Agriculture comprises the greatest single type of land use on the planet— as such, what happens on farms will have large and far-reaching effects on all other systems on the biosphere. Furthermore, with world human population continuing to grow at an exponential rate, the search for sustainable agricultural systems will become more and more urgent. This course will focus on the biological properties of agricultural ecosystems, with an eye towards which systems are the most sustainable. This will involve using theoretical and empirical approaches that are often used to study natural ecological systems and applying them to heavily-managed agroecosystems.

The task of describing the ecological framework of an agricultural system is relatively straightforward, though at times complex. One approach will be using natural systems such as tallgrass prairie as a benchmark when examining ecological relationships in agricultural fields. However, deciding which type of agricultural system is most sustainable is not so easy. Making judgments about "sustainability" involves a host of non-scientific disciplines such as ethics, philosophy, history, and economics. I find that everyone I talk to has a different definition of "sustainable agriculture," based in part on their ideals, ethics, and background. We will be spending some time throughout the term looking at these different views of agriculture, with readings in ethics and history, as well as delving into some economic analysis.

Since agricultural ecosystems are managed systems (that is, managed by people), it is important to understand what types of factors affect management decisions. What this means is that we need to understand how and why farmers make decisions about how to run their farm. In addition, there are many interest groups that are trying to sway farmers towards certain management decisions (Government regulators, environmentalists, consumer groups, agrochemical companies, etc.). To get a handle on these viewpoints, we will be looking at agricultural issues from a variety of perspectives, in a sense looking at the issues through the eyes of many types of people—a scientist, an environmentalist, a ‘conventional’ farmer, an organic farmer, etc. I am an organic farmer myself (my wife and I have a farm called Big Woods Farm) and I have my own opinions about a whole host of agricultural issues. However, my goal is to provide a balanced view of all issues—please let me know if my biases get out of hand (and also feel free to ask what my opinions are!).

Course Format

The class will meet Tuesdays and Thursdays, 8:15-10:00am, in Olin 02. The class meetings will consist of a mix of lecture, discussion, and outside speakers, as noted on the course schedule (available on class web page). I will use my lectures to present background information, for example on ecological theory and agricultural practices. Most discussions will focus on several assigned readings.

The first half of the course will involve a "crash course" in agricultural methods. Through my lectures and readings I hope to provide everyone with a common foundation of what techniques are involved in farming. Since the ecology and sustainability of an agricultural system depends on what practices are used, it’s important to understand the set of possible practices from which to choose. During the second half, we will examine ecological interactions in agroecosystems and address several specific topics, including biotechnology, farm policy, and alternative farm models (such as CommunitySupported Agriculture).
**Assigned Readings**

Required texts for the course:

- *Fatal Harvest: The Tragedy of Industrial Agriculture*, edited by Andrew Kimball.
- *The Unsettling of America*, by Wendell Berry.

As mentioned above, the discussions will focus on several assigned readings, as listed on schedule on the class web page. In addition, I will also assign material for most of the lectures and for speaker visits.

**Instructor**

David Hougen-Eitzman  
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Office Hours: Tues 10:30-11:30am; Wed 2:30-3:30pm  
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**Course Models**

There is a bewildering diversity of farms and farming methods used throughout this country and the world. In order to allow for discussion and analysis of alternative methods, we will focus our attention in the course on two farming ‘models’, as well as a natural ecosystem. By narrowing the discussions in this way, we can hopefully deal with particular situations and reduce the immense diversity in the types of farms and farming practices to a manageable level.

For both of these models, I chose farms that occur in southern Minnesota. The **first model** is a standard Midwestern farm - a farm where the farmers derive most of their income from the farm, grow row crops that primarily include corn and soybeans, and may raise either hogs or dairy cows. If the farm has dairy cows, the farmers also will probably raise hay on some of the acreage. The **second model** is a Midwestern vegetable farm. Again the farmers derive most of their income from the farm and here grow a variety of vegetables that are either sold through wholesale or direct-marketed to stores, co-ops, or farmer's markets. I am an organic vegetable grower myself, so I hope you will excuse my bias towards this model. The **third model** is a Midwestern tallgrass prairie. This is the type of ecosystem that was present on much of the farmland in the Midwest before farming settlers arrived.

Though we will focus on Midwestern farms, there will be times when our readings concern farms in other parts of the country, or our discussions deal with issues of a national or international nature. By giving ourselves a grounding in a specific area (i.e., the two Midwestern farm models and the tallgrass prairie), we will all have a common basis both for learning concepts and from which we can broaden our discussions to include more complicated (and hence more real) situations.

**Grading**

The class grade will be based on two essays, two quizzes, several case studies, a group project, and participation in the Caucus conference and discussions. Since participation in discussions and interaction with the speakers are both integral parts of the course, attendance at all class meetings is mandatory (two unexcused absences are allowed).
Graded work:
20% two essays
20% two quizzes
30% Case studies
20% group project (including peer evaluation)
10% Class participation (includes teaching module)

Essays
There will be two graded essays due during the term (see class schedule for exact dates). For each essay I will hand out a list of possible topics one week before the essay is due. This list will draw on the material covered in class and will show the types of topics that are appropriate for your essay. You may choose a topic or issue from the list, or you can discuss with me an idea you have for an alternative topic. In any case, the topic for the essay must deal with issues discussed in class (either from assigned readings, in-class discussions, a visiting speaker, or lectures). I would like these essays to deal with the "non-scientific" aspects of sustainable agriculture, such as culture, ethics, history, or philosophy. Refer to the essay stylesheet on the class web page for information about the format of the essays. After I return your essay with a grade and my comments, you may rewrite the essay and receive up to one letter grade increase in your grade.

Quizzes
There will be two short 20-30 minute quizzes during the term. These quizzes will cover material from lecture and readings, focusing on the science of agroecology.

Case Studies
There will be three or four case studies that you will work on in a group. These studies will involve in-depth problem solving and work outside of class.

Group Service Project
During the term, you will work with (ideally) two other students on a service learning project. One of the goals of the course is to help you become an active participant in solving environmental problems. And since agriculture is at the center of many environmental issues, this project should provide plenty of real-world fodder for a good project. For your project, you should tackle a real-world problem or issue in agriculture in a way that will provide a service to the community (local, regional, or even larger-scale). A topic should be chosen that draws on the expertise and/or interest of each of the group members (see project description on class web page). During the last week of the term, each group will present a poster during a poster session that occurs during class (see the class schedule), as well as a project synopsis in the form a 2-3 page document. Refer to the poster stylesheet on the class web page for information about the format of the poster, the poster session, and the grading of the poster.

After the class poster session, each member in the group will evaluate the other members in his/her project group in terms of how much each person participated. The score you give to your group members should reflect how you feel about the extent to which the other members of your group contributed to your group's work and performance. This score will be used to alter the group project score for each group member – up to one letter grade up or down. See the peer evaluation on the class web page for a description of how this process will work.
**Teaching module**

I am believer that you must learn something to be able to teach it. Also, teaching and public speaking are important skills for any member of our society. You and two or three other students will teach a module about biotechnology. Your module should last approximately 15 minutes. We will discuss the topics and resources for the project later in the term.

**Participation**

Two types of participation are required for this course. First, as much of the course material is presented and discussed in class, I expect all students to attend all classes and take part in all discussion. Part of my expectation for your attendance in class is that you have completed the assigned readings before class begins. Second, each student should respond to all class speakers on Caucus. To get full credit for participation on the Caucus conference, you must respond to each class speaker within one week of the speaker’s visit.

**Class Conference on ‘Caucus’**

I have set up a Caucus conference for this course called ‘Agroecology.’ This conference will serve two purposes. First, I hope that it will serve as a medium for online discussions about issues raised in the course (in lectures, readings, and discussions) and other current agriculture-related issues about which you have an interest. Second, the conference will provide a location for you to enter comments on visits from speakers.

The class conference is an online bulletin board of sorts. It is structured as a series of topics, with a set of replies attached to each topic. Comments or replies about the topic are then attached to the topic. For example, you should enter your comment/response to a speaker as a reply to the topic. Additionally, I welcome you to post comments on sustainable agriculture or the course here.

To access Caucus, go to the Carleton College home page and click on ‘Caucus’. Then click the box that says ‘Log in to Caucus’. You should then join the class conference. The easiest way to do this is to type ‘Agroecology’ in the box for joining a conference. Once you are on the ‘Agroecology’ Caucus page, you should make yourself a member of the conference and add the conference to your personal list by clicking on the appropriate ‘Yes!’ box. Reading and responding to messages is relatively straightforward – follow the directions on the screen. If you have questions, contact me or someone at the computer help desk in CMC.

**Class Web Page**

I have created a web page for the course. This page can be found by clicking ‘Course Web Pages’ on the Carleton Biology Department home page. Most importantly you will find the readings for each class period, as well as descriptions of other graded assignments. There are quite a few resources available related to agriculture on the World Wide Web and I hope the course web page will help you in your search for information. I will put useful and interesting links to agriculturally-related sites on the course web page as I find them: if you find any good sites, let me know so I can add them to the page. In addition, I will put copies of the class handouts on the web page so you can refer to them on-line.

I encourage anyone with special needs to talk to me after the first class period or come visit with me in my office.