportunity to attend virtual presentations by experts in an array or areas in the food system The firsthand information shared by the guest speakers provided robust support towards the academic formation of our students.

Dr. Guillermo Ortiz, PR's Dairyman. His research and other activities at the Cooperative Extension Services - Mayaguez Campus-University of Puerto Rico are focused on the improvement of the efficiency, economic solvency, and sustainability of the Dairy Industry. He is a leading scholar on his field in the Caribbean. At class, he explained the multiple global factors within the dairy industry that have impacts to food, health and environment and strategies for improvements.



Mr. Rafael Rivera, Manager of Food Safety and Production Programs at U.S. Poultry & Egg Association. Over 20 years of experience in the field. He is a PhD student at the University of Georgia. He advocates for food safety, the welfare and health of the livestock, and the welfare & immunity of workers in the poultry industry.

Dr. Reinaldo Funes-Monzote, visiting Professor at Yale University. Well known scholar in Environmental Caribbean History. He exposed about political issues affecting food, health & environment in a particular historical context. He contextualizes the case study of Cuba, the political transition transforming food, health system and the nation's environmental views.

Prof. Edwin Muñiz, Acting State Soil Scientist, NRCS-New Jersey. As a Federal Scientist with over 20 years of experience Prof. Muniz, is a regular speaker at the universities of Rutgers & Princeton. In our class he exposed the relationship between soil, food, health and environment. He talked about climate in several regions of the US east coast, influence of precipitation changes, types of soils, conservation practices and food insecurity.

Mrs. Damarys Del Castillo, Director **of Co-Pack & Quality Assurance for Bar-S, Sigma Alimentos,** Texas. Over 20 years of professional experiences, Master's Degree in Food Safety and certified in international food regulations/laws from Michigan State University. Former QC Director of Goya-PR, Inc. She talked about the environmental and health impacts at the manufacturer's level. The relationship between Food, Covid and hurricanes.

Research Projects

A Quest for efficient Nutrient Media

BY FLOR HENDERSON

A year ago I received funding from CUNY-PSC to conduct research on nutrient media for aeroponic farming. Planning and experimental design started in the summer of 2019. The first facet of the project was successfully implemented in the fall semester. Eight aeroponic towers were used to grow four different species of leafy greens. Four towers fed the plants with the standard Juice Plus (JP) nutrients, the other four towers were treated with Master Blend (MB), a very popular nutrient alternative. Both nutrient media are similar in their chemical contents, including Nitrogen, Phosphoric Acid, Soluble Potassium, Magnesium, Boron, Copper, Iron, Manganese, Molybdenum and Zinc. Juice Plus is commercialized as a liquid solution, and Master Blend as in crystalized form that is combined with Magnesium Sulfate (Epsom Salt) and Calcium Nitrate to prepare a usable solution.

The leafy greens for the experiment were selected from a wide range of species previously experimented with in the lab (romaine lettuce, basil, Swiss chard, and cilantro). The desirable trait they shared was their short life span, a characteristic that made them suitable for semester-long experiments. The seeds were germinated using a standard treatment of moisture and temperature. Seeds were planted in rockwool blocks and let to germinate for a period of approximately three weeks. Once the plants reached an appropriate seedling stage, 3-4 leaves, and roots protruding from the substrate, these were transferred into JP towers with repetition of the same plants in MB towers. Plants were exposed to 16 hours of light a day.

Weekly observations were performed in selected specimens, recording increases of leaf number, expansion of area surface, and changes in leaf shape and coloration. At harvest time, leaf area, and length of the root system were recorded. Fresh mass was calculated as well as dry mass after drying samples in a convective oven.

Collecting data of fresh samples

The preliminary results showed that both nutrient media has similar effects in the overall development of

the plantlets. Biomass measurements indicate a slim difference between the sets, with MB plants weighting few milligrams more than JP plants. Also, MB leaves acquire a darker green coloration during the later periods of development. Currently, the data set is too small to draw any conclusions. The projected second and third repetitions were interrupted by the critical situation created by Covid-19. We plan to reinitiate the work when the aeroponic lab is accessible. In the second and third phases, the experiments will replicate the procedures. The results of this project are of great interest to the Food Studies Program because the results will provide a well-researched selection of nutrient media for future class work.

Root system under hydroponic growth

Harvest time with Karin Contreras

This project was conducted in collaboration with Emilio Pena, College Lab Technician (CLT) in the Physical Sciences Lab, who provided support preparing the different chemical solutions and sharing insightful ideas for future undertakes, and with Karin Contreras, CLT in the Aeroponic Lab, who kept the aeroponic towers functioning and helped collecting data. Special thanks go to my students of the two sections of BIO131 Plants and Society taught in the fall of 2019 for their contributions to this research.

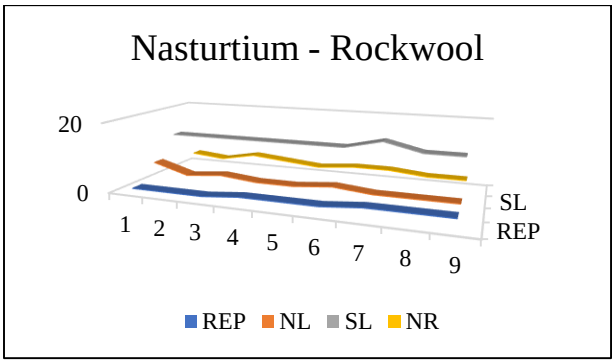
Germination and Development of Nasturtium, Mustard Greens and Swiss Chard in Different Substrates - PILOT PROJECT I

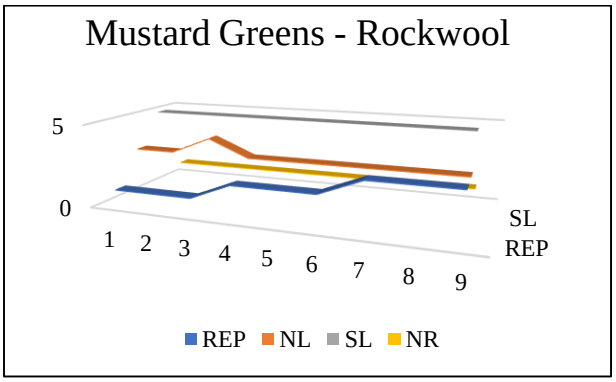
By MICHAEL JAMES, LIBERAL Arts and Sciences Major and MARCIA RIBEIRO, Professor of Biology

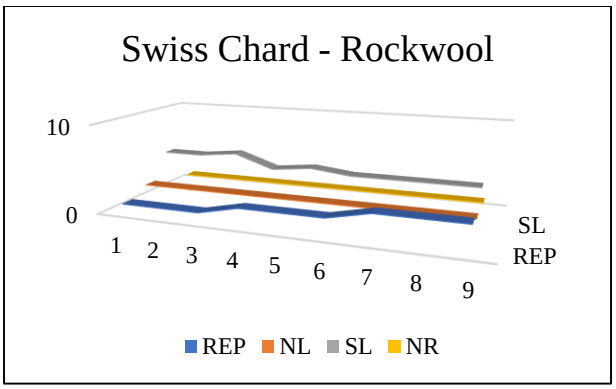
Nasturtium is an excellent source of minerals and antioxidants and has been used in popular medicine due its antiviral, antibacterial, antifungal, and antitumor properties. Mustard greens are a leafy plant with a zesty dijon mustard flavor and a nutrient-rich addition to salads or stir-fries. Swiss chard is a green leafy vegetable, has highly nutritious leaves, making it a popular component of healthy diets and also a source of phytochemical compounds, pigments and other phenolic compounds, its extract has significant biological activities.

Rockwool is made from rock that has been melted and spun into fibrous cubes and growing slabs, it provides roots with a good balance of water and oxygen. The soil (Miracle-Gro Potting Mix®) is a mix of nutrients prepared to garden plants. Expanded clay pebbly is made by baking clay in a kiln, since it is full of a tiny air pockets, which give it good drainage.

The objective was observing the growth cycle in specific substrate. The experiment was carried out in the Natural Science Department of the Hostos Community College, Bronx-NY. Seeds (Johnny's Selected Seeds®) of nasturtium, mustard greens and Swiss chard were established in trays with rockwool, soil (Miracle-Gro Potting Mix®), and expanded clay pebbly.







After germination, the following variables were analyzed: NL – number of leaves, NR – number of roots, and SL – shoot length. Although the use of rockwool has already been established for a wide range of species in the hydroponic system, it was necessary to evaluate whether rockwool would also be the best substrate for non-hydroponic systems. The results showed that rockwool is the best variable in any system, but it is worth noting that this research is only a pilot and repeating the experiment outdoor under other environmental conditions would be ideal.

Michael James and Professor Marcia Ribeiro

Piloting the Kratky Method of Growing Leafy Greens

BY FLOR HENDERSON

One of the simplest methods of hydroponic farming is the Kratky method, a method that involves growing plants without soil simply by suspending them in a water solutions with nutrients. Once the seedlings are fully developed and roots sprout beyond the substrate, the seedlings are placed in a net pod and sat on top of a container filled with the enriched water solution with the roots touching the surface of the watery medium.

The method sounds simple and is widely used by professional and aficionado farmers. Therefore, it has a great potential for being implemented as a practical experience for Plants Sciences, Food Studies and Urban Agriculture courses in the future.

The pilot was conducted at the same time I was implementing a large-scale project on plant nutrients. The main objective was to test the feasibility of using this method to conduct and complete a 15-week teaching and learning experience. Additionally, the second objective was to observe the effects of home produced nutrient media.

The materials included Mason jars, rock wool cubes, net pods, and seeds of leafy greens. The experimental chamber was installed to treat four species of plants with three repetitions each.

Set 1: was treated with Juice Plus (JP)
Set 2: was treated with Master Blend (MB)
Set 3: was treated with filtered coffee grounds
Set 4: was treated with Calcium extracted from eggshells.

Once seedlings fully developed and roots protruded from the rockwool cubes, each individual cube was installed in opening of Mason jars with nutrient liquid. In theory, the amount of liquid should be gradually absorbed by the roots until the plant reaches full size.
As the experiment progressed, several problems were encountered. First, there was the issue of creating a dark environment for the roots to grow healthy and to prevent proliferation of algae, a common problem in hydroponic farming. For that, the jars were covered with aluminum foil, measure that prevented direct observations of the roots. The second issue was that contrary to the literature, the plants absorbed the nutrient media faster than expected, forcing to add more water every so often. One possible explanation for the accelerated consumption of liquid is that plants exposed to more hours of artificial light than plants growing under natural conditions, generate more photosynthetic activity, thus, the overconsumption of water. Third, the set with eggshell extract become moldy after few days. The mold killed the seedlings and invaded the nutrient solution transforming it into a slimy and foul-smelling solution. One possible explanation is that the shells were contaminated before the process of extraction. One way to prevent this would be to expose the shells to high temperatures prior extraction, killing any unwanted microscopic contaminants.

Romaine lettuce plants in different nutrient media.

Among the interesting observations were that the sets growing in commercial nutrients, JP and MB, which grew steadily and at a similar rhythm, whereas the set growing in coffee ground extract grew faster and the leaves acquired a darker coloration. Also the plants did not consume as much of the liquid media as the others sets.

Based on these preliminary observations, I think that implementing a lab experience using the Kratky Method experience is a doable project. The experience offers many elements that can generate great interest in our students. Overall, this was an experience worth of replicating with the necessary corrections.

I want to thank Emilio Pena, Karin Contreras, and Ana Gonzalez for their contributions to this initiative, not only with new ideas and suggestions, but with their inexhaustible enthusiasm and dedication.

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Current Events: COVID-19

The effect of COVID-19 in Food Chains

BY LECHINEDA ST. FORT and ERIC COSTOSO

The novel Coronavirus outbreak, which is taking place now on a global scale spells disaster for food systems around the world, causing disruptions to how food is grown, produced, and transported to the consumers who need to eat. According to the Center for Disease Control and Prevention (CDC), COVID-19 (as it is officially called), COVID 19 is a SARS-type virus that targets the respiratory system, causing coughing, shortness of breath, muscle pains, and a high fever. COVID-19 is highly contagious as well as dangerous to those who already are at risk because of health problems. The virus primarily spreads through mucus droplets expelled when people cough, sneeze, or talk (CDC, 2020). Essential workers that are needed to produce and process the foods we eat are, as a whole, usually working in close proximity to one another as the scale that the food needs to be created on must be matched with the number of consumers needing it. As workers that can work in the food ecosystem, they are themselves put at risk when in the process of making sure the food is ready for customers to eat, even if that means being put workers in compromised situations. Farmers around the world are very concerned about their crops being affected during this pandemic, which puts the food chain at high risk. The global agri-food system is impacted, causing major changes in food supply globally, as it affects farmers, manufacturers, customers, countries, and people who have a low income.

Food mostly comes from the ground –soil that is the foundation for seeds which will grow, taking time, water, fertilizer, pesticides, and more land if the farm is successful enough to expand. This only accounts for fresh produce, such as fruits and vegetables. There is energy as well which goes into growing and processing animal products such as poultry and beef, needing feed from grains and soybeans as part of the process leading to slaughtering, which is under heavy regulation by the United States Department of Agriculture (USDA). For the USDA, meat carcasses and animal products finding their way to consumption are inspected to make sure for the public. For the entirety of the United States to eat as much meat as it does, this process poses a considerable challenge for the USDA, which must have a representative in all meat processing plants in the US, which also import (USDA, 2015). This entire process of growing the crops or livestock then harvesting them takes quite the energy from resources on the planet.

While it cannot be estimated how much oil is used for food production, oil is a key ingredient for energy production utilized in almost every single aspect of the food production chain. When it comes to the price of fuel affecting the price of food, the price of oil per barrel is an indicator of how transported fuel prices will be priced. In today's era of coronavirus, the price of oil has dropped significantly as oil has been used less as more people stay inside their homes. This price reduction means that oil companies are panicking to find solutions to stay afloat as oil isn't bringing in profit (Carrington et al., 2020). Even with its low price, oil isn't ideal for food as it is slowly being phased out of a world with other resources, such as biofuel made primarily from ethanol (Sage, 2012) and batteries, both of which will become more viable solutions for popular forms of transportation such as container ships, trucks, trains, and airplanes.

Countries with populations of low income are at a high risk of being affected by this pandemic and food insecurity will increase globally as a result. Many people can go to the nearest supermarket or wholesaler and purchase their needed groceries for the week, then wait a week to go out again. For products such as toilet paper, milk and meat that are extremely popular during the pandemic, however, they are not readily accessible. The agri-food system is a global and progressive system that is fundamental in agriculture. It consists of the farmers who produce the food, but also the huge industry that supplies farmers with inputs --from seeds to fertilizers to tractors to fuel, and the even larger industry that processes, packages, and distributes the food (Sage,201, P.30,31). The food system is extremely complex, very linear and well organized in which the flow of the food chain starts from primary food production, then passes through processor and retailer stages, finally arriving on the consumer's plate. According to an interview conducted by CBS News, a farm owner in Homestead, Florida said "There are not enough customers for all the tomatoes, beans, squash, everything just raised in Homestead, we're all struggling," because 80% of tomatoes grown in Florida go to the food industry. However, with the restaurants, schools, and cruises being closed, the products cannot get to many customers as usual. (Bojorquez,2020).

This pandemic affects the food chain by costing farmers their jobs and not allowing food to get to panicked consumers, which can cause prices to increase (UN News, 2020). Farmers around the world are losing profits. According to CBS News, "Dairy farmers in Pennsylvania are pouring milk down the drain because of dried-up demand from closed restaurants and schools, while others stand by helplessly as their crops rot in the field" (Bojorquez,2020). As *The New York Times* reports, the companies that produce these foods are expanding their businesses to keep up with the new demand that is created due to consumers staying at home, products such as Oatly for their oat milk as said in the article for homemade coffee, Mondelēz for their Oreo and Ritz crackers production (Hu, 2020). This new demand for these products means that people who want these products now will continue to buy these once the pandemic is over.

The workers that are producing these products for the shelves are put at risk, as work conditions do not allow for workers to distance themselves from other workers in the workspace. This change, in turn, can cause the workspace to become a hotspot for the virus to spread and create a safety hazard for the food being produced. As *The Guardian* reported, meat factories in Nebraska are putting workers at risk to get an optimal amount of meat out to customers, but this, in turn, made multiple workers sick and some even died. 30 workers have died due to the virus and over 10,000 workers have been infected because of the unsafe conditions in place in the factories, at the time of the article's publication (Lakhami, 2020). The workers at the factories are also the victims of not having the correct protective equipment, which while not bulletproof, can prevent more infections. While consumers cannot do much about the workers, more reporting and union action for the workers can mean the factories can be cleaned more often and better ventilation for the workers can be provided to help prevent transmission of the virus.

The Committee on World Food Security defined food security as when all people, at all times, have physical, social, and economic access to sufficient, safe, nutritious food that meet their food preferences and dietary need for an active and healthy life. In this time of crisis, the food chain has to adapt rapidly to an increase in food demand, with panicked buyers leaving shelves empty in stores worldwide which in turn causes an increase in prices of products such as milk, meats, and eggs. Covid-19 has caused a shortage in labor where farmers have to "destroy their crops to avoid surpluses, something which would drive down prices and create yet another problem along the food chain" (Reynold, 2020). Many food processing plants were forced to close because employees across the country had been infected with Covid-19. According to CNN News *the United Food and Commercial Workers International Union* "at least 13 processing plants have closed over the past two months, resulting in a 25% reduction in pork slaughter capacity and 10%

reduction in beef slaughter capacity" (Gallagher and Kirkland, 2020)

For the local consumer of groceries, what is recommended is to have a single day of the week be a dedicated day for shopping at the local market. Walking to the supermarket should mean wearing a mask along with gloves to make sure none of the pathogens get on the person of concern. Groceries should be wiped down with alcohol or disinfectant wipes to rid the virus that could still be lingering on the packaging. If groceries are being delivered to one's house, it must be considered that the workers are going through a tougher time than most people are on the frontlines of this pandemic, so we should consider using delivery services less often than going outside for groceries. Products that are prone to going out of stock are the items that are usually the products that are most in need, while those products are becoming more available, hoarding these products needs to be avoided to curb price gouging. The pandemic will not be over until the disease is eradicated, meaning a vaccine is created and delivered. People should follow guidelines from the CDC and the World Health Organization of the United Nations to help themselves prevent being infected from the virus.

The agri-food system and healthy people are crucial parts of the world economy. The Covid-19 pandemic showcases the cracks in the food supply chain, and the vulnerability of food security for the average household, if basic household products are not available. Consumers' panic in buying food contributes to the food shortage in stores. Retailers need to implement a limit in the purchase of items per person which could help reduce panic buying. The government should help farmers with money because they are losing a lot of products due to the pandemic. We need farmers because they are at the top of the food chain. There is no food chain without farmers.

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Letter to Author of San Francisco Garden Project for Prisoners from Student in Shoes of Wendell Berry, Agricultural Writer

BY SHENNEL MITCHELL

Dear Catherine Sneed,

My name is Wendell Berry and I wrote an article called “The Pleasures of Eating”, in which I see similarities about agriculture processes in your article “These Green Things” about the San Francisco Garden Project which you described to be “…an eight-acre garden, [where] prisoners grow produce using the biodynamic French intensive method….” (245) I suggest that inner-city people get involved with farming and gardening to live healthier lives since there are no organic produce within urban communities and I’m glad you gave the opportunity to the prisoners to create a garden out of a garbage dump. For centuries some prisoners have probably been passive consumers who never questioned whether their meals came from an organic farm or a factory farm and were also prisoners of the food industry. Within the food industry passive consumers could be considered as prisoners because they’re told to just accept the food that’s given to them. In my article I state “…we cannot be free if our food and its sources are controlled by someone else….” (1) The San Francisco Garden Project was the one thing the prisoners had control of while incarcerated. The only way to truly know if what people are consuming is organic is to grow it themselves. You have restored the hope that the prisoners have lost in themselves by introducing them to gardening. When asked about gardening you said “… growing things does give many people a sense of power….” (247) While reading about the San Francisco Garden Project I noticed the prisoners were proud of themselves for successfully growing crops and understanding the growth process with your guidance.

Unfortunately, agriculture is not common in urban communities because they have become crowded with processed foods. I tell inner city people to “...eat responsibly….” (1) because that’s all they can try to do when surrounded by so much food that contain harmful chemicals. Wanting to eat healthier could be challenging with all the temptation from fast food restaurants and for those in prison, commissary is filled with junk food and there are no healthier alternatives until you and a few prisoners created the garden to make a difference and give the prisoners a choice when it comes to eating. In my article I advise “...the advertisements of the food industry, food wears as much makeup as the actors....” If a consumer were to make any of these processed meals the organic way, they would taste and see the difference in the finished products which would result in a consumer no longer wanting to be passive.

Sincerely,

Wendell Berry

A.S in Food Studies

The Associate in Science (A.S.) Degree in Food Studies at Hostos Community College consists of 60 credits, which includes: Common Core courses required by the City University of New York; Food Studies core courses; a career practices course; and a required internship. After the first semester students select a track in one of four areas: Food Policy; Food and Social Issues; Health and Nutrition; or Environment and Sustainability. These tracks prepare graduates to transfer into four-year bachelor's programs in food studies and related fields such as Political Sciences, Urban Studies, Nutrition, and Environmental Studies.

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