United States Department of Agriculture

Progress Report

Title:	Growing Food in the City: Urban Food Gardens for Research and Education

Sponsoring Agency	NIFA	**Project Status**	ACTIVE
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Program Code: NJ **Program Name:** Hispanic Serving Institutions Education

Project Director

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Recipient Organization

CAL STATE L.A. UNIVERSITY AUXILIARY

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Performing Department

Biological Sciences

Co-Project Directors

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Chatterjee, Choi

Departments

Geosciences and Environment

Kinesiology & Nutritional Sci

History

Non-Technical Summary

This comprehensive project will educate, mentor, and train students in food production on the urban food gardens at California State University, Los Angeles, while examining the science, technology, and history behind the effective natural resource management in these locales. Urban populations are completely dependent on the market and have little knowledge about how to grow fresh fruits, vegetables, and herbs, critical components of a healthy and nutritious diet. Urban farming can restore a measure of food security to the city, increase awareness of health and nutrition, and create community bonds through a shared commitment to the preservation of natural resources. In addition, we propose polyculture farming methods that can be an effective tool in managing water supplies, restoring degraded soils, increasing carbon storage, increasing the local pollinator count, and reducing radiant heat in the city by providing shade. Urban agriculture can also and play a key role in managing organic urban waste. By creating new undergraduate courses on the science and history of urban agriculture, water management, health, and the environment in the natural, social and health sciences, and by modifying existing courses to include new information, we will reach about a thousand students per year. In addition, the grant will provide research opportunities for graduate students in these fields of study. We will provide students with the training necessary to participate in and contribute to urban agriculture and food processing industries. Using the results from our project, we expect to take our model of urban agriculture to the low-income communities that surround our campus and potentially impact thousands of residents.

Accomplishments

Major goals of the project

This project will combine research and educational efforts in four departments and two colleges at California State University, Los Angeles to accomplish the following goals: 1) Expand the number of minority students involved in training and education in nutrition and urban natural resource management. 2) Enhance understanding of food gardens at multiple educational levels through a multi-faceted training and research program. 3) Create a forum for evaluating research and educational results and for impacting public policy and management. .4) Develop "pipelines" for students to participate in the program,

starting at the lower division undergraduate and community college level, and continuing through graduate degrees in natural, social, and nutritional sciences. The ultimate objectivves of this project is to provide education, close mentoring, and experiential learning opportunities while exposing students to topics of urban sustainability and food programs and nutrition using food gardens as a cornerstone for applying theory and practice in the proposed program. This will be accomplished by recruiting lower division students from Cal-State University Los Angeles and surrounding high schools and community colleges and mentoring them through their lower and upper division undergraduate programs and graduate degrees. All PIs in this grant will recruit and mentor, in a close interactive way, numerous students from underrepresented communities during the duration of this four-year project via a staggered application process. These students will participate in the experiential learning projects, educational projects, and other research activities outlined in this plan. At least 3000 students will participate in the proposed projects during the life of this grant.

What was accomplished under these goals?

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IMPACT: During the 2020-2021 academic year this project has impacted more than 1000 undergraduate students, 5 graduate students, and our entire campus community. We were able to expand our existing garden infrastructure on campus and build a new and much larger campus garden. This garden is now already being used for research in Plant Ecology and History of LA agriculture. It is also being used by students and community-members at CSULA to get hands-on experience growing their own food and learning about compost in an urban environment. The urban garden is being used in coursework in 4 different classes (and will expand to 8 by the end of the academic year). Students and faculty are starting to be able to see how food connects to their health, happiness, and larger research themes associated with efficient food production in urban environments.

1. Tier 1, GE Coursework/Curriculum

The foundation of our GE program focuses on our recently developed 3-unit course Natural and Social Sciences (NSS) 1001 - "Introduction To Higher Education". We have now developed a week-long module and 4 educational videos for this course:
Video A shows how the Cal State LA Urban Food Garden was developed and constructed. The video shows the garden after the planting of fruit trees, native vegetation, crops, and the installation of composting stations.
Video B includes the faculty input on the NSS degree options that fit into the environmental and social aspects of urban food gardens.
Video C -The issue of poor nutrition in urban areas, and how urban food gardens can be an important source of nutritious land locally grown produce.
Video D -What is an urban heat island? What is carbon sequestration? How can networks of urban food gardens create urban cooling and serve a role in capturing atmospheric CO2?
Video E. Viewing of Pre-Recorded Lecture by Dr. Choi Chatterjee
https://www.youtube.com/watch?v=BIRksUKqM50&t

2. Tier 2, Lower Division Specialized Coursework

Course 1: Biology 1200 Laboratory, Polyculture for growing food research experience
To give our students a deeper understanding of the themes of ecology and sustainability associated with agriculture we have begun to develop a course-based undergraduate research experience (CURE) to be implemented in Spring 2022 in the introductory population biology curriculum (BIOL 1200). We have developed the following timeline for our CURE:
Week 1: We will visit the garden and talk about the crops growing there during each semester.
Week 2: Students will work in groups of 3 and run germination trials on crop varieties that we are interested in experimenting with in the research garden.
Course 2: Geology 1500 Laboratory, Earth Revealed
Although not listed in our USDA Grant as a course to be modified, Geology 1500 Laboratory, part of the Geology 1500 Earth Revealed Class was modified in 4 sections by adding an Urban Agriculture option in the Civic Learning part of this class: Environmental issues of installing an urban community food garden. How will the urban garden help reduce carbon in the atmosphere? How does a garden improve urban heat island effect?

3.Tier 3, Upper Division Course Development and Course Cross-Fertilization

A. Watershed Analysis Geology 4870 (3 units)
For the first time, a week of lecture material on urban agriculture and urban gardening was added to this Geology 4870-Watershed Analysis during spring 2021. Urban agriculture lectures were given on May 11 and May 13, 2021.
Hibbs, B. May 11, 2021. Urban Agriculture/Urban Gardens - History, Issues, and Environmental Water Quality Management.
Chatterjee, C. May 13, 2021. Agriculture in the City of Los Angeles.
B. Geology 4900 Special Topics; field and laboratory methods in hydrology in urban agricultural lands and watersheds.
Nothing to report due to delays associated with COVID-19
C. Biology 4620, Plant Ecology (3 units)
For the first time, background information on polyculture growing practices in an agricultural context were added to this course. In Spring 2022 this will be paired with a student-designed research project to be carried out in the garden by the 24

students enrolled in this class. This was delayed due to COVID-19 restrictions on our campus.
Lecture 1: Soils and Nutrition (given on February 9, 2021): macronutrients and micronutrients for plant growth.
Lecture 2: Resource limitation in Southern CA (given on February 16, 2021): major resource limitation issues for plants growing in Southern California.
Lecture 3: Biodiversity and productivity (given April 15, 2021): polyculture farming practices.
D. Nutritional Science 4200, Community Gardening and Food Sovereignty (3 units)
Nothing to report due to delays associated with COVID-19
E. History 4900, History of Agriculture and Food Justice (3 units). This seminar will be offered in the spring of 2022
Nothing to report due to delays associated with COVID-19
3b. Course Cross-Fertilization
A. Hibbs, B. Technical and Policy Issues Related to Concrete Lined and Unlined Stream Channels in the Los Angeles Metropolitan Area. Presented in: Sociology 4870: ENVIRONMENTAL POLICY, LAW, AND SOCIETY, Thursday April 15, 2021.
B. Hibbs, B. Concrete-Lined and Unlined Stream Channels - Water Quality, Restoration, and Research: Presented in Environmental History Seminar.
C. Chatterjee, C. Agriculture in the City of Los Angeles on May 13, 2021 to Dr. Hibbs' class, Watershed Analogy Geology (GEOL 4870).
D. Hillstrom, M. presented on the new garden to HHS 1001, Introduction of Higher Education in Health and Human Services, on March 1 and 2, 2021.
4. Tier 4, Student/Faculty Research
Graduate Students:
In Fall of 2020, Dr. Chatterjee recruited two graduate students, Moises Ponce-Zepeda and Jewleyn Mims to help build a Database on Climate Adapted Agriculture in Los Angeles.
Dr. Chatterjee and her graduate students created a google site of climate adapted agriculture in Los Angeles in the last 300 years. https://sites.google.com/view/historical-database-of-climate/home. Their team also made a formal presentation of their preliminary findings to the members of the History Department https://www.youtube.com/watch?v=a1l9ecoGEXs&t=179s.
In Spring 2021, Dr. Wright recruited a new graduate student to begin research and training in urban ecology and agriculture in Fall 2021. In May 2021, Dr. Wright and Ms. Ramirez began soil preparation, germination trials, and early planting trials for a new polyculture farming and microclimate amelioration study in our garden. Crystal attended a preliminary meeting in St. Paul, Minnesota in August 2021 to discuss the possibility of joining an NSF-funded national network of campuses that use urban agriculture for undergraduate education.
During the 2020-2021 academic year, Dr. Hillstrom mentored a promising undergraduate nutritional science student in the Honor's College, McKenna Rivers. McKenna successfully presented her paper, graduated from the Honor's College in spring 2021 and has continued her education in Food Science at Chapman University in their MS program.

5. Manual of Urban Food Gardens
Nothing to report
6. Certificate in Urban Ecology and Agriculture
Dr. Wright contacted several community partners (e.g. FarmLA.org) to discuss the utility of an Urban Ecology and Agriculture certificate for our students in the LA region.
7. Grant Assessment Components and Activity: During the 2021 year, we conducted an inaugural focus group (led by our outside evaluator Dr. Gisele Ragusa at USC) with the students who had worked with the urban garden. Preliminary results: Question themes and responses
Interdisciplinary: 57.9%, "I can see immediate connections with the neighborhood and the needs that the garden can address regardless of our major in school."
Academic experiences: 21.1%, "Working on the data bases not only helped connect to my courses, but also research."
Future career: 21.1%, "Eventually I want to be a researcher and so working with others on research is so important."
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What opportunities for training and professional development has the project provided?

1. Two graduate students have been supported financially and mentored closely by Dr. Choi Chatterjee while working on her project, A Historical Database of Climate Adapted Agriculture in Los Angeles. Both students are members of under-represented minority groups and one of them is also a first-generation college student. One has been accepted into a PhD program at USC. The other is finishing her work with Dr. Chatterjee.
2. One graduated student has just begun her work in Dr. Wright's Plant Ecology lab. She is being supported by the grant and being mentored closely by Dr. Wright. She is a first- generation college student and a Hispanic woman.
3. One undergraduate student has been mentored heavily by Dr. Mandy Hillstrom. She completed an Honor's thesis on food,

campus sustainability, and the role of our new campus garden. She has completed her degree at CSULA and started an MS program at Chapman University in Food Science.
4. We have developed materials (educational videos and course modules) for 2700 students this semester to learn about the ecology, history, and the nutritional role that a food garden can play on campus. These students will learn about this resource for the first time in the introductory course NSS 1001, offered in the Fall semester of 2021 .
5. Introductory Geology: 100 students were taught about the role of urban community food gardens in our LA community. Of these students, 14 chose to develop a 15 minute presentation on the importance of urban community food gardens in our community.
6. Advanced Watershed Analysis: 8 students exposed to multiple levels of content on the role of urban food gardens in urban watersheds and the history of agriculture in LA.
7. Advanced Plant Ecology: 20 students learned about soils, resource limitation, and the role of polyculture for ecological systems in Southern California.
8. Our part-time garden technician runs a gardening club on campus. In the past reporting period, she has organized educational sessions over zoom and in-person to teach students about composting and growing food crops on our campus.
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How have the results been disseminated to communities of interest?

We have produced several products towards disseminating our work to communities of interest:

1. Dr. Choi Chatterjee and her students, Moises Ponce-Zepeda, Jewelyn Mims, presented 5 lectures on the importance of urban agriculture to students enrolled in five sections of the introductory course NSS 1001 during the month of November, 2020. We reached 300 students through this educational outreach effort. In addition, over a hundred students, faculty, and staff members attended the series of talks and presentations convened by the Environmental History Discussion Group that was created in association with the project: A Historical Database of Climate Adapted Agriculture. Many students participated in the 10 Book Club discussions that were hosted by the Environmental History Group in the summer of 2021. https://sites.google.com/view/historical-database-of-climate/home.

2. Dr. Hillstrom presented about the opportunities in the garden to HHS 10001, Introduction to Higher Education in Health and Human Services. There were 60 undergraduate students in the lecture.
3. Lecture: Hibbs, B. April, 15, 2021 "Concrete-Lined and Unlined Stream Channels: Water Quality, Restoration, and Research." Presentation to the Environmental History Research Group in the History Department at Calstate LA.
4. Lecture: Chatterjee, C. October 20, 2020. Edible Garden Club, Cal State LA. "On the history of industrial, regenerative, and urban agriculture" https://www.youtube.com/watch?v=BIRksUKqM50&t=1890s
5. Lecture: Hibbs, B. and Chatterjee, C. 2021. Growing food in the city: urban food gardens for research and education. Presented in Natural and Social Sciences Dean's Board of Advisor's meeting.
6. Website: Growing food in the city: a USDA-funded urban education and research grant. This website is meant to publicize our classroom, training, and research-related activities. https://sites.google.com/view/growingfoodinthecity/home
7. Website: Historical Database of Climate Adapted Agriculture: A USDA-funded urban education and research grant. This website is meant to publicize historical research on agriculture in the Los Angeles region. https://sites.google.com/view/historical-database-of-climate/home
8. Dr. Wright's student, Crystal Ramirez, attended a preliminary meeting in St. Paul, Minnesota in August 2021 to share what we have been doing in our garden and discuss the possibility of joining an NSF-funded national network of campuses that use urban agriculture for undergraduate education. This is being led by Dr. Eric Chapman and Dr. Adam Kay.
9. Dr. Chatterjee presented a lecture entitled "Agriculture in the City" to students of Dr. Hibb's Watershed Analogy Geology (GEOL 4870) Class on May 13, 2021. https://sites.google.com/view/historical-database-of-climate/environmental-history-discussion-group?authuser=0
10. We have produced a film about the campus food garden and it is being shown to students enrolled in multiple courses. https://www.youtube.com/watch?v=eYQTgezrRns&t=6s
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What do you plan to do during the next reporting period to accomplish the goals?

1. We will conduct pre and post survey assessment of students in our GE Coursework (NSS 1001) to assess understanding of the importance of urban agriculture and food gardens in LA, the ecological role of food gardens, and student sense of inclusion and access to these projects.
2. We will implement our hands-on two-week CURE in the introductory BIOL 1200 laboratory in Spring 2022. This will serve ~200 students in the next reporting period. We will conduct pre and post survey assessment of student understanding and sense of inclusion during this course as well.

3. We will implement our hands-on one unit Geology short course in Spring 2022.
4. We will add the experiential "learning in the garden" component into our advanced Plant Ecology course. Student understanding of experimental methods will be evaluated with the EDAT test.
5. We will implement our advanced Nutritional Science course in Spring 2022. Students will learn about food justice and garden maintenance.
6. We will implement our modified advanced History course on agriculture and food justice in the San Gabriel Valley. Students will work with historically relevant crops that we will grow in the garden and conduct research on the history of these crops in our region.
7. We will recruit a new student from an underrepresented group into the MS training program under the guidance of Mandy Hillstrom.
8. We will begin the production of our annual of urban good gardens.
9. We will continue working with the Dean of Natural and Social Sciences to implement a certificate in Urban Ecology and Agriculture.
10. We will continue to disseminate information about the campus food garden through activities coordinated by the Edible Garden Club on campus.
11. Using the research findings from the Historical Database of Climate Adapted Agriculture, we will plant medicinal and edible pants that were used by the indigenous communities of Los Angeles in the campus food garden. We will also provide tours of the garden to explain the ecological, nutritional, and medicinal significance of native plants.

Participants

Actual FTE's for this Reporting Period

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	3.5	0	3	0	6.5
Professional	0.8	0	0	0	0.8
Technical	0.2	0.2	0	0	0.4
Administrative	0.7	0.2	0	0	0.8999999999999999
Other	0	0	0	0	0
Computed Total	5.2	0.4	3	0	8.5999999999999999

Student Count by Classification of Instructional Programs (CIP) Code

Undergraduate	Graduate	Post-Doctorate	CIP Code
	1		01.11 Plant Sciences.
	2		54.01 History.
1			01.99 Agriculture, Agriculture Operations, and Related Sciences,

Target Audience

Cal State LA undergraduate community, Cal State LA graduate student community, Los Angeles urban gardening community, and the local community in and around Cal State LA. The Cal State LA undergraduate community is a Hispanic Serving Institution and serves a historically underrepresented group in the fields of Biology and Agricultural Sciences. Our efforts to serve these populations during this project term included formal classroom instruction, laboratory instruction, development of new curriculum and course based undergraduate research experiences (CUREs), and graduate student training through research. We have also now developed a new garden that serves as a place for collaboration within the broader LA community. This collaboration has included hosting tours in the garden for community members and hosting informal instructional sessions in the garden for students and community members who want to learn more about gardening.

Products

{Nothing to report}

Other Products

Product Type

Audio or Video

Description

Video: The Cal State LA Urban Food Garden: a brief history of the establishment of the garden. Directed by undergraduate student: Aaron Bloom.

Product Type

Audio or Video

Description

Video: Urban food gardens & heat island effects. Written and presented and produced by Dr. Alexandra (Sasha) Wright.

Product Type

Audio or Video

Description

Video: Career options for Cal State LA students seeking volunteer opportunities in the Cal State LA urban food garden (including talks from Drs. B. Hibbs, A. Wright, C. Chaterjee, and M. Hillstrom). Edited by undergraduate student Aaron Bloom.

Product Type

Educational Aids or Curricula

Description

Lecture: Wright, A. February 9, 2021. Soils and Nutrition. Written and presented for the Cal State LA Advanced Plant Ecology course in Spring 2021.

Product Type

Educational Aids or Curricula

Description

Lecture: Wright, A. February 16, 2021. Resource limitation in Southern CA. Written and presented for the Cal State LA Advanced Plant Ecology course in Spring 2021.

Product Type

Educational Aids or Curricula

Description

Lecture: Wright, A. April 15, 2021. Biodiversity and productivity. Written and presented for the Cal State LA Advanced Plant Ecology course in Spring 2021.

Product Type

Educational Aids or Curricula

Description

Lecture: Chatterjee, C. October 20, 2020. Edible Garden Club, Cal State LA. “On the history of industrial, regenerative, and urban agriculture” https://www.youtube.com/watch?v=BIRksUKqM50&t=1890s

Accession No. 1023285 **Project No.**

Product Type

Educational Aids or Curricula

Description

Dr. Choi Chatterjee and her students, Moises Ponce-Zepeda, Jewelyn Mims, presented 5 lectures on the importance of urban agriculture to students enrolled in five sections of the introductory course NSS 1001 during the month of Novermber, 2020. We reached 300 students through this educational outreach effort.

Product Type

Educational Aids or Curricula

Description

Lecture: Chatterjee, C., Gurrola, C., Ponce-Zepeda, M., Mims, J. and Gurrero, J. December 2, 2020, “Building a Historical Database of Climate Adapted Agriculture” Presentation to the Environmental History Research Group in the History Department at Calstate LA.

Product Type

Educational Aids or Curricula

Description

Lecture: Hibbs, B. April, 15, 2021 "Concrete-Lined and Unlined Stream Channels: Water Quality, Restoration, and Research." Presentation to the Environmental History Research Group in the History Department at Calstate LA.

Product Type

Other

Description

Website: Growing food in the city: a USDA-funded urban education and research grant. This website is meant to publicize our classroom, training, and research-related activities. https://sites.google.com/view/growingfoodinthecity/home

Product Type

Other

Description

Website: Historical Database of Climate Adapted Agriculture: A USDA-funded urban education and research grant. This website is meant to publicize historical research on agriculture in the Los Angeles region. https://sites.google.com/view/historical-database-of-climate/home

Changes/Problems

COVID - 19: The Cal State LA campus was closed for the majority of the 2020-2021 school year. For all on-campus activities we were required to go through a lengthy procedure to gain access to the campus. In particular, in order to build out the garden beds and other infrastructure that will be required for all of our coursework and research, we needed to complete an approval process that took nearly 5 months to finish. This restricted our ability to complete any hands-on research experiences associated with our General Education course, our upper division courses, and our research program. We were able to make the following progress associated with the garden infrastructure, albeit on a much delayed timeline:
September - December 2020 - a graduate student in Nutritional Science, Alicia Papanek, conducted remote meetings that laid much of the groundwork for the modifications we were able to make to our current campus garden this year (in prep for the work described herein). She met with students, faculty and administrators to gain support for expanding the campus garden in student housing. Alicia also established the Edible Garden Club, which is a student-led campus group through Associated Students. A nutritional science faculty member was the club mentor and now that responsibility is shared with Dr. Chatterjee. The student group, under Alicia's enthusiastic leadership, gained the support of the all levels of administration.
Fall 2020 - finalizing garden design with our campus administration via remote meetings. We were given permission to build a new garden that expands on our current gardens on our campus. The administration demonstrated clear support for this

expansion and all co-PI's led an effort to secure funds from the administration for an ADA compliant walkway that could be installed into a brand-new campus food garden for our work.
Winter 2020/2021 - Cal State LA started opening our campus for limited research-related activities. This involved a 20 page research application for our team. Dr. Wright led the process of completing this application in winter and we gained access to our new garden space in March 2021.
Winter 2020/2021- The garden intern, Meghan Garvey, assisted by Dr. Chatterjee and members of the Edible Garden Club of Cal State LA, planted seven drought tolerant fruit trees, and a variety of native plants including grapes, aloe, nopales cactus and others.
April 2021 - The ADA compliant walkway was completed and we installed 8 new large raised beds (subdivided into 16 plots) during this time. We also hired a Cal State LA student to work as a part-time garden technician to help with planting, irrigation design, and student volunteer recruitment/involvement.
May 2021 - Planted first crops for education and research. Installed irrigation. Began installing research equipment.
June 2021 - New compost system installed by a partner group in Los Angeles (LA Compost).
July and August 2021--Meghan Garvey, the garden intern, secured a truckload of compost from the city of Los Angeles and spread it around the garden. Garvey has also installed several raised beds with funding from ASI (student organization on campus), and planted it with edible plants and herbs. She is continuing to feed and mulch all the planted areas.
August 2021 - First data collected on plant growth, soil moisture, and microclimate (temperature and humidity) associated with PI Wright's research and graduate training agenda.
Medical Leave by PD Dr. Barry Hibbs
In August 2021, PD Barry Hibbs filed for medical leave for the Fall 2021 semester. The length of his medical leave will last through Fall 2021, though it is unknown when he will return at that point. Dr. Hibbs has now been replaced by Dr. Alexandra (Sasha) Wright as PD for the project.
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