AGRICULTURAL & URBAN LAND USE: HUMAN-ENVIRONMENT INTERACTIONS
EESC BC3032y
Seminar
Tuesdays, 2:10-4:00 PM
805 Altschul
4 Credits

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COURSE OVERVIEW
DESCRIPTION
Humans have transformed their terrestrial environment since paleolithic times and continue to do so in profound ways. This course focuses on the major physical and biological processes involved in human-environment interactions, and the concepts that humans use to understand their relationship to nature in two contrasting settings: the city and the farm. In the urban setting, we discuss ecological processes and analyze land use, energy flow, and the feedbacks between cities and their regional water resources, climate, and ecosystem. In the rural setting, we study how the first (and following) farmers manipulated plants, animals, soil, and water. We also look at the processes governing nutrient cycling in agroecosystems and the impacts of climate change on agriculture. Drawing from past and present examples of human use and abuse of the environment, we will seek to define our own guidelines for practical sustainable land use, linking rural and urban environments.

OBJECTIVES
• Explore biophysical and socio-economic processes driving human-environment interactions in urban and agricultural settings
• Examine how climate variability and change influence land use
• Analyze the concept of sustainability as it relates to agriculture and urban areas

SKILLS OBTAINED FROM THIS COURSE
• Learning to find and interpret primary literature and data therein
• Understanding key biogeochemical processes related to land use
• Working both individually and with your peers to effectively conduct research related to human-environmental interactions and communicate research results

REQUIREMENTS
The work of the class involves four parts:

I. Attendance, Readings, Homework, and Field Trip (30%)
   • Readings: Readings will include excerpts from key texts and research articles on class topics. The readings will be posted on the class website.
   • Homeworks (10): Take-home problems sets/calculations to be completed before class each week and blog post on ClimateYou (2); Theme: biogeochemical and ecological processes (25%)
   • Field trip and field trip report (required): Study tour of McEnroe Farm (Millerton, New York) (5%)

II. Discussion (20%)
   • General participation: Raise discussion questions and key reading points (15%)
   • Discussion leadership (1) – Powerpoint slides (4) (5%)
     ○ Summarize key points from readings and pose discussion questions
     ○ Research and present a paper related to readings, with at least one figure showing data
     ○ Relate to broader class topics

III. Exams I and II (20%)
   • In class: Covers key concepts and processes, readings, and calculations

IV. Project/Paper (30%)
   Students will describe and discuss the progress of their projects throughout the semester. Feedback will be given on each part, so that the final papers and presentations are the culmination of the semester’s work.

   There are four parts:
   • Scope: Topic/Outline/References (3-5 pages, double spaced) (5%)
   • First Draft: 5 pages, double-spaced, plus References/3-5 draft tables/figures (5%)
   • Final Paper: 10 pages, double spaced, plus References/3-5 tables/figures) (15%)
   • Presentation: Powerpoint (5%)
SCHEDULE

Week 1 (Jan 21): Introduction - Processes, Scales, Concepts
Problem Set: Bio-Regional Quiz

I. The City

In the urban setting, we analyze land use, resource-use efficiency, and the ecological footprint, the effects of cities on climate and vice versa, and the manipulation of water resources via harbors, watersheds, and wetlands.

UNIT I: URBAN ENVIRONMENT INTERACTIONS

Week 2 – The City (Jan 28): The urban environment: air, climate, hydrology, and soils

Readings:
  - Introduction
  - Chapter 2: The impact of urbanisation on climate, p. 15-28
  - Chapter 3: Air quality and health in the urban environment, p. 30-54
  - Chapter 4: Impacts of urbanisation on land and water systems, p. 56-73

Week 3 - The City (Feb 4): Urban climate and energy

Guest lecturer: Stuart Gaffin

Readings:

UNIT II: CITIES AND CLIMATE CHANGE

Week 4 - The City (Feb 11): Climate Change and New York City

Readings:
● New York City Panel on Climate Change, 2013: Climate Risk Information 2013: Observations, Climate Change Projections, and Maps. Rosenzweig, C. and Solecki, W. (Eds.). Prepared for use by the City of New York Special Initiative on Rebuilding and Resiliency, New York, New York
  ○ Executive Summary (p. 4-6)
  ○ Chapter 1: New York City adaptation in context, p. 19-28
  ○ Chapter 2: Adopting a risk-based approach, p. 29-40
  ○ Chapter 4: Infrastructure impacts and adaptation challenges, p. 63-86
● City of New York. 2013. Chapter 1: Sandy and Its Impacts In New York City Special Initiative on Rebuilding and Resiliency. A Stronger, More Resilient New York

Week 5 - The City (Feb 18): Climate Change and Cities: Resilience and Transformation
Guest lecturer: William Solecki, Professor and Director, CUNY Institute for Sustainable Cities, Dept. of Geography, Hunter College of the City University of New York

Readings:

---------------- SCOPES DUE (Feb 21st) ----------------

Week 6 - The City (Feb 25): Urban Ecology and Sustainability

Review Session

Readings:
  - Chapter 1, Urban Ecology, p. 1-9
- Why the World Needs an Urban Sustainable Development Goal, Sustainable Development Solutions Network (SDSN), September 18, 2013
  - Executive Summary
  - Chapter 4. Resiliency and Environmental Sustainability

Week 7 – The City (March 4)

------------------ Exam I ------------------

II. The Farm

In the rural setting, we study how the first (and following) farmers manipulated plants, animals, soil, and water; and whether the Europeans encountered the “forest primeval” in the “New World.” We examine the processes that govern agroecosystems and how agriculture affects global warming and vice versa. Finally, how can agricultural sustainability be defined and achieved?

UNIT III: AGRICULTURAL ENVIRONMENT INTERACTIONS

Week 8 - The Farm (March 11): Agroecosystems: Nutrient Flows, Processes, and Interactions

Readings:

  - Chapter 12: Soil Organic Matter, p. 446-490
  - Chapter 13: Nitrogen and Sulfur Economy of Soils, p. 521-523
- Magdoff, F., and van Es, H. 2010. Building Soils for Better Crops: sustainable soil management. Sustainable Agriculture Research and Education (SARE) program, Waldorf, MD
  - Chapter 11: Crop Rotations, p. 115-125

Assigned to Discussant:

Week 9 - No Class (March 18): Spring Break

Week 10 - The Farm (March 25): Origins of Agriculture and Domestication of Plants and Animals  
**Guest lecturer: Peter Neofotis**

**Readings:**
  - Introduction, p. 11-18  

----- Field Trip to McEnroe Organic Farm [March 29th (Sat)] -----

Week 11 - The Farm (April 1): Environments and cultures of the Middle East

Why did some civilizations persist and others did not? Case Study of Nile and Mesopotamia. Erosion, sedimentation, irrigation, salinization.

*No homework to discuss; Group discussion of projects; go over 1st draft criteria*

**Readings:**
  - Chapter 11: Silt and salt in Mesopotamia  
  - Chapter 12: The gifts of the Nile  
  - Chapter 13: Husbandry of the rain-fed uplands
  - Chapter 4: Human Impact on Soils, p. 94-116
  - Chapter 10: Soil Erosion, p. 446-490  
  - Chapter Salinity
--- Field Trip Reports Due ---

**Week 12 - The Farm** (April 8): Transformations, before and after, in South America. No CR
Population, disease, species introductions. Did the Europeans encounter the “forest primeval” in the “New World”?

*Readings:*
  - Chapter 2: Human impact on vegetation, p. 20-32
- Scarborough, V.L. 2003. How to interpret an ancient landscape. PNAS 100:4366-4368

--- FIRST DRAFTS DUE – April 11 ---

**UNIT IV: AGRICULTURAL SUSTAINABILITY AND CLIMATE CHANGE**

**Week 13 - The Farm** (April 15): Climate Change and Agriculture

*Readings:*


Week 14 - The Farm (April 22): Sustainable Agriculture and Food Security

**Guest Lecturer: Glenn Denning** (Professor of Professional Practice in International and Public Affairs. Director, MPA in Development Practice Program. Director, Center on Globalization and Sustainable Development at the Earth Institute.

**Readings:**

• Alberts, B. 2013. Standing up for GMOs. Science 341:1320 DOI: 10.1126/science.1245017

Week 15 (April 29):  -------- PROJECT PRESENTATIONS 2:10 – 5PM  --------

Bioregional snacks

Week 16 - No Class (May 6) – Required Reading period; Review session (3-4 PM Altschul)

May 9:  --------------- FINAL PROJECT PAPERS DUE  ---------------

Final Exam Date (Tuesday, May 13):  -------- Exam II, ALT 805 1 – 4 PM  --------
No CR

Week 15 (April 29):  ----- PROJECT PRESENTATIONS – 2:10 – 5:30 PM  -----