Summer Ecosystem Experiences for Undergraduates (SEE-U)

Agro-eco- and Food Systems: The rural-urban landscapes of New York City

Columbia University

Summer 2017 (6 credits)

Faculty

Amanda Caudill sc2083@columbia.edu
Shahid Naeem sn2121@columbia.edu (Professor of Record)

Course Assistants:

Clare Sullivan
Tiff van Huysen
Suzanne Lipton

Course Locations:

Various, see schedule

SEE-U NYC: An Immersive Educational Experience in Agro- and Food-system Environmental Biology

The Summer Ecosystem Experiences for Undergraduates (SEE-U) provides undergraduate students of all majors with an understanding of the fundamentals of environmental sustainability. The SEE-U Agro-ecosystems program, like its counterparts in Brazil, Jordan, and previously at Black Rock Forest, India, the Dominican Republic, and Puerto Rico, gives students the opportunity to learn through an immersive experience combining lectures, field trips, and training in field and laboratory methods. Agro-ecosystems represent the dominant ecosystem on Earth today, but differ from other ecosystems in the way they are managed. They are the primary ecosystems that provide humanity with food, fiber, and biofuels. Our course will cover agro-eco and food systems of the entire world, but its field exercises and excursions will be centered in the farms and food systems of the rural-urban gradient from New York City to its surrounding environs.

Course Description

Perhaps the single most pressing challenge humanity faces this century is how to sustainably produce and distribute food to an ever growing, increasingly urbanized population. Nearly two-thirds of the ecosystems of the world have been converted or are managed to provide food, fuel and fiber for our current population of 7.2 billion people. Over 44 percent of land in the U.S., for example, is already under cultivation, yet over 12 million children in our country suffer from hunger and one in seven households suffer from food insecurity. By 2050, another two to three billion people will join our population, the majority of them living in urban environments, and considerable research and debate surrounds whether we can sustainably feed humanity without jeopardizing environmental sustainability.

Food is a complex, interdisciplinary, and extraordinarily fascinating topic. It is not just about farming and calories, but about production, packaging, storing, distributing, and insuring health and safety. It is about history, tradition, cultural preferences and dietary choices. It's about markets, economies, and policies. Whether picking up food from a food truck or dining at a five-star restaurant, shopping online or in a high end supermarket, preparing fresh food or eating processed foods, the choices and decisions we make about food have consequences that extend beyond our individual health and well-being to local, regional, and global environmental sustainability.

SEE-U Agro/Food Systems provides an in-depth examination and analysis of agro-ecosystems, from community gardens to global markets. The course makes use of the extraordinarily diverse array of farms and food systems in New York City and its surrounding environs. Lectures review the natural and social science foundations of ecosystem ecology and conservation, but focus specifically on agro-ecosystems, including farms, rooftop operations, pastures, grazing lands, orchards, and plantations. The material also covers food systems, or the "food to fork" pathways from growing to harvesting to processing to packaging to transporting to marketing to consuming, and includes recycling, composting, and waste disposal. Structured as an immersive summer class, SEE-U Agro/Food Systems couples each lecture topic with field excursions and exercises to bring the material to life. Every week we will conduct field trips to urban farms, small rural and peri-urban farms, and local food purveyors and distributors to get a comprehensive look at the local agro/food systems of New York City and its surrounding environs.

Lectures and classroom exercises

With an emphasis on ecological interactions and conservation, this course will introduce students to the enormous diversity of life and ecosystem functions that support a healthy agro-ecosystem. SEE-U Agro/Food Systems covers genes to species to ecosystems to the biosphere. We will introduce students to field methods to investigate and analyze ecological systems using agro-ecosystems as examples. The course will also cover the basics of genetics and evolutionary biology to explore how agro-ecosystem diversity is generated and maintained. Moreover, the

course will explore current issues in food security, nutrition and health, dietary choices, and sustainable farming and land resource conservation and management.

Field excursions and exercises

New York alone has approximately 7.2 million acres of farmland, the equivalent of one quarter of the land area in the state. While more than half of the farmland in the U.S. is still classified as "small farm," in the second half of the 20th century, as large agro-businesses boomed and industrial farming became the norm, the number of small farms in New York and nationally decreased steadily. In the past decade however, interest in and recognition of the ecological, social and economic benefits of small, sustainable farming practices has induced a resurgence of small farms in and around New York City. Small farms outside of the city support the local economy, a healthy landscape, and ecosystem services that in turn benefit the city. Productive urban and peri-urban farms provide fresh produce for local consumers, bolster community development, increase food security and provide ecosystem services in a predominantly built environment. We will visit these farms and engage in field exercises to study the underlying ecological mechanisms of the farm landscape in and around New York City.

Capstone Project

The centerpiece of the course will be the individual research project: students will learn how to plan, execute, and present ecological research and will have the opportunity to work with local farms and food institutions. No previous knowledge of science is assumed.

COURSE OBJECTIVES

- Appreciate the diversity of taxa and ecosystems present within the agro-ecosystems that support New York City.
- Explore current controversies regarding the sustainable management of agro-ecosystems in New York State and its surrounding environs, within the context of global controversies about land cultivation.
- Understand the effects of diverse agro-ecosystem management strategies (both positive and negative) on species persistence and ecosystem functioning.
- Become familiar with methods of research, management, and analysis through exposure to primary literature and field work.
- Gain an understanding of the local, burgeoning agrarian economy in and around New York City and its corresponding impacts on our local ecology.
- Analyze the ecological, environmental, social and economic benefits of urban farming in New York City.
- Examine the urban-rural ecological gradient through the lens of sustainability science.
- Gain an understanding of the scientific method and its theoretical underpinnings.

- Become fluent in varied methods of ecological sampling and statistical analyses.
- Learn to present research in both written and oral forms.
- Take initiative in developing and enacting a final project involving original research, analysis and presentation.

Grading

- **Daily Activities (Exercises, Discussion) 30%**
  · Participation in daily exercises
  · Oral presentations
  · Participation in class discussions and debates
  · Write-up
- **Individual Projects 30%**
  · Final Proposal (10% of Individual Project's total grade)
  · Draft Final Report (.ppt preferred) (20% of Individual Project's total grade)
  · Final Report in PowerPoint format (50% of Individual Project's total grade)
  · Oral Presentation of Final Report (20% of Individual Project'ss total grade)
- **Examinations 30%**
  · Field Practical - 15% of overall grade
  · Quizzes - total of 15% of overall grade
- **Blog/Journal 5%**
  · Completeness & Creativity
- **Overall Participation 5%**

Required Text

Gleissman, S. (2014). *Agroecology: The Ecology of Sustainable Food Systems, 3rd Ed*. Boca Raton, FL. CRC Press.

Course Schedule

Please see the schedule for site visits, course schedule, and assignments.

Faculty Statement on Academic Integrity

The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.

Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars' work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that inform our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.
In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent.
Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Students failing to meet these responsibilities should anticipate being asked to leave Columbia.

Student Academic Integrity

Students should be familiar with the Undergraduate Guide to Academic Integrity.

Laptops may be used in lectures for taking notes, but pencil and pad are recommended for the field. In the field, students may use suggested note taking applications for mobile devices, or notebooks. Laptops are only allowed for quizzes and presentations if instructed. Group work is only allowed if specified.

Faculty Statement on Disability Accommodations

If you are a student with a disability and have a DS-certified ‘Accommodation Letter’ please come to my office hours to confirm your accommodation needs. If you believe that you might have a disability that requires accommodation, you should contact Disability Services at 212-854-2388 and disability@columbia.edu."