Academic Portfolio

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Welcome to my Portfolio!

In this document I provide context and narrative regarding my academic journey as an interdisciplinary teacher-scholar. I hope you find it useful.

In 2010, I completed a B.A. in Sociology/Anthropology from Florida International University's (FIU) Global and Socio-Cultural Studies Department in Miami, Florida. My coursework as an undergraduate was cross-disciplinary in: social sciences, biological sciences, and environmental studies. As an undergraduate student I explored how social identity influenced pro-environmental civic engagement, particularly after exposure to climate change and resource degradation data from IPCC reports. I held leadership roles in various student organizations, such as the Global and Socio-Cultural Studies Club, the FIU Farmer's Market, and Minorities in Agriculture and Natural Resource Related Science. Prior to beginning my M.S. degree, I acquired a grant to research second-generation biofuel production in India and interviewed communities engaged in government-funded cooperatives promoting biofuel expansion.

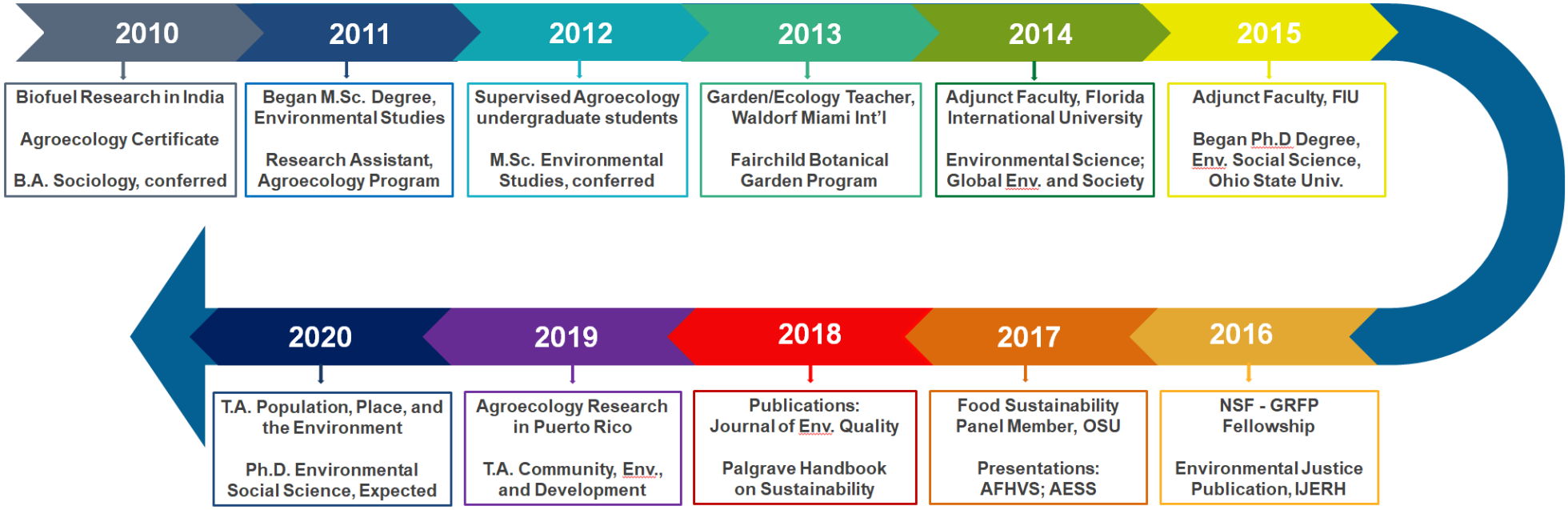
In 2011, I began an M.S. in Environmental Studies at FIU, which was funded through the Agroecology Program and USDA grants. My coursework and research centered on agroecology, plant and soil science, ecology, and biotic resources. For my thesis, I harvested an invasive tree species and converted it into biochar and then applied it to soil at various rates to measure carbon sequestration, soil nutrient availability, and crop growth in a greenhouse study. During time I was an integral part of the Agroecology Program. I was responsible for mentoring and supervising all undergraduate student field research projects, assisting with teaching *Agroecology* and *Sustainable Agriculture* courses, coordinating annual Agroecology Symposia, and managing the university organic garden, fruit orchard, and biofuel demonstration area. I was also charged with overseeing urban agriculture projects, leading ecological restoration projects at the FIU Nature Preserve, and leading field trips for *Ecology of South Florida*. I graduated in 2012 with honors.

After my Master's, I assumed the role of Garden and Ecology teacher at Waldorf International Miami School. I then became adjunct faculty at FIU in the Department of Earth and Environment from 2014-2015. In this role I developed the curriculum for, and taught, *Global Environment and Society*, as well as, *Environmental Science and Sustainability* courses. Through this work I confirmed that I love, and am really good at, teaching and mentoring undergraduate students. I also came to appreciate the importance of interdisciplinary training, particularly as it relates to environmental problems and agroecological research. I chose to pursue my Ph.D. at Ohio State University's School of Environment and Natural Resources to work with scholars researching socio-environment problems using interdisciplinary methods.

In my doctoral research I merged my training in agroecology and environmental science, with sociology and social psychology scholarship to investigate the rise of agroecology, environmental justice, and climate justice movements. This work also extends to sustainable urban agriculture projects and local food movements. Agroecology is often taught in universities as strictly science and practice. However, leading scholars have highlighted that agroecology is deeply political and cannot be divorced from a social movement lens as it is tied to issues of sovereignty and justice for marginalized and frontline communities. Through my teaching and research, I draw connections to systemic problems contributing to environmental injustice, and amplify the work of organizations creating climate resilient communities and sustainable food systems. I strongly believe all undergraduate students benefit from interdisciplinary training, and I am excited to share my natural and social science knowledge with them.

Academic Timeline

Below is a timeline highlighting my academic experience over the past 10 years. While it is not a comprehensive list, it serves to illustrate my experience teaching and mentoring undergraduate students, as well as, my capacity to maintain a robust and active research program.



TEACHING AND MENTORSHIP

Teaching Statement

Summary of Experience:

I have eight terms of teaching experience at Florida International University and Ohio State University as both adjunct faculty and teaching assistant. As an adjunct at Florida International University (FIU), I was charged with developing curricula for, and teaching, two undergraduate courses, *Global Environment and Society* and *Environmental Science and Sustainability*. At FIU, I was also the teaching assistant for *Agroecology* and *Sustainable Agriculture* courses. I served as the lead instructor for the field-based components of these courses and as the mentor for 25 Agroecology Program undergraduate student projects and poster presentations. At Ohio State, I had an active role in redeveloping the structure and content for the upper division course, *Community, Environment, and Development*, and also managed Student Instructional Assistants for this course. I also serve as a teaching assistant for the graduate course, *Population, Place, and the Environment,* where I guide students in Geographic Information Systems to map socio-environmental problems of their choice.

I have completed several trainings and workshops, through the Ohio State University Institute for Teaching and Learning, including *Inclusive Teaching* and *Course Design Institute,* which is only offered to faculty and advanced doctoral students. I also participated in workshops at the Center for the Advancement of Teaching at Florida International University, including a *Team-Based Learning* training offered through the Office for Global Learning. These professional development workshops have served as a platform for me to get feedback on my own instructional materials and have helped me strengthen and build out my pedagogical strategies.

Teaching Philosophy:

In pursuit of pedagogical excellence, I strive to execute four core goals through my courses and teaching:

1. Develop practical skills students can draw upon as scientists, professionals, and/or advocates of environmental stewardship and social justice..

2. Inspire curiosity about the physical environment, social structures, and challenges we (as a collective) are facing today;

3. Cultivate critical thinkers who actively engage with theoretical, empirical, and applied research their courses expose them to; and

4. Equip students with diverse and global perspectives that allow them to transcend singular viewpoints.

Teaching Statement

As a teacher, I want students to become self-motivated to learn about their society. Thus, I challenge students to actively engage in problem-solving through service learning and community-based projects. Some examples include having students volunteer at a local organization of their choosing, or partnering with an entity and having students produce work that is of value to them and the organization. In the course, *Environmental Science and Sustainability*, students learned about ecosystem function and endangered species by working on restoration projects in the endangered and endemic pine-rockland habitat. Students have also worked on urban agriculture projects and with wildlife rehabilitation centers. This serves the purpose of getting students field experience while also connecting them with potential employers. This experience may pose a strain for non-traditional students, so I offer alternate projects to provide accommodations.

I strive to challenge students, intellectually and philosophically. I introduce complex concepts in my curriculum, but moderate the rigor using comprehensive strategies for assessing learning beyond the typical term paper and exam. Some of these include low-stakes assignments, such as: reflection essays, team-based quizzes, policy memos, and podcast creation. When teaching *Global Environment and Society*, I had students produce policy memos on local socio-environmental issues of their choice. I have also tasked students with conducted waste-inventories or life-cycle assessments of personal items. These exercises prompt introspection and open the door for dialogue on individual contributions to socio-environmental problems and the institutions and structures preventing lasting solutions.

One strategy for engaged and active learning I recently implemented is role play. In the *Community, Environment, and Development* course I assisted with, students engaged in a semester-long project where they were grouped into mock nations and communities with varying degrees of resources and capital. Students gained an understanding of the role of capital (social, political, cultural, physical, financial, natural, and human capital) as they worked to create policies and actions plans for sustainable community development. Each community had a set of environmental problems (natural disasters or water pollution) and students navigated competing interests while developing their community plans.

Courses I am Prepared to Teach:

Agroecology (science, practice, and movement)	Environmental Sociology
Urban Agriculture and Aquaponics	Environmental Ethics
Intro to Environmental Science	Environmental Policy
Sustainability Science and Policy	Environmental Justice

Mentorship and Student Advising List

Florida International University, 2010-2012, Agroecology Program

Undergraduate students in the Agroecology Program are fully funded through the USDA National Institute of Food and Agriculture's Hispanic-Serving Institutions Higher Education Grant Program, Florida-Caribbean Consortium for Agricultural Education (FCCAgE), and the Multicultural Scholars Program (MSP). All students-scholars must dedicate 6- 8 hours per week on research development and Agroecology related activities. I was tasked with supervising all student field/garden projects, helping them produce academic outputs for conferences and symposia, and apply for internships.

1. Kurt Spokas
2. Nall Moonilall
3. Adonis Alvarez
4. Bianca Bonilla
5. Ayman Elyasin
6. Braian Tome
7. Rosario Vidales
8. Barbara Pazos
9. Jatnna Alvarez
10. Carolina Alzate
11. Amy Diaz
12. Enzo Swayne
13. Tricia Callahan
14. Carin Luna
15. Stephanie Perez
16. Kristine Matos
17. William Granda
18. Karina Jiron
19. Elena Cordova
20. Luis Garbinski
21. Nina De La Rosa
22. Carmen Rodriguez
23. Edy Cicilio
24. Eliana Cordoba
25. Joshua Muñoz

Fairchild Challenge, 2013

The Fairchild Tropical Botanical Garden hosts a 14-week program for high school students in conjunction with the FIU Agroecology Program. I organized content for the program, executed presentations, and supervised student progress on projects at the FIU Organic Garden and the FIU Nature Preserve.

1. Dairene Leon
2. Ashlynn Dobbs
3. Antonio Aninat
4. Joshua Linenfelser
5. Nicolas Petrakis
6. Emilio Arias
7. Irene Polo

The Ohio State University, 2015-2019, Environment and Natural Resources

Undergraduate Students:

1. Ariel Hall
2. Adrian Nieto
3. Itzel Garcia
4. Monica Stevenson

Master's Students:

1. Laura Bond, Environmental Science, c/o 2016
2. Julie Slater, Ecological Restoration, c/o 2017
3. Joshua Simon, Urban Forestry, c/o 2020
4. Dax Fisher- Garibay, Urban Stream Ecology, c/o 2021

Mentorship Statement

When I was a research assistant at Florida International University, I served as a mentor for twenty five undergraduate students in the Agroecology Program. My primary focus, beyond managing ongoing projects at the organic garden, was to guide these students in developing their independent environmental studies research projects, and to teach them how to produce posters for conference presentations. Students presented at local, regional, and national conferences under my guidance. I also helped place many of our students in internships with environmental and agricultural organizations. This early exposure to mentoring and supervising student research catalyzed my desire to help students acquire skills that are not often taught at the undergraduate level.

During that time I also recruited three of our top undergraduate students to assist in my own research project. Over the course of several months I worked closely with these students to collect *M. quinquenervia* trees and convert them to biochar. I taught them laboratory methods for measuring soil and plant nutrient content, how to engage in research design for greenhouse studies, and strategies to maintain and clean the data we collected. In essence, they were learning how to engage in research. Two of these students eventually went on to pursue graduate school. The other recently reached out to me to write them a letter of recommendation for a career prospect in Los Angeles. I appreciate that these students still keep in touch with me over 7 years later.

While at Ohio State University, I have been engaged with several undergraduate and master's student projects and have been a consistent point of contact for junior colleagues needing a critical lens with which to view their work. These projects have ranged in disciplinary specializations from wetland restoration and wildlife ecology to communicating climate change and environmental psychology. Additionally, as a PhD candidate that has brought in substantial internal and external funding, including the NSF Graduate Research Fellowship, I have helped five graduate students prepare their application materials for the NSF and Ford Foundation Fellowships, and have reviewed many smaller grant applications for other students that have been successfully funded.

Within my own research projects, I have recruited undergraduate students to assist me with my dissertation data in both transcription and data analysis. These students expressed the desire to gain research experience and are interested in pursuing graduate degrees in the near future. One of these students has demonstrated an interest in publishing an academic paper, so I have been helping them develop a framework with which to anchor their interests. I have also discussed the potential to have these students publish alongside me.

I am confident in my capacity to mentor and supervise Sacramento State Environmental Studies undergraduate students, and I look forward to engaging them in research and projects that can help them advance their skills as professionals and scholars.

Mentees in the Soil Lab

Undergraduate students gain soil research experience while working on a Master's thesis project.

Above Image: from L to R students Kristine Matos, myself, and Nall Moonilall mix 2:1 soil (collected from the FIU organic garden) and compost (made on-site using cafeteria food waste). The aggregated soil was air dried and weighed prior to potting for a greenhouse study.

Above Image: from L to R, Andrew Jungman and myself preparing soil samples for analysis of nutrient content using Olsen and Mehlich III procedures.

Mentees in the News

09/20/12--10:02: Student researches alternative way to grow plants 0 0

FIU Environmental Studies student Nall Moonilall would like to see food and plants grown in a more environmentally sustainable way, and he's doing something about it. Moonilall is a senior agroecology student conducting research into the use of new compost materials made from the waste of insects reared for various scientific [...]

11/14/11--07:08: Environmental Immersion Day 0 0

Students from Miami Springs High School visit FIU's organic garden and shade house as part of the Fairchild Tropical Botanic Garden Challenge Program's "Environmental Immersion Day" on Nov. 9. The Challenge Program engages local high school students in multi-disciplinary environmental science education and fieldwork to motivate them to pursue careers [...]

Mentee Conference Poster

E. Cicilio was an Agroecology Program undergraduate placed in an internship at University of Tennessee's Center for Renewable Energy. The poster I helped him develop (below) was presented at the 2012 Agroecology Symposium.

Implications of the genetic modification of switchgrass (*Panicum virgatum L.*) cell wall recalcitrants on plant stem toughness

Edy Cicilio[1], Ecici001@fiu.edu; David P. Harper [2], dharper4@utk.edu; Nikki Labbé [2], nlabbe@utk.edu

[1]Agroecology Program, Department of Earth and Environment, Florida International University [2] Center for Renewable Carbon, University of Tennessee

Introduction

Biomass conversion to biofuels by fermentation is a promising near-term technological option to reduce transportation greenhouse gas emissions. Current biomass fermentation processes have a relatively high cost due to the inherent recalcitrants (cellulose, hemicellulose, and lignin) found in biomass cell walls. To achieve sustainable energy production, it is necessary to overcome the chemical and structural properties of biomass that inhibit its conversion to biofuels.

Previous research, using a widely distributed "Alamo" switchgrass cultivar, shows that down-regulation of the caffeic acid 3-O-methyltransferase (COMT) gene in the lignin pathway, leads to the generation of transgenic plants with a normal growth phenotype, decreased lignin content, and increased ethanol production yield (Fu, 2011).

Modification of cell wall chemistry may have unintended benefits, such as requiring less energy for conversion to biofuels, and consequences, such as decreased hardiness in the field. To better understand this dilemma, 10 replicates (9 plants per replicate) of a transgenic Alamo variety (COMT 3) and 5 replicates (9 plants per replicate) of a comparable non-transgenic Alamo variety were studied. Two cross-sectional cuts were made at different nodal heights (Internode 2 and 4) on individual plants, these were then embedded into an epoxy mold in order to perform an impact test to measure plant physical properties.

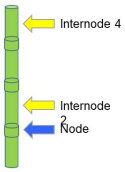


Figure 1. Switchgrass stem samples harvested from internodes 2 and 4.

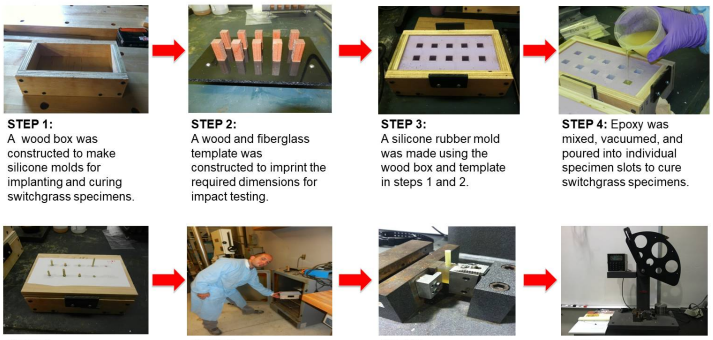
Event	Lignin (%)
COMT 3 (+) Transgenic	18.3
COMT 3 (-) Control	19.9

Table 1. Percent lignin before and after down-regulation of COMT gene in COMT 3 event.

Objectives

- This study aims to understand the effects genetic modification to reduce the lignin content in switchgrass (*Panicum virgatum L.*) plants has on the physical properties of the plants.
- Sample preparation methods were developed to ensure proper clamping of switchgrass specimens on pendulum-style impact tester without causing damage to stems.
- Analyze and compare plant physical properties (stem wall thickness, stem diameter, and breaking energy) of transgenic and non-transgenic switchgrass plants.

Materials and methods



STEP 1: A wood box was constructed to make silicone molds for implanting and curing switchgrass specimens.

STEP 2: A wood and fiberglass template was constructed to imprint the required dimensions for impact testing.

STEP 3: A silicone rubber mold was made using the wood box and template in steps 1 and 2.

STEP 4: Epoxy was mixed, vacuumed, and poured into individual specimen slots to cure switchgrass specimens.

STEP 5: A wood template was used to center specimens while curing.

STEP 6: Oven-dry 6 hrs. @ 45° C

STEP 7: Standard size epoxy clamping base on individual specimens.

STEP 8: Impact test performed on switchgrass specimens to measure breaking energy.

Results

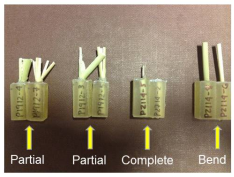


Figure 2. Observed specimen fractures.

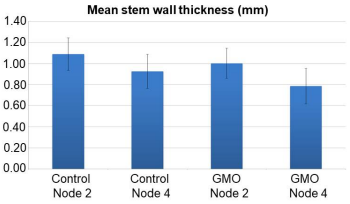


Figure 3. Mean stem wall thickness measurements for transgenic (node 2 and 4) and control (node 2 and 4) events.

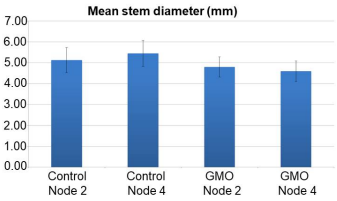


Figure 4. Mean stem diameter measurements for transgenic (node 2 and 4) and control (node 2 and 4) events.

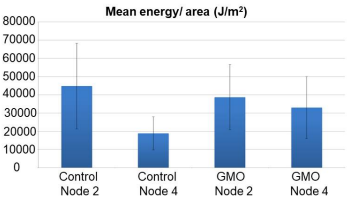


Figure 5. Mean breaking energy per area results for transgenic (node 2 and 4) and control (node 2 and 4) events.

Discussion

Figure 2. Observed specimen fractures
- Partial: 198
- Complete: 34
- Bend: 16
- Contamination: 22 (switchgrass specimens contaminated by epoxy through capillary action into the hollow stems, which affects breaking energy).

Figure 3. Mean stem wall thickness (mm)
- Genetic modification and node location both affect stem wall thickness.

Figure 4. Mean stem diameter (mm)
- Genetic modification affects stem diameter, node location did not.

Figure 5. Mean energy/ area (J/m²)
- Node location affects energy required to fracture specimen, genetic modification does not.

Conclusion

Better data quality is necessary for future applications to ensure accurate results and analysis. Individual switchgrass stems varied in diameter and height, which possibly affected the energy required to break the stems. Future testing must approximate uniformity in specimen diameter and height to prevent erroneous results. Developing measures to prevent epoxy resin contamination inside cell walls of plants is also critical to ensure accurate breaking energy measurements. Using other measuring methods for determining breaking energy can possibly increase the accuracy and validity of future studies.

Literature cited

Fu, C., Mielenz, J. R., Xiao, X., Ge, Y., Hamilton, C. Y., Rodriguez, J. M., et al. (2011). Genetic manipulation of lignin reduces recalcitrance and improves ethanol production from switchgrass. *PNAS* , *108* (9), 3803-3808.

Acknowledgments

I would like to express my sincere gratitude and deepest thanks to Dr. Mahadev Bhat, Dr. Krish Jayachandran, Dr. Kateel Shetty, and Mrs. Thelma Velez for their guidance, encouragement and patience during my studies. I would like to thank the CRC faculty, Dr. David P. Harper, Dr. Niki Labbé, and Dr. Stephen Chmely for their support, guidance, and friendship.

Funding for this project was provided by the USDA-NIFA- Hispanic Serving Institutions Grant 2011-38422-30804

If interested in any of the FIU Agroecology Program's scholarships or internships, please contact Dr. Bhat (bhatm@fiu.edu), Dr. Jayachandran (jayachan@fiu.edu), Stephany Alvarez-Ventura (scaalvar@fiu.edu).

Mentee Conference Poster

B. Tome was placed in an REU internship at University of Virginia's Bear Mountain Lake Research Station. He carried out research on foraging bees. The poster below was presented at the 2011 Agroecology Symposium.

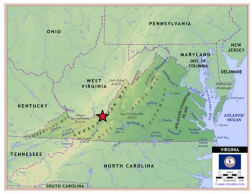
Foraging Patterns of Bees In and Around Mountain Lake Biological Station

Braian Tome (btome001@fiu.edu)

Agroecology Program, Department of Earth and Environment, Florida International University

Introduction

Insect pollinators have been declining in the past few decades due to habitat loss and fragmentation, and the increased use of synthetic pesticides and herbicides. The service these organisms provide is a key ecological process, which, if disrupted, has the potential to make food webs collapse from the bottom up. Native bee species, especially bumble bees (*Bombus spp.*), are of great importance in supporting this system. Blueberries (*Vaccinium* spp.) serve as a source of nectar and pollen for pollinators, food and habitat for mammals and birds, and a food crop for humans. It is of interest to determine the most important alternative floral resources used by blueberry pollinators throughout the season at high elevations in and around Mountain Lake Biological Station (MLBS), Giles County, Virginia.



Materials and Methods

- Observed different flowering shrubs during the month of June 2011
  - Warm days with temperatures at or above 17° C
- Observations lasted from 6 to 9 hours, between 7 am and 5 pm.
- Collected and/or noted bees that landed on flowers
- Bee specimens were then identified and correlated to their respective shrub

SHRUB OBSERVATIONS

Observation #	Plant Species	# of Plants	Date	Site	GPS Coordinates	Elevation (in m)	Observation Time
1	Lowbush Blueberry (*Vaccinium pallidum*)	1	6/1/2011	Hedrick Trail	N 37.27582, W 80.51841	1189	7 am - 4 pm
2	Minnebush (*Menziesia pilosa*)	1	6/4/2011	Judd Knob	N 37.2688, W 80.51821	1014	8 am - 4 pm
3	Common Blackberry (*Rubus allegheniensis*)	8	6/8/2011	Bear Cliff	N 37.27889, W 80.51884	1027	8 am - 5 pm
4	Flame Azalea (*Rhododendron calendulaceum*)	8	6/11/2011	Spring Road Trail	N 37.28600, W 80.51991	1187	9 am - 4 pm
5	Mountain Laurel (*Kalmia latifolia*)	2	6/16/2011	MLBS Lawn	N 37.27583, W 80.52112	1179	2:15 pm - 6:15 pm
6	Mountain Laurel (*Kalmia latifolia*)	2	6/17/2011	Crazy Rocks	N 37.27685, W 80.52152	1189	9:40 am - 11:40 am
7	Mountain Laurel (*Kalmia latifolia*)	2	6/20/2011	Hedrick Trail	N 37.27582, W 80.51841	1189	3:30 pm - 5:30 pm
8	Southern Mt. Cranberry (*Vaccinium erythrocarpum*)	6	6/30/2011	Judd Knob	N 37.26896, W 80.51818	1014	10 am - 1:30 pm
9	Swamp Azalea (*Rhododendron viscosum*)	3	6/29/2011	Moosehaw Dell Trail	N 37.27228, W 80.51861	1170	9:15 am - 3:15 pm
10	Great Rhododendron (*Rhododendron maximum*)	7	6/30/2011	War Spur Loop Trail Overlook	N 37.3892, W 80.50781 N 37.38324, W 80.48867	1073-1158	9:17 am - 4:17 pm

Blue Ridge blueberry (Lowbush) (*Vaccinium pallidum*)

Minnebush (*Menziesia pilosa*)

Common blackberry (*Rubus allegheniensis*)

Flame azalea (*Rhododendron calendulaceum*)

Mountain laurel (*Kalmia latifolia*)

Southern mountain cranberry (*Vaccinium erythrocarpum*)

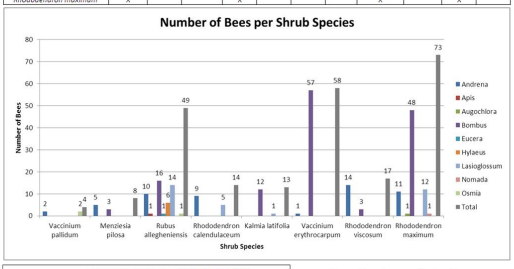
Swamp azalea (*Rhododendron viscosum*)

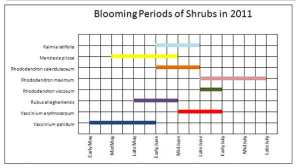
Great rhododendron (*Rhododendron maximum*)

Results

SHRUBS FORAGED ON BY BEES (2010, 2011, Literature)

Shrub Species	Bee Genus										
	Andrena	Apis	Augochlora	Bombus	Eucera	Halictus	Hylaeus	Lasioglossum	Megachile	Nomada	Osmia
Highbush Blueberry	X	X		X							
Lowbush Blueberry	X			X		X	X	X	X	X	X
Vaccinium corymbosum	X			X							
Vaccinium pallidum	X			X							X
Gaylussacia baccata	X			X				X		X	X
Menziesia pilosa	X			X							
Rubus allegheniensis	X	X		X	X		X	X			X
Rhododendron calendulaceum	X							X			
Kalmia latifolia	X			X				X	X	X	
Vaccinium erythrocarpum	X			X		X		X			
Rhododendron viscosum	X			X							
Rhododendron maximum	X			X				X		X	





- The plant species that attracted the highest diversity of bees were *Rhododendron maximum* and *Rubus allegheniensis*, probably due to their generalist flowers

- Bees foraging on shrubs (from highest to lowest number of individuals): *Bombus, Andrena, Lasioglossum, Hylaeus, Osmia, Apis, Augochlora, Eucera*, and *Nomada* (the last four had the same number of individuals)
- Shrubs visited by bees (from highest to lowest visitation rate): *Rhododendron maximum, Vaccinium erythrocarpum, Rubus allegheniensis, Rhododendron viscosum, Rhododendron calenduleaceum, Kalmia latifolia, Menziesia pilosa*, and *Vaccinium pallidum*

Importance of Study

- Conservation of forest resources and wildlife
  - Continuous floral resource ensures pollen and nectar for pollinators = food for wildlife
  - Native plants, especially perennial shrubs, may lead to increased provision of ecosystem services in natural areas.
- Reintegration of such plants into suburban and rural areas:
  - In private home properties, roadsides, stream corridors, woodlots, utility rights of way, and wetlands
  - Expand the habitat and foraging range of native bees
  - Native plant producers benefit economically
- Sustainable development of blueberry farms
  - Shrubs from study, along with other native trees and shrubs, can be planted in hedgerows.
    - Provide bees with nesting sites and food sources close to cultivated blueberries through the season
      - May lead to higher fruit production
    - Attract beneficial insects, such as pest predators
    - Natural habitat corridor for wildlife
  - Common blackberry and southern mountain cranberry
    - Can be cultivated for medicinal and food purposes

Acknowledgments

This research was conducted at Mountain Lake Biological Station, University of Virginia, and was funded by the MLBS REU-Sites program, which is supported by the National Science Foundation under Grant Number DBI-0453380. I thank Barbara J. Abraham for her mentoring and assistance in bee identification, Cedric N. Shamley, Jr. and Landon Collins for their assistance and company in the observation process, Zack E. Murrell for his assistance in plant identification and guidance, Vincent A. Formica for his assistance in the statistical analysis, Henry M. Wilbur for his botanical knowledge and guidance, Becky Wilbur for her botanical knowledge, Eric S. Nagy and Edmund D. Brodie III for their guidance, and Dr. Mahadev Bhat, Dr. Krish Jayachandran, Thelma Velez , and the USDA for all their help and support.

RESEARCH EXPERIENCE

Research Statement

My research over the past ten years has focused on various aspects of food system sustainability and creative solutions to socio-environmental challenges. Throughout my M.S. in Environmental Studies program, I concentrated on the science and practice of agroecology to develop solutions to resource degradation and climate change. Specifically, my research projects included: water conservation through rain-fed irrigation, integrated pest management techniques, and climate change mitigation through application of biochar. For my Master's thesis I designed a study using *Melaleuca quinquenervia,* an invasive tree species in the Everglades, to develop a designer biochar product that could sequester carbon in agricultural soils. I also tested this biochar product at different rates in an agronomic study with *Phaseolus vulgaris* L. (bush bean) to determine the effect on plant and soil nutrient content and crop growth. My findings showed the biochar was highly effective at sequestering carbon and methane in the tested soils. However, increased application rates also had negative effects on crop production, including decreased crop yield and even plant mortality. My research received media attention from the Soil Science Society of America and was published in the *Journal of Environmental Quality*.

Fascinating as my thesis research was, I knew there were missing components to the sustainability challenges I sought to address. Though production and consumption of food and natural resources is clearly linked to environmental degradation, these processes are also less visibly tied to political and social structures which have become increasingly concentrated in power. This is particularly relevant for agroecology, which extends beyond science and practice, and is rooted in a world-wide movement for ecological sustainability, food sovereignty, and farmer justice. I incorporate this perspective in my doctoral research by examining the socio-economic and political drivers of food-system failures and injustices, as well as, grassroots and community-based solutions for sustainable food systems. For my dissertation entitled, *A Just Recovery: Agroecology and Climate Justice in Puerto Rico post-Hurricane Maria,* I researched agroecology on the island as a means to promote climate resilience and adaptation in the face of growing natural disasters and a deficient government support system.

My research has been funded by the National Science Foundation (2016-2019) and the Society for the Study of Social Problems (2019-2020). To carry out this study I used a mixed-methods approach including: in-depth interviews, community-based participatory methods, surveys, and digital content and media analysis, which I coded and analyzed in MAXQDA. In 2019, I volunteered on agroecological farms throughout Puerto Rico, participated in brigades rebuilding farms, and connected with various organizations promoting the expansion of agroecology across the island. My research findings identify agroecology and micro-grid expansion as integral components to climate resilience and adaptation. I also expose deficiencies in the federal government's disaster response and historical policies which contribute to the archipelago's failing food-system and weaknesses in climate-disaster preparedness. The first publication from this study is currently under review in the journal, *Capitalism, Nature, Socialism*. I have also published on the ethics of conducting agroecology research with vulnerable, frontline communities in a disaster zone in the *Journal of Latin American Geography*. Additionally, I have disseminated my findings through presentations at the American Environmental Studies Society, the Association of American Geographers, the American Sociological Association, and the Society for the Study of Social Problems.

Research Statement

Additional research projects I have pursued while at Ohio State include two urban agriculture case studies, as well as, collaborative research projects promoting regional food system sustainability. I have a sole-authored book chapter in *The Palgrave Handbook on Sustainability* on small-scale, sustainable agriculture in Broward, Florida. I also have a co-authored publication in the book, *Cities around the World: Struggles and Solutions for Urban Life* on edible urban greening initiatives in Rotterdam. Additionally, I am a member the *One Linden Cooperative*, a group of interdisciplinary OSU researchers and community members working to develop a food hub in a neglected area of Columbus. We have raised over $78,000 and are working with Nationwide Children's Hospital and anchor institutions to acquire matching funds. I am first-author on the forthcoming paper, entitled, *Empowering the Community through the Linden Worker- Owned Food Hub*, which has been selected for publication in the second edition of the book, *Cultivating Food Justice,* edited by Dr. Julian Agyeman and Dr. Alison Alkon.

Moving forward, there are several threads of research and scholarship I am interested in pursuing which extend my thesis and dissertation work. For example, in Puerto Rico, I worked with Ian Pagán-Roig, agronomist and manager of the leading agroecology field school, Proyecto Agroecológico El Josco Bravo. El Josco Bravo has been pioneering a combination of hands-on and classroom agroecology training on the island since 2015. Ian and I have discussed research collaborations including: 1. using network analysis to evaluate the school's impact on the emerging agroecology movement in Puerto Rico, 2. publishing El Josco Bravo's initiatives in the *Journal of Agriculture, Food Systems, and Community Development*, and 3. documenting integrated pest management and agricultural biodiversity strategies being employed in tropical regions. I would be delighted to lead undergraduate students in conducting research in Puerto Rico as well. In another thread of research, I seek to work with sustainable and urban agriculture projects and local food movement organizations near my future institution. As a farm-to-fork leader, Sacramento provides a model for researching the complexity of regional food-system sustainability and conducting comparative analyses to other regions in the U.S.

Finally, I am preparing to apply for the USDA National Institutes and Food and Agriculture (NIFA) Higher Education Challenge Grant. The purpose of this grant is to enable universities to provide sustainability education capable of strengthening the nation's food and agricultural workforce, both scientific and professional. Grants of this nature have the potential to strengthen departments by creating funding for undergraduate student research and professional development related to agriculture and sustainable food systems. My previous mentors, the co-directors of the FIU Agroecology Program, have offered their guidance to help me secure the grant. Given my expertise in agroecology (as a science, practice, and movement), I feel well positioned to advise undergraduate students in environmental and agriculture-related research and learning that transcends disciplinary boundaries. I see this as a great opportunity to provide students with tools they need to succeed in their careers, while also contributing to the growth and development of my academic department.

Research Activity at

Florida International University

FIU Research Activity, Biofuels Research in India

A team of ten researchers, including Agroecology Co-Directors, Dr. Mahadev Bhat and Dr. Krishnaswamy Jayachandran (Jay), and 8 undergraduate students travelled throughout India for eight weeks, July-August 2010. We collaborated with researchers at the University of Agricultural Science, Bangalore and Tamil Nadu Agricultural University in Coimbatore on various research projects related to the production and dissemination of second generation biofuels. Each team member worked on grafting and planting biofuel trees, learning how to process and transesterify biodiesel, and we travelled to several rural villages and met with *panchayat* (village council) leaders to discuss implementation of a nationally-funded biofuel program. I was also tapped to be the spokesperson for FIU at two media press releases in Bangaluru. After returning Dr. Bhat, Dr. Jay, myself, and several students collaborated to produce reports and conference posters, we hosted an International Biofuel Symposium with scholars from several countries, and installed a biofuel demonstration area under my supervision at the FIU Organic Garden. We also signed a Memorandum of Understanding with both institutions the following year. This research was funded by USDA's NIFA International Science and Education Grants Program (2008-51160-04356).

FIU Research Activity, India Biofuel Co-authored Poster

Connecting Borders through Biofuels

Collaborations between FIU and Indian Agricultural Universities and Agencies

Mahadev Bhat, Krish Jayachandran, Stephany Alvarez-Ventura, and Thelma Velez
Florida International University, Miami, USA

UAS, Bangalore hosts Florida Intn'l Univ (FIU)

The Visit: UASB hosted FIU students and faculty for a two week intense biofuel education course in July-August 2010 .

Students without borders: FIU students conducted field studies in the Biofuel Park, Hassan, Karnataka and University of Agricultural Sciences, Bangalore (UASB), receiving hands-on training on biofuel production. They met with local villagers, industry leaders and UASB research to understand grass-root biofuel movement in India. Students participated in tree planting in rural Hassan, along with local school children, and shared each one's knowledge about agriculture and education.

The Partnership: In Bangalore, a ceremony was held to sign a Memorandum of Understanding between the two universities. Dr. Narayanaswamy, Vice Chancellor of UASB, signing the MOU, set the stage for future collaborative research and educational exchange visits. Later, Dr. Gowda and Dr. H. Prasanna of UASB later visited FIU as panel speakers for the 2011 Agroecology Symposium. Daria Stepien and Andrew Jungman, FIU students, both conducted their thesis research in USAB.

TNAU, Coimbatore hosts Florida Intn'l Univ (FIU)

The Visit: TNAU hosted FIU students and faculty for a three day power packed workshop on various aspects of biofuel production.

Taking a closer look: FIU Students spent three days at Tamil Nadu Agri Univ, Coimbatore (TNAU). Students attended diverse lectures on Jatropha research, such as bioengineering and seed analysis, for biofuel development. Students also visited the university's research facilities and plantations, and learned about scientific advances in Jatropha production, fuel conversion and distribution questions.

The Partnership: In Miami, the two university heads, TNAU Vice Chancellor Dr. P. Murugesa Boopathi and FIU provost Douglas Wartzok, gathered to sign a Memorandum of Understanding between the two universities. Each agreed to partner together to host future visits and research opportunities.

Plans for collaborative research works are in the works.

FIU and Karnataka Biofuels Development Board (KBDB)

The Visit: In July 2010, FIU students met with Mr. Y.B. Ramakrishna, Chairman of KBDB, to learn about the government programs on biofuels in India and Karnataka.

Expanding the horizon: FIU students learned more than biofuels during the visits to local villages that work with KBDB, gaining insight and respect for the organizational structure among the villages. FIU students later had a tour of a village farm on a mixture of agroforestry and experimental biofuel fields.

The Partnership: Mr. Y.B Ramakrishna also present during the MOU signing in USAB and agreed to share his knowledge and support for adoption of a sustainable biofuel program.

The Results: Mr. Y. B Ramakrishna and Mr. A. Monnappa, Managing Director of KBDB, recently visited FIU to explore future research and educational collaborations on biofuel development.

Reflections from Students

"The highlight would have to be when we went to the villages in Hassan and were able to talk to the laypeople that participate in this initiative towards a brighter future. We learned what their day was like, what conditions they lived in, what their fears and hopes were and so much more."

Cristina Garcia, a sophomore in Middle Eastern Studies

"Most of all, I was inspired by their unwavering desire to build India up from the grassroots level; in some ways, it gave all of us hope again that change and improvement on behalf of the people is still possible."

Allie Zangari, BS in Environmental Studies:

"Being immersed in a foreign culture to work with an array of individuals, ranging from professionals to local villagers and farmers, has really been a blessing. I feel I have learned immensely from this experience and am eager to share this knowledge with others."

Thelma Velez, masters in Environmental Studies

"I'm grateful for this partnership that has fostered not only my research in biofuels, but also my international experience"

Andrew Jungman , masters in Environmental Studies

Benefits of the Collaboration

This collaboration enables both Indian and the US universities and agencies to build stronger research and educational partnerships. With the US biofuel production on the rise, a mandate was given to increase renewable transportation fuel to 36 billion gallons per year by 2022. The current production relies heavily on corn-based ethanol. Monoculture of corn or soybean for ethanol production may not be sustainable in the long-term. The community-based biofuel production in India can serve as a model for creating incentives in the rural, private sector of the U.S. Similarly, the recent biofuel technological advancements in the US may be of value to India. With the help of these partnerships, FIU, UASB, TNAU and KBDB will strive to find practical biofuel solutions that are *Worlds Ahead*.

Acknowledgments

Agroecology Program at Florida International University

We thank the Biofuel Park, UAS & TNAU's professors and staff for their time, knowledge, and hospitality during the biofuels course. We also thank the different institutions for their collaboration efforts and support.

2010 International Scholarship for Biofuel Studies
Florida International University
Agroecology Program
Funds were made possible by USDA's NIFA International Science and Education Grants Program (2008-51160-04356).
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FIU Research Activity, Sole-authored Biofuel Poster

The Biofuels Push:
Land Management Strategies for Sustainable Community Development

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Introduction

Roughly one third the size of the United States, India holds at least 15% of the world's population (USDS.) India's domestic crude oil can only account for 23% of the nation's demand, while the rest must be imported (National Policy on Biofuels.) Realizing oil imports have reached record highs, the Government of India has adopted a plan aimed at buffering environmental impacts, decreasing rural poverty, and increasing national security. The National Policy on Biofuels encourages rural farmers to grow non-edible oil seed crops on marginal, waste, or degraded land for the production of biodiesel. The creation of financial incentives for research and development has led to the implementation of unique land management strategies in Karnataka, India.

Objective

To research and assess the land management strategies that are being employed at the village and community level in Karnataka, India and gauge how effective outreach programs are for sustainable community development.

Questions:

- Who are the primary stakeholders in the land management schemes?
- What biodiesel programs have been implemented to strengthen sustainable development in rural communities?
- What is the level of community involvement in management?

Methodology

Library research was conducted to gain familiarity with India's organizational structure, the National Policy on Biofuels, and stakeholders in biodiesel development.

Between July and August, 2010, I traveled to India to conduct semi-structured interviews with scientists and professionals from the University of Agricultural Sciences, Bangalore (UASB), the Karnataka Taskforce on Biofuels (KTB), and the Biofuel Park stationed in Hassan.

Image 1. Professionals meeting at UAS, Bangalore Including: Y.B. Ramakrishna, M. Bhat, B. Gowda, K.T. Prasanna

Through the Biofuel Park, I was connected to three rural villages involved in biodiesel programs, Gunjevu, Kinnera Halli, and Nettekere. At each village, I conducted semi-structured interviews with elders and panchayat leaders.

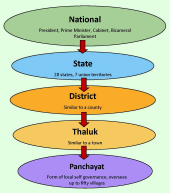
Image 2. Gunjevu Village

Image 3. Kinnera Halli Village

Image 4. Nettekere Village

Data Findings

Figure 1. Organizational Structure National to Village level



Example: Karnataka State has thirty districts. The district of Hassan has eight thaluks, 255 panchayats, and 2584 villages. Each panchayat is comprised of ten to fifteen villages.

Chart 1. India Land Use

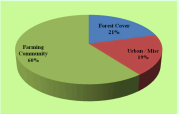


Figure 2. Hassan Progress

Table 1. Primary Stakeholders and Roles

University of Agricultural Sciences, Bangalore
-Director- Dr. Balakrishna Gowda
Role: R&D; demonstration plots; host local fairs for growers to gain knowledge of the plants and share experiences.

The Karnataka Taskforce for Biofuels
-Director – Sri Y.B. Ramakrishna
Role: Advise government; work with local villages and NGO's to implement programs, ex: Hasiru Honnu and Baradu Bangara.

Biofuels Park in Hassan
-Co-Director – A.C. Girish
Role: Research on production and processing; community outreach and education; propagation of biodiesel trees fro donation to villages.

3 Villages:
- Gunjevu - Kinnera Halli - Nettekere -
Role: Pilot programs and relay issues; manage land; cultivation and collection of seeds; form organizational leadership, co-op networks, and self help groups (SHG.)

Table 2. Local Management Mechanism

Councils- each village forms a council to oversee biofuels projects; it is always recommended by the Biofuels Park that participation be gender split, most have at least 30% women.

Co-ops- several households and villages band together to increase seed collection to increase profits. 335 seed growers co-ops to date.

SHGs- village support groups, usually comprised of mostly women seeking to be more independent.

Table 3. Village Brief

Gunjevu
Adult population > 700, 2,000 including children. 1800 acres of government forest land, 800 acres accessible. Council 30% female. There is access to water and grid power is available for up to four hours per day.

Kinnera Halli
80 households with 350 acres of farmland, 10 acres wasteland. Council consists of 5 female, 5 male. Access to water exists and children attend a local school.

Nettekere
Under thirty households~ 110 people including children. Council consists of 5 female, 5 male. They were relocated by Government due to the building of a dam. Used to own 450 acres, now only have 4 acres. Access to water > 1km walk.

Table 4. Land Management and Cultivation Schemes

"Hasiru Honnu Programme" - Kinnera Halli and Nettekere
- Extensive informational campaigns and training programs.
- >2,039 villages in Hassan covered for data inventory (Ramakrishna.)
- >930 meetings and training programs with over 40,500 farmers and interested parties (Girish.)
- Biofuels plants are donated to rural areas by Biofuels Park.
- Mahatma Gandhi Rural Employment Guarantee Act (MGREGA) - farmers are paid 25 RS. per plant and maintenance expenses for three years (KTB Pamphlet.)

"Baradu Bangara Scheme" – Gunjevu
- Establishes joint forest management (JFM) with Village Forest Communities (VFC.)
- VFC - forest land is leased to locals with rights to harvest and graze cattle.
- JFM also engages community in afforestation measures.
- Biodiesel trees are donated by Biofuels Park
- 90% profit from seed sales goes to VFC
- 10% profit facilitating government agency.

Figure 3. The Success Triangle

Substance
Scientific knowledge and data analysis
UAS,Bangalore, Biofuels Park

Process
Administration and policy decisions
KTB, panchayats, councils

Relationships
Networks and connections at all levels
Local: Outreach teams, co-ops, SHG's
Higher up: Y.B.Ramakrishna, B.Gowda

Adapted from Meffe 2002

Conclusions

Sustainable community development can be looked at from several standpoints: economic, social, and ecologic. Adaptive management requires collaboration from institutions and individuals from the national to village level. The Hasiru Honnu and Baradu Bangara programs engage various stakeholders in biodiesel production. By closing the loop between policy makers, scientific researchers, and rural villages, these land management strategies increase the chance of success for India's National Policy on Biofuels.

U.S. Applications

US biofuel production is on the rise given a mandate to increase renewable transportation fuel to 36 billion gallons per year by 2022. The current production of ethanol from corn cannot satisfy this demand sustainably. Large conversions of lands for biofuel production is not a panacea. The land management schemes in Karnataka, India can serve as a model for creating incentives in the rural, private sector of the US. Further studies to gauge the feasibility of cooperative management among rural farmers on fallow or barren land should be conducted.

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Acknowledgments

I would like to thank Dr. Mahadev Bhat and Dr. Krishnaswamy Jayachandran for making this opportunity available to me, Dr. Balakrishna Gowda for investing the time to educate me on recent biodiesel developments and Dr. A.C. Girish for taking me to each village and providing direct contact. I would also like to thank all of the scientists and community leaders that provided their knowledge and expertise.

Funding for this project was provided by the USDA NIFA International Science and Education Grants Program # 2008-51160-04356.

If you are interested in finding out more about FIU's Agroecology Program, scholarships, or internships, please contact Dr. Bhat (bhatm@fiu.edu) or Dr. Jayachandran (jayachan@fiu.edu)

USDA Agroecology Program at Florida International University

FIU Research Activity, Rain Water Harvesting

Recognizing the demand for freshwater withdrawal in agricultural production, I conducted research on the potential to use rainwater harvesting at the FIU Organic Garden. For this project, I developed and installed a rain catchment system for the FIU Organic Garden to reduce water withdrawals for irrigation. This project entailed collaboration with Barbara McAdam from the University of Florida Institute for Food and Agricultural Sciences Extension in Miami-Dade County. Funding for this project was provided by the USDA's NIFA Higher Education Grant (2008-38422-19209).

Resource Conservation through Rain Water Catchment

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Introduction

As the demand to feed an exponentially growing population increases, so will the need for freshwater. Expanding conservation techniques, such as rainwater harvesting and water storage, is a necessary measure towards alleviating this dilemma.

Currently, almost 70% of global freshwater withdrawals are connected to agricultural irrigation (IPCC 2007.) Miami-Dade County withdraws more fresh groundwater than any other Florida county; the majority of it goes to agricultural lands (IFAS 2010.)

Florida receives an average annual rainfall of 54 inches and only 5% is captured (FDEP 2011.) The majority of water runoff is re-directed into the ocean, resulting in a serious disbalance in estuaries and a waste of usable fresh water.

At Florida International University (FIU), students and faculty grow seasonal crops in the Organic Garden. Sustainability is a primary goal of the Organic Garden and developing strategies for water conservation is a top priority. Currently, water is sourced from a well and pumped out through a drip irrigation system to most plots.

Objectives

To research rain water catchment techniques as a means of natural resource conservation.

To develop and establish a rain water harvesting system at the FIU Organic Garden, where feasible, for sustainable irrigation of crops.

Methodology

Planning

1. Attend Miami-Dade County Cooperative Extension Service workshop on rain-water harvesting.
2. Measure the plots at the FIU Organic Garden and determine how much water should be collected and stored for irrigation.
3. Establish a feasible plan within the budget of $1,000.

Engineering

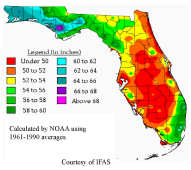
1. Create a non-porous surface for the collection of rain water.
2. Install a stable backing for a gutter system to direct collected water to rain barrels.
3. Develop an overflow system for the barrels.

Maintenance

1. Establish a plan for upkeep and repairs.

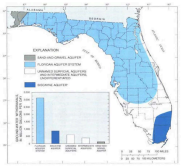
Findings

Florida Annual Average Precipitation

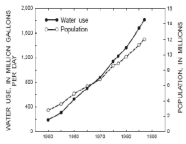


Courtesy of IFAS

Florida Groundwater Withdrawal



Florida Water Use and Population



A) Garden Needs (not including Orchard):
- Garden cropping area ~ 1300 square feet
- Requires ~ 300 gallons/week in dry season
- 1 inch of rain on 1000 feet of non-porous surface area yields ~ 600 gallons of water
- 7 rain barrels, 60 gallons = 420 gallons storage

B) Materials and Cost:
- Workshop $40
- (7) HDPE 60 gallon barrels with spigots $315
- (3) 20' aluminum gutter $ 40
- (3) 7" gutter screws pack $100
- (20) cinder blocks $30
- Miscellaneous: washers, screws, overflow attachments, couplings, screens, gorilla tape, silicone, cable ties $250
- 60' wood backing for gutters - Donation
- (3) 20' x 7' UV resistant tarpaulin - Donation

C) Creating a Surface Area
- Connect the length of one side of the shade house to the parallel fence: (Image 1)
  - Shade house length 56', height 12'
  - Fence length 64', height 6'
- Establish a secure backing for gutters along fence.
- Attach and overlap three tarps, each 20' x7' (Image 2, 3, 4)
- Resulting surface area 55' x ~ 6'4"- 6'8" (approximately 360 square feet.)
- One inch of rain on this surface collects over 210 gallons of water.

Images Left to Right: attaching tarp 1 to top of shade house, overlapping tarps, gutter screws and tarp attachment, reinforced grommet with washer, testing a barrel,

Images Left to Right: overflow connection, three barrels arranged for overflow, same barrels outside view, completed catchment structure, harvested water.

Issues and Suggestions

After several tears and repairs, it is apparent that there is a need to create a stronger non porous surface. Currently, the need for repairs has kept the tarps rolled up for several months. Money has to be set aside for future repairs.

Investment in S-hooks should follow; this will make connecting the tarp to the top of the shade house less tedious and time consuming.

In the future, water storage containers need to be connected to the drip irrigation system using a pump. and more water needs to be collected for orchard.

It would be great to have water collection units installed on all of the buildings at FIU. This water could potentially be used by facilities management to irrigate landscape, flush toilets, or even clean.

Conclusion

The need to conserve water is on the rise as climate change leads to unknown variability in precipitation and water tables. Implementing simple rain water harvesting systems may not completely eliminate the need for water withdrawals, but it significantly reduces water stress. Furthermore, by implementing water collection, issues related to runoff, leaching, and water diversion are minimized.

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Acknowledgments

I would like to thank Dr. Mahadev Bhat and Dr. Krishnaswamy Jayachandran for their generous support, the USDA for the funding of this project NIFA HSI grant (2008-38422-19209), Barbara McAdam from the Extension Service for helping me develop a plan and obtain barrels, Diego Hurtado for supporting my ideas. I am indebted to Miguel Campo and Eric Sotolongo for lending me a hand during installation, rain or shine.
If you are interested in finding out more about FIU's Agroecology Program, scholarships, or internships, please contact Dr. Bhat (bhatm@fiu.edu) or Dr. Jayachandran (jayachan@fiu.edu)

Agroecology Program at Florida International University

FIU Research Activity, Agroecology Program Assessment

Executing a successful agricultural science program at an urban university poses significant challenges, especially given that FIU lacks land-grant status. This poster presented at the North American Colleges and Teacher in Agriculture (NACTA) 2011 Conference in Alberta, CAN provides an evaluation of the FIU Agroecology Program's co-curricular education strategies. This assessment entailed disseminating a survey instrument to all past and current participants of the program, including undergraduate students and high school teachers in Miami-Dade county to evaluate the effectiveness of the program's use of out-of-classroom experiences, internships, and career development opportunities. This study was designed by Dr. Bhat and Dr. Jay.

The Role of Co-curricular Education in Enhancing Agricultural Science Programs in Urban Universities

Thelma I. Velez, Mahadev Bhat, and Krishnaswamy Jayachandran
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Introduction

Urban public universities are increasingly finding a need to offer agricultural science education to urban-mised students. These universities may not have the financial resources to provide extensive in-class curriculum. The Agroecology Program at Florida International University (FIU) has attempted to overcome this shortfall by engaging students in out-of-class learning activities. Melodia and Scherske (2000) demonstrate that programs offering "contextual learning, which requires relationships outside of the classroom [to] provide students with an array of agricultural internships, career development opportunities, leadership experiences, and the like" can lead to greater success. Co-curricular activities in FIU's Agroecology Program include: a student-run Organic Garden Club, weekly Farmers' Market participation, workshops and symposiums, fieldtrips to local organic farms, and community engagement internships.

Objective:
This study serves as a quantitative and qualitative assessment of the performance of the FIU Agroecology Program's co-curricular education.

Methodology

A survey instrument was distributed to past and current participants. Respondents were asked to gauge the effectiveness of the program using a four point Likert scale (3=strongly agree; 0=strongly disagree) in terms of two categories:

(a) educational and professional learning outcomes (9 variables)
(b) overall program's impacts (4 variables)

The original sample comprised students, high school teachers, collaborators, and faculty.
A sub sample of only students (n=29) was selected for this analysis.

Organic Garden Club Meeting
Organic Garden Workday
FIU Farmers Market
2010 MAMRO Conference

Results

Educational and Professional Learning Outcome Measures

Overall Program Goals and Impacts

Overall Averages (Excluding Not Relevant)

Cross-tabulation of Involvement and Learning Outcomes

Engaged in six or more co-curricular activities:
No (n=15) Yes (n=14)

KEY POINTS

> **96% of the respondents felt the program:**
a) Increased Knowledge on Sustainable Agriculture
b)Increased Knowledge on Agricultural Biodiversity
c) Provided Educational and Professional Opportunities

61% of the respondents felt the program:
- Improved Leadership skills

100% engaged in six or more co-curricular activities strongly agreed they gained hands on experience managing agricultural resources, compared to < **67%** of those who were not as involved.

> **92%** engaged in six or more co-curricular activities felt communication skills improved. In the less involved group, > **26 %** disagreed.

Discussion

The results show the Agroecology Program at FIU has been successful in helping students gain significant knowledge on the subject matter, while also fostering social and professional interactions. All of the respondents felt this program increased collaboration between multiple institutions and created an important agricultural educational opportunity in South Florida. Urban universities, such as FIU, can still offer substantial agricultural education by utilizing co-curricular activities that extend into the local community and cross the boundaries of several institutions. Of the thirteen outcome measures, leadership and communication skills received the lowest ratings. Further research into how the program can tap into these personal skills is needed, however, it is crucial to note that greater involvement led to overall better feelings on the programs' educational goals. Cross-tabulations show that greater involvement in co-curricular activities provided students with more experiential learning opportunities, such as, crop production and resource management, as well as increased analytical and communication skills. The Agroecology Program at Florida International University can be used as a model for other urban universities.

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Acknowledgments

I would like to thank the USDA for giving me the opportunity to pursue a M.S. in Environmental Studies at Florida International University. Dr. Mahadev Bhat and Dr. Krishnaswamy Jayachandran have both been an integral part of my educational career at FIU, Thank You. Funding for this project was provided by the USDA NIFA Hispanic Serving Institutions Higher Education Grant # 2008-38422-19209.

For Further Information
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USDA Agroecology Program at Florida International University

FIU Research Activity, Ecological Restoration FIU Nature Preserve

The FIU Nature Preserve is a 14-acre environmental education facility, representative of three ecosystems found in the Florida Everglades, including hardwood hammock habitat, a wetland dominated by bald cypress and pond apple, and the critically endangered, and endemic, Pine Rockland ecosystem. An urban ecology oasis, it has been used as an outdoor classroom, a research facility, and recreation space since 1978. As a leader of volunteer workdays from 2009 through 2014, I have supervised several thousand student and community volunteers at the FIU Nature Preserve in urban ecological restoration projects. This includes invasive species removal, re-introduction of extirpated species, and coordination of prescribed burns in the pine rockland area.

FIU Research Activity, Master's Thesis Project

Publication:

Vélez, Thelma, Moonilall, N., Reed, S., Scinto L. J., Jayachandran, K. 2018. Impact of *Melaleuca quinquenervia* biochar on *Phaseolus vulgaris* L. growth, soil nutrients, and microbial gas flux. Journal of Environmental Quality, 47(6), 1487-1495.

Abstract:

Biochar has been heralded for improving soil quality, sequestering C, and converting organic residues into value-added amendments. Biochar research in agricultural settings has been primarily conducted on acidic soils, with few studies evaluating biochar effects on alkaline soils. Given the rise of small-scale, sustainable farmers experimenting with biochar in South Florida's alkaline, carbonaceous soil, this study sought to assess biochar use in South Florida using an invasive plant species as a feedstock. *Melaleuca quinquenervia* (Cav.) S.T. Blake biomass was converted into biochar to measure how application at two rates, 2 and 5% (w/w), affects plant growth, soil macro- and micronutrients, and microbial gas flux (CO_2) in a potted greenhouse experiment using *Phaseolus vulgaris* L. Plant growth was inhibited with biochar addition at the 2 and 5% rates. Dry shoot, pod weight, and pod length decreased significantly between treatments ($P < 0.001$). Significant reductions in plant-available P, Ca, Mg, Cu, and Zn were observed in the 5% biochar soil postharvest ($P < 0.05$). Compared with the control, addition of biochar at 2 and 5% rates significantly reduced CO_2 flux during the growing season, but not at harvest ($P < 0.01$). Our results indicate that those considering biochar application in South Florida's alkaline soil should be cautious in selecting feedstock and temperature for biochar production. Biochar can be produced at lower temperatures to decrease pH, but the concomitant increase in volatile matter (VM) is of concern. Although CO_2 flux may have decreased, the deleterious impacts of *M. quinquenervia* biochar (pH = 8.12, VM = 26.5%) on *P. vulgaris* production should not be dismissed.

Table 2. Mean dry weight, pod count, and pod length for *Phaseolus vulgaris* grown in 0, 2, and 5% biochar (BC)-amended soil.

Treatment	Shoot dry weight	Pod dry weight	Pod count	Pod length
	g			mm
Control	8.21a†	4.25a	7.75	110.8a
2% BC	4.24b	0.78b	11.5	48.9b
5% BC	4.09b	0.54b	5.25	53.3b

† Means within a column followed by a different letter are significantly different at $p \leq 0.001$.

Table 4. Elemental content and pH of soil and biochar (BC)-amended soil postharvest for *Phaseolus vulgaris*.

Media	Extractable P	K	Na	Ca	Mg	Fe	Cu	Zn	Mn	pH
	mg kg^{-1}									
Control	285.94a†	145.35	282.45	3537.99a	177.04a	45.07	0.87a	8.55a	3.98	8.04a
2% BC	225.93b	176.01	274.16	3264.46a	161.73b	44.64	0.83a	7.78a	4.15	8.15b
5% BC	180.14b	183.82	284.28	2509.97b	133.06c	36.12	0.70b	6.57b	3.45	8.18c

† Means within a column followed by a different letter are significantly different at $p \leq 0.05$.

Research Activity at
The Ohio State University

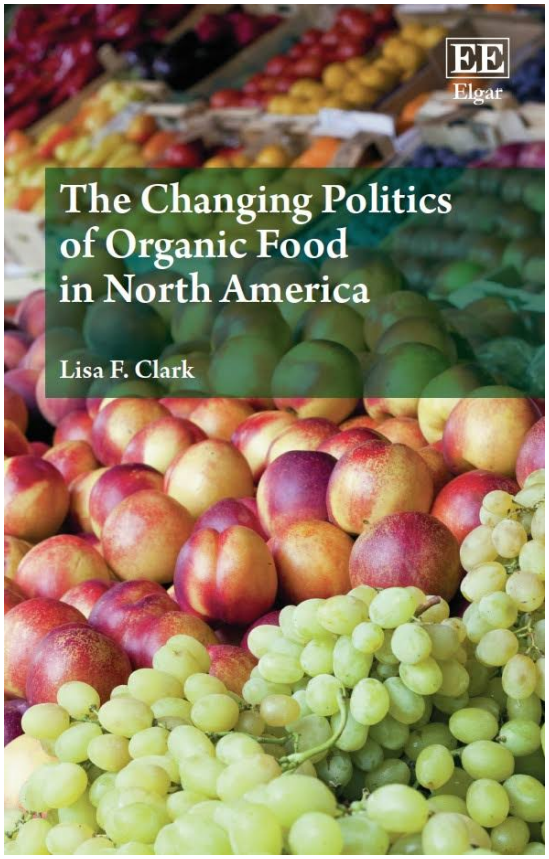
OSU Research Activity, Politics of Organic Food

Book Review:

Vélez, Thelma. 2017. Lisa F. Clark: The changing politics of organic food in North America. Agriculture and Human Values, 34 (3), 781-782.

Summary:

In The changing politics of organic food in North America, Lisa F. Clark provides a detailed account of the evolution of perspectives, practices, and definitions of organic agriculture in the United States and Canada, and the consequence of such changes for organic commodities. In the first three chapters of the book, she delves into the implications of the transition of organic principles from a process-based practice to a product-based definition. She attempts to persuade the reader that the root of the organic movement has been essentially lost through the institutionalization and mainstreaming of organic food. The book is timely as organic food purchasing continues to grow, even though studies reveal many people have difficulty understanding what organic truly means. Through this account, Clark argues organic food today means something very different than what it meant to pioneers of the movement in the 1960s and 1970s. She then explores how this shift came to be and what it means for the future of organic food.



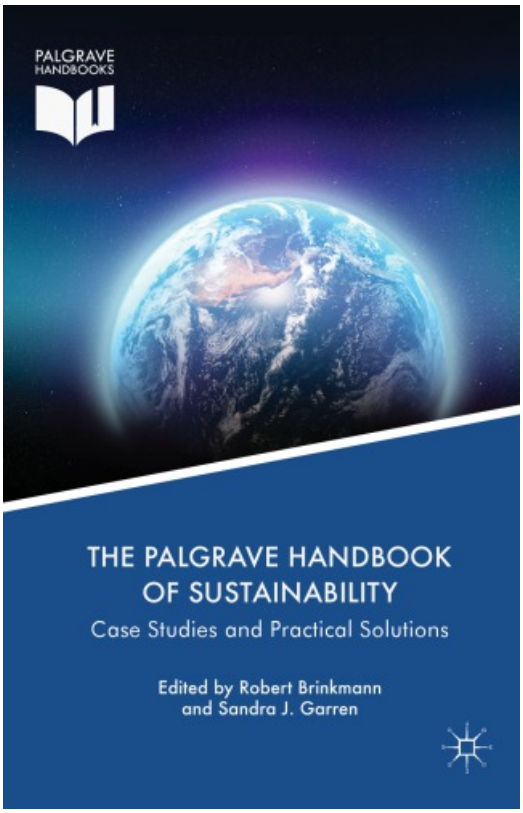
OSU Research Activity, Sustainable Urban Agriculture in Florida

Publication:

Vélez, Thelma. 2018. Treehugger Farm: Sustainability Visions in Urban Agriculture. Palgrave Handbook of Sustainability Case Studies and Practical Solutions, Eds. Sandra Garren and Robert Brinkman, Palgrave MacMillan, Ch.22, pp 411-429.

Abstract:

As a response to the inadequacies of an industrialized food system, small-scale, sustainable, urban agriculture projects are on the rise. This chapter begins by identifying historical trends in agriculture that arose during the green revolution. It examines the ecological repercussion of an industrialized food system, as well as the negative socio-economic implications of the changing structure of agriculture. The latter-half the chapter is a case study on Treehugger Organic Farms in Broward, Florida. It enables readers to contextualize the challenges of sustainable urban agriculture. It outlines the progression and struggles of developing an environmentally and socially sustainable farm. The closing of this chapter raises some important questions about farming as a business and farming as a labor of love, and what happens when visions of a sustainable future are tested.



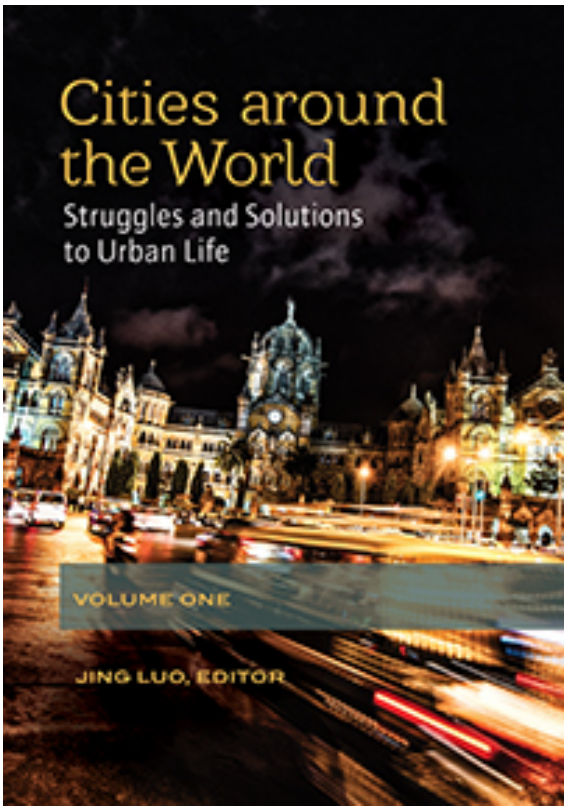
OSU Research Activity, Edible Green Spaces in Rotterdam

Publication:

Vélez, Thelma and Kerry Ard. 2019. Building an Edible City: Green Spaces in Rotterdam, the Netherlands. Cities around the World: Struggles and Solutions to Urban Life, Ed: Jing Luo. ABC- CLIO, Vol.2 pp 169-173.

Abstract:

A rising trend in cities around the world is the decline in green spaces to make way for development projects. The impact of declining urban green space has been a topic of growing interest. To that effect, many cities across the world are developing policies to incorporate green spaces throughout the city. As one of the greenest cities in the Netherlands, Rotterdam is no exception. The 2010-2014 Rotterdam Programme for Sustainability and Climate Change Report identified increasing green space as a key task for making the city sustainable. This chapter examines the initiatives and green space installations in Rotterdam, such as the Green Gateway Tidal Park, Roofpark Vierhavenstrip, and Eetbaar (Edible) Rotterdam. It also identifies areas of concern requiring attention from local officials.



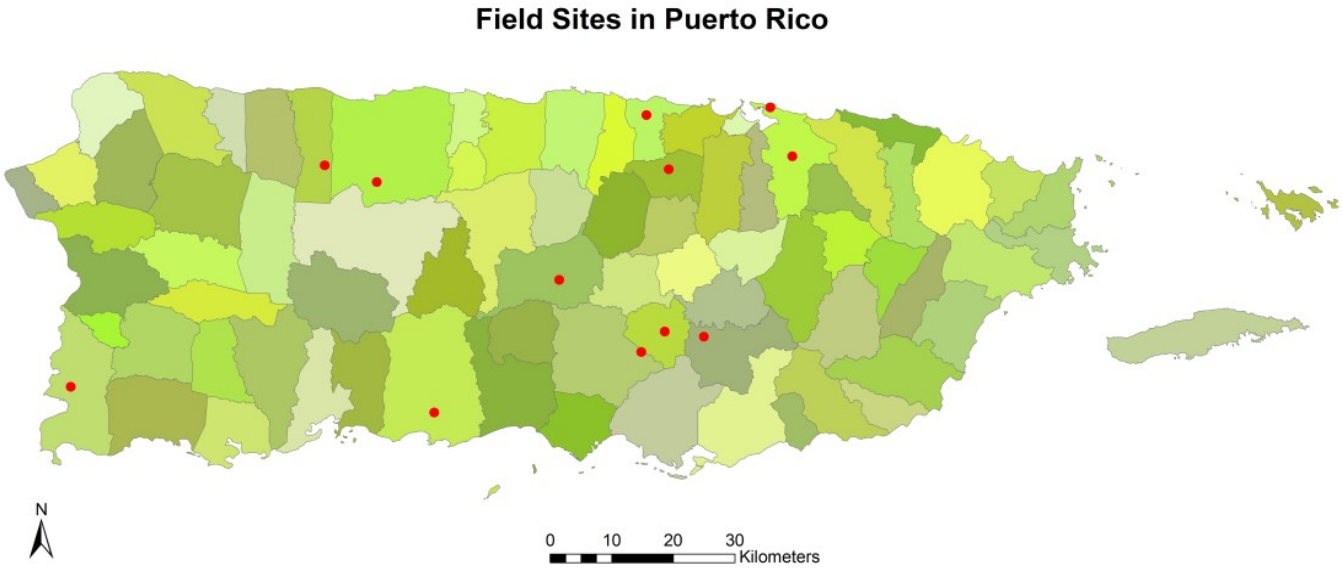
OSU Research Activity, Agroecology in Puerto Rico

Under Review:

Velez, Thelma. 2019. Puerto Rico's #JustRecovery: A Historical and Political Economic Analysis of Colonialism and Agrarian Change. Capitalism Nature Socialism.

Abstract:

Hurricane Maria made landfall in Puerto Rico in 2017, and the devastation was unprecedented. In the wake of the storm, the #JustRecovery campaign championed a community-led recovery centered on justice via agroecological expansion. This paper argues Hurricane Maria was a catalyst for agroecological mobilization because deep-rooted grievances of colonialism became salient after the failed federal response. Using interview data from agroecologists in Puerto Rico, I argue that agroecological expansion offers frontline communities in Puerto Rico a path toward resisting extractive, capitalist economic systems, while creating climate resilience in ways that are transformational, democratic, and socially just. In this paper I present evidence to reinforce Just Recovery's claims of coloniality through a historical and political economic analysis of agrarian change. Using a content analysis consolidating over 2,700 pages of archival data, legal and policy documents, government reports, and scholarly contributions, this work exposes consistent inequities in both delivery and timing of disaster recovery funds and provides a political economic analysis highlighting how diversified and comprehensive agriculture planning was marginalized in exchange for neoliberal development projects that exacerbated economic struggles by contributing to dependency on U.S. capital.



OSU Research Activity, Field Research Pictures

An interview with one of the founding members of an agroecology cooperative in Toa Alta, Puerto Rico. Their farm was devastated after Hurricane Maria, but the cooperative focused their energy on helping the surrounding community. Two years after Hurricane Maria, Federal Emergency Management Assistance teams have yet to make it to this part of the island. The four founding members were all part of the first cohort of Proyecto Agroecológico El Josco Bravo, 2015.

An agroecology brigade working on an agroecology cooperative farm in Caguas, Puerto Rico.

Intercropped cassava and banana plants on a farm in Utuado, Puerto Rico

OSU Research Activity, Field Research Pictures

Students from the sixth cohort of the Proyecto Agrecológico El Josco Bravo giving their final group project presentations. Ian Pagán-Roig owner of the school invited me to attend the presentations and help proctor the final examination.

The 2019 cohort of El Josco Bravo's agroecology school after their final exam.

OSU Research Activity, Publication

Publication:

Vélez, Thelma. 2019. So you're 'Latina, Latina': Positionality and Reflexivity in Scholar-Activist Praxis. Journal of Latin American Geography, Vol.18 (3), 215-220.

Abstract:

As a scholar engaged in agroecological research in Puerto Rico post-Hurricane Maria, issues of *positionality* and *parachute disaster research* have been sources of internal, and external, tension. Too often, frontline communities are "studied" by scholars who are external to the community and have extractivist agendas. As someone from the Puerto Rican Diaspora, this contribution begins by highlighting my internal struggle in deciding whether, and how, to engage in work with agroecological farmers and activists in Puerto Rico. It details my experiences engaging in sweat equity and utilizing my agreocological training on farms, and my efforts to gain recognition on the island as a scholar wishing to develop community-based projects.

So you're "Latina Latina": Positionality and Reflexivity in Developing Scholar-Activist Praxis

Thelma I. Vélez
The Ohio State University

When I signed up for field methods in graduate school, I really just wanted to know how to structure qualitative research that would broadly adhere to positivist epistemology. I admit, at that point in my academic career, I possessed a fairly narrow definition of what qualified as research and how it should be conducted. And thus began a process of un-learning, as I scrutinized forms of knowledge production considered valid by many of my colleagues and contemplated on the type of knowledge I wanted to produce. My research praxis evolved as I immersed myself in scholarship on methodology, ethics, positionality, extractivism, and scholar-activism in the field (Rose, 1997; Hale, 2001; Nagar, 2002; Nagar & Ali, 2003; Chacko, 2004; Koopman, 2016; Valentine, 2005; Breitbart, 2010). Self-critical introspection and dialogue with feminist geographers, to whom I am greatly indebted, led to my own reflexive-turn (Rose, 1997; Foley, 2002).

In this essay I situate my experience as a scholar-activist researching and supporting agroecological expansion in post-Maria Puerto Rico, and I reflect on some key tensions that have arisen prior to and during my time in the field. I first elaborate on some of the conundrums I considered before deciding to work in territorial space devastated by a disaster, and my efforts to distinguish myself from piratic researchers. Additionally, I discuss some of the tensions that arose while navigating multiple, intersecting identities. To explore these tensions, I begin by providing some personal and professional context.

When Hurricane Maria made landfall in Puerto Rico, I was already embedded in research on alternative food movements in the mainland U.S. At the time, I was mapping the values and goals of various food-movement activists and organizations to distinguish food justice and food sovereignty from less radical food movements. Before this, I spent over a decade working with sustainable urban agriculture projects and mobilizing for food and farm issues as well as farmworker justice in South Florida. Though I am an environmental sociologist who focuses on social movements, political sociology, and food, climate, and environmental justice, my master's research was in agroecology (as a science and practice). I provide this context to highlight that my understanding of agroecology is situated in hands-on experience working the land, and that I share an ideolog-

OSU Research Activity, Food-Hub Project

Project Title:

One-Linden Cooperative: Community-University Partnership for Social Justice, Local Food, and Community Economic Development.

Description:

This is an applied research project based in an urban and predominantly-Black community in Columbus, Ohio, that has been neglected and pushed into economic marginalization through decades of discriminatory planning policies. Our project aims to develop an alternative and sustainable economic model through the creation of worker-owned food hub. Our interdisciplinary team consists of university faculty and staff, community members, and local business leaders. We have raised over $78,000 and negotiating matching funds from Nationwide Children's Hospital and other anchor institutions to assist our team in execution. For more details see: One Linden Cooperative

ONE Linden Cooperative

(A Community-University Partnership for Social Justice, Local Food, and Community Economic Development)

Dear Linden Community Residents and Leaders:

We would like to invite you to a second Linden Listening Session, an update on the efforts of the Collaborative to create a new economic model for community wealth building in Columbus. This is an invitation-only gathering to bring you up to date and seek your involvement in the planning process.

Date: Thursday, October 10, 2019
Time: 6:00pm - 8:00pm
Location: St. Stephen's Community House - 1500 E. 17th Avenue

You may have participated in a "Roundtable" we hosted at St. Stephen's Community House in November 2018, in which we introduced the concept of worker-owned businesses that enlist the purchasing power of local anchor institutions to create living-wage jobs and stimulate building community wealth in Linden, a historically under-invested neighborhood. Or, you may have attended the "Listening Session" held at the Linden Recreation Center in March 2019 when we solicited community input into the idea.

We have made significant progress since the March listening session: securing a planning grant and contracting with The Democracy Collaborative to launch our multi-step planning and implementation process. In addition to bringing everyone up to speed on the project's development, we want to ensure that interested Linden residents and community leaders continue to be engaged in the planning process; each of these groups are key to the work of building place-based community building strategies. The purpose of this gathering is to lay the groundwork for continued engagement and collaboration.

We welcome your suggestions for people we should include. Please let us know so that we could extend the invitation to them also. Dinner will be provided. Please **RSVP** by emailing Ms. Peggy Williams via slaczoning@gmail.com or at (614) 625-3610.

Sincerely,

Peggy A. Williams, Project Coordinator
ONE Linden Cooperative

The One Linden Collaborative is comprised of The Ohio State University's Initiative for Food and Agricultural Transformation (InFACT), the Knowlton School's City and Regional Planning section,the B.R.E.A.D. Organization, (Building Responsibility, Equality and Dignity), Linden community residents and others.

OSU Research Activity, Food Hub Publication

Accepted Chapter Proposal for *Cultivating Food Justice 2nd Edition*, Eds. J. Agyeman and A. Alkon

Title: Intersecting Justices in the One-Linden Cooperative: a Worker-Owned Food Hub for Social Justice, Food Justice, and Alternative Economic Development

Authors:

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Kareem Usher
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Abstract:

Food justice practice, scholarship, advocacy, and activism has increased in popularity. Concomitant to growth in the field, has been the expansion and subsequent refinement of what constitutes food justice practice. Cadieux and Slocum (2015) highlight successful food justice interventions "enable people to effect systemic change while dealing with power relations across relevant scales." Our work contributes to the discourse on systemic change and power relations, while also addressing a breadth of inequities that intersect with food justice. In this paper we highlight a place-based strategy to empower a marginalized community through the creation of a university-community partnership for social justice, local food, and community economic development in Columbus, Ohio.

Columbus, Ohio is the second most economically-segregated large city in America. Within Columbus, Linden is a low-income and predominantly-Black community that has been pushed into economic marginalization through decades of discriminatory planning policies and disinvestment. Unsurprisingly, Linden residents also face high levels of food insecurity. In this paper, we will highlight the social and spatial processes contributing to food (and other) injustices, as well as, our community-centered efforts to effect systemic change. Though still constrained by neoliberal tactics, our project aims to establish a worker-owned food hub for the immediate residents of Linden, particularly for formally incarcerated citizens. As with all justice work, transformative food justice change cannot occur without empowerment (Sweeney et al. 2015). In this university-community partnership, we have worked alongside residents and local leaders of Linden to promote an alternative economic model and wealth retention.

Additional Scholarly Activity

Agroecology Research-Action Collective- we are a collective of scholar-activists working on issues of agroecology, farm justice, food justice, and food sovereignty in North America. We strive to make research and science accessible to the general public and be a bridge between academic and non-academic organizations. Our collective meets monthly through Zoom and annually at conferences. We have collaborated with various organizations, such as Union of Concerned Scientists, Science for the People, and Democracy Now! https://agroecologyresearchaction.org

Ohio Delegation on Food System Resilience and Equity- we are a group of academics and community-based practitioners working to transform the regional food-system to be more inclusive and equitable. As a group we helped organize the first, National Resilience and Equity in the Food System Workshop, at Stanford in 2018. Our most recent project entailed organizing a theme of justice and diversity within the Ohio Ecological Food and Farm Association Annual Meeting. We meet monthly to discuss regional projects aligned with our goals. Our next meeting is Feb. 14th in Dayton, OH, where we will be facilitating discussions with famed agroecologist, Eric Holt-Gimenez.

Institutional Procurement of Sustainable Food – The president of Ohio State University has committed to a charge of sourcing 40% local and sustainable food by 2025. The OSU Food Sustainability Panel was established to help meet this goal. The panel is comprised of administration, faculty, staff, and two graduate students. We met bi-weekly from Fall 2016- Spring 2018. Our committee has been integral in defining local and sustainable, identifying logistics and current allocation, as well as identifying how to engage the community and regional producers.