

# SMALL SCALE FOOD PRODUCTION

Env Studies 166FP/ Geog 171FP / Anth 166FP/266FP, 5 units, 2008 Spring, UCSB, DA Cleveland

Website: <http://www.es.ucsb.edu/faculty/cleveland/Courses/166fp/166fpintro.htm>

Lecture/Discussion: Tuesday 12:30-1:45, Girvetz 1112.

Lab and garden work: Thursday 12:30-4:50, UCSB Greenhouse & Garden Project (SW of Los Carneros and Mesa)

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Teaching Assistant: Laurel Brandt. Email: [lbrandt@bren.ucsb.edu](mailto:lbrandt@bren.ucsb.edu) (put "SSFP" in subject line). Office hours: Tuesday 11:00-12:00, Wednesday 1:30-2:30, and by appointment.

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## 1. Introduction

Small-scale food production has not disappeared or been entirely replaced by large-scale production, despite many predictions to the contrary, and the assumption that it is not a viable option for the future. Much theory and data suggests that small-scale, locally-based food production will continue to play an important part in increasing the sustainability of the world's food systems for the foreseeable future, despite the growth of large-scale, nationally and globally-based food production. However, there are also much theory and data that challenge this conclusion. In this class we critically examine hypotheses that small-scale, locally oriented food production is more environmentally, socially and economically sustainable than large-scale food production as part of a global food system. We also learn practical principals of small-scale food production through hands-on experience and lab exercises in the class garden plot at the UCSB Office of Student Life, Greenhouse and Garden Project, and through field trips to local small-scale farms. Each student will cultivate a garden plot as member of a small group, including participation in a group experiment, and keep a garden journal. Garden

membership is required (\$20 fee); tools (excluding small hand tools) will be provided. The main texts are Cleveland and Soleri (1991) *Food From Dryland Gardens*, weekly readings of scientific articles, and the class *Lab Manual*.

## 2. Requirements

This syllabus is a **contract** between you (each individual student) and the instructor. By taking this course you agree to the requirements and terms stated here. These requirements may be modified or supplemented later in minor ways, and you are responsible for those changes.

**QUIZZES AND EXAMS WILL NOT BE GIVEN EARLY, AND MAKE-UPS WILL BE GIVEN ONLY IN DOCUMENTED CASES OF EMERGENCY. ALL WRITTEN ASSIGNMENTS ARE DUE AT THE BEGINNING OF CLASS ON THE DAY THEY ARE DUE. ASSIGNMENTS TURNED IN AFTER THE BEGINNING OF CLASS WILL BE CONSIDERED ONE DAY LATE. ASSIGNMENTS WILL BE MARKED DOWN ONE LETTER GRADE FOR EACH DAY THEY ARE LATE.**

**SO, CHECK YOUR ACADEMIC, ATHLETIC AND SOCIAL SCHEDULES FOR THE QUARTER, AND DROP THIS COURSE NOW IF THERE IS A CONFLICT. THIS INCLUDES PLANNING YOUR CLASS SCHEDULE SO THAT YOUR FINALS DO NOT CONFLICT AND SO THAT YOU DO NOT HAVE TOO MANY FINALS ON ONE DAY.**

You are **REQUIRED** to have a three-ring note book to keep your lab exercises and other class material in by lab of Week #1.

### 2.1. Computer and internet access and competency

*Access to and frequent use of the internet for class assignments is required.* Weekly assignment and syllabus updates will be posted on the class website, and some readings available only on the internet will be assigned, and you are responsible for everything posted on the class website. Website is restricted access, user name = I2Eat, password = lettuce08. *Also required is an active email account that you check daily*, so you can use it for communication with instructors, and with other students. Access to and use of computer, word processor and printer is required for producing written assignments. There are computers and a printer in the Environmental Studies Conference Room.

### 2.2. Readings

There are three required readings.

1. *Food From Dryland Gardens* (1991) by David A. Cleveland and Daniela Soleri. CD, can print chapters.
2. *Lab Manual for Small-Scale Food Production*.
3. Articles and other readings, mostly from scientific literature (most available on the class website, some handed out in class).

You will also have to review and use material from *World Agriculture, Food and Population*, the prerequisite for this class.

### 2.3. Participation in class and lab

#### 2.3.1. Reading and class participation

*Lecture/discussions and labs will be based on the assumption that you have done the required reading by the date it is listed on the syllabus.* I expect all students to participate in class/lab discussions, group garden work, lab demonstrations, and experiments. If you have not done the readings, it will be difficult for you to understand the lectures/labs and participate. Weekly study questions will guide you to the parts of readings that require the most attention and thought. *Critical Analysis Guidelines* will be handed out and will serve as the rubric for evaluation of class material.

**Note:** on some of the readings only specified pages are assigned, and you do not have to read the whole article. You should read and understand the study questions before doing the reading; skim quickly through the reading to get the main points; then read it again more carefully, take notes, and write out answers to the study questions.

### 2.3.2. Labs

The lab meets at the Greenhouse and Garden Project (GHGP) on campus. Each week there will be a lab exercise/experiment to complete and hand in by the following Tuesday. They will normally be graded and returned by your TA the Thursday following.

Things to bring/wear each week:

- Work clothes including good shoes.
- Your own hand tools if you want them.
- Work gloves, hat, sunscreen, and if you're sensitive, insect repellent to protect yourself (citronella oil is nontoxic).
- Food and water.
- Eating utensils, plate, bowl, cup.

In addition, garden tools are available for your use at the Garden Project. The combination to the locked shed is 10-28-34. You are responsible for replacing all borrowed materials. I encourage you to continue maintaining your group plot through the summer, fall and winter, until a new class takes over next spring.

You will need to follow all the rules of GGP. This includes not using bird netting or fencing (wire, wood, pipes, etc.), no stripping fruit trees, etc. A copy of the GGP rules will be available.

Use of cell phones, music, etc. is **NOT** allowed during labs (except by instructors).

### 2.3.3. Group Plot Groups and Experiment

A major part of the class is working in the class garden plot, and in your group plot at the GHGP. We will divide into six plot groups, and your group will be responsible for your plot for the entire quarter. We will also be conducting an experiment comparing compost with no compost. Each group plot will have 2 1m<sup>2</sup> experimental plots, one control and one treatment, and will maintain and weigh harvests, record data and analyze data.

### 2.3.4. Food Group,

Each week we will have a break of 20-30 minutes for a snack. We'll divide the class into 8 groups, and each group will be responsible for bringing a *vegan* snack one week (Weeks 2-9). Remember to bring enough for the class plus any guest speakers (~32 people) Try to get as many ingredients as possible from local, small-scale resources, including your class garden plot! **Display and turn in form listing ingredients for each dish you make, including as much information as you can obtain on where and how the ingredients were produced.** Week #1 David and Laurel will provide the food. When we have a long field trip we'll eat our snack while we're traveling between farms, so the snack group for these weeks should make sure to bring only food easily eaten with fingers.

### 2.3.5. Commons Class Plot Group

The food group will also be the Commons Group will maintain the common area of the class plot for one week each (Weeks 2-9). The TA will assign your work and evaluate it. Group work includes maintaining paths and common areas, care of trees on the perimeter of our plot, and maintaining the compost pile.

## 2.4. Written work

### 2.4.1. Format

All written work should be machine printed on 8.5 x 11 inch paper, single-spaced, with one inch margins on all four sides, staple in the upper left hand corner, use 12 point font such as Times New Roman, Arial or other standard font. Put your name, course number, and date in the upper *right* hand corner of the *first page*, and your last name and page number in the upper *right* hand corner of *each subsequent page*. Papers that are difficult to read because of poor printer quality will not be accepted. To *conserve paper*, you can print on both sides of the paper, or reuse paper that has one side previously used, as long as your assignment is clearly legible.

### 2.4.2. Introductory essay

This essay is due Week #2, Tuesday. It should be 300-500 words, and answer the following questions in sections numbered 1 to 7.

1. Why are you taking this course?
2. What do think are the most interesting and important aspects of small-scale food production?
3. What is your definition of small-scale food production?
4. What is your experience with small-scale food production?
5. What is your major career interest, and how does this course relate to it?
6. What do you expect to get out of this course, and how do you hope to apply it in the future?
7. What grade do you expect to receive and what level of work do you plan on doing to receive it?

### 2.4.3. Lab exercises

The Lab Book contains exercises (questions on basic principles, records of your observations, and results of demonstrations and experiments for each of the nine weekly labs. *The questions on basic principles need to be answered before the lab and will be checked at the beginning of each lab.* For most weeks the lab exercises will be collected on Thursdays at the end of lab, graded, and returned on Tuesdays.

There are also pages for weekly journal entries, one for general observations and a diagram of your plot. The purpose of keeping a journal is to help you to improve your powers of observation and reflection, and to increase your understanding of agricultural processes. *Journal entries will be checked regularly.* The journal should include:

- a) a diary of *natural events* in your group plot and in the garden as a whole (e.g. plant life cycles, insects, diseases, animals, weather),
- b) a diary of your *individual, group and class* activities in garden, e.g. planting, watering, weeding,
- c) notes on field trips
- d) notes on demonstrations, experiments, presentations (in addition to written lab reports),
- e) personal reflections on life in the garden,
- f) notes of weekly events in your group plot recorded on the map.
- g) sketches to illustrate above,

### 2.4.4. Exams

The best way to prepare for the Quizzes and the Final Exam is by 1) taking notes on the lectures, readings, lab demonstrations and exercises, and class presentations, 2) using these notes to answer the study questions which will be handed out, 3) asking questions and participating in discussions during the lectures and labs, 4) contacting the instructors outside of class if you have any remaining questions. Questions will be a mixture of short and long essay, and will be based on the study questions. Quizzes will concentrate on Tuesdays' readings and discussion. The Final will be based on the class materials for the whole quarter.

### 2.4.5. Graduate student paper

Graduate students will write a research paper dealing with topics covered in the course. Paper topic and content must be approved by Cleveland.

## 3. Student Evaluation

DESCRIPTION	DATE	POINTS
Introductory essay (1-2 pp.)	Wk #2	25
Tues seminar: written assignments and class participation in	Wks #2-9 (15 points/week)	120
Lab exercises (due following Tue)	Wks #1-10 (20 points each)	200
Quizzes (best 3 of 4) (in class)	Wks # 3, 5, 7, 9 (3 @ 80 points each)	240
Final exam	Wk #11, Mon, June 6, 12 -3p.m.	220
Work in group plots, experimental plot	Wks #1-9 (15 points/wk)	135
Commons Group work, as assigned	Wks 2-9	30
Food group (food & written description)		30
<b>TOTAL</b>		<b>1000</b>

Your grade will be a result of your work *and* improvement during the course. Grading is *not* on curve. All students can earn an "A," or an "F".

POINTS EARNED	GRADE
967-1000	A+
933-966	A
900-932	A-
867-899	B+
833-866	B
800-832	B-
767-799	C+
733-766	C
700-732	C-
667-699	D+
633-666	D
600-632	D-
0-599	F (Failure)

## 4. Getting help

If you experience difficulty with understanding the material in this course, please discuss this *immediately* with one of the instructors. In addition, a wide range of services is available at UCSB to support you in your efforts to meet the course requirements.

- Campus Learning Assistance Service: 893-3269. CLAS helps students increase their mastery of course material through course-specific tutoring and academic skills development. Check out the tutorial groups and drop-in tutoring schedules posted the web site: [www.clas.ucsb.edu](http://www.clas.ucsb.edu). Sign up for services at the CLAS main office, Building 477 9-5 daily.
- Counseling & Career Services: (893-4411, [www.counseling.ucsb.edu](http://www.counseling.ucsb.edu)) offers counseling for personal & career concerns, self-help information and connections to off-campus mental health resources.
- Disabled Students Program: 893-2668; [www.sa.ucsb.edu/dsp](http://www.sa.ucsb.edu/dsp) DSP provides academic support services to eligible students with temporary and permanent disabilities. Please let us know if you require special classroom accommodations due to a disability. You must register with DSP prior to receiving these accommodations.
- Office of International Students and Scholars, <http://www.oiss.ucsb.edu/>.

## 5. Schedule

→\*\*N.B. This schedule is provisional, **CHECK CLASS WEBSITE EACH WEEK FOR REVISED SCHEDULE**

### Week 1. Introduction to the class; beginning our garden plot.

Tuesday, April 1. *Small-scale food production—past, present and future.*

#### LECTURE/DISCUSSION

Small-scale food production: testing hypotheses from local to global.

#### READINGS

Class Syllabus.

Review *World Agriculture* Lectures and Readings for Weeks 1-3; un=worldag, pw=carbon&U .

FFDG (Cleveland, DA and D Soleri. 1991. *Food from Dryland Gardens: An Ecological, Nutritional, and Social Approach to Small-Scale Household Food Production*. Tucson, Arizona: Center for People, Food and Environment, with UNICEF). Chapter 1 (Introduction)..

**Thursday, April 3. Setting up class plot and 6 group plots.**

Basic principles and practices of composting, plant selection, planting seeds and transplants caring for seedlings.

**READINGS**

*Whitman, W. 1856. This compost.*

*The Greenhouse & Garden Project*

*Lab Manual. Introduction, Lab #1.*

*FFDG. Chapter 6 (re. seeds, sections 6.4, 6.5), Chapter 8 (re. plant management, sections 8.1-8.5), Chapter 9 (re. organic matter and composting, section 9.6).*

***Water-soil-plant relationships and management.***

**Tuesday, April 8. Soils, nutrient cycles, and plant growth.**

**LECTURE/DISCUSSION**

Soil quality and management in organic and conventional agriculture. Guest presenter: Oliver Chadwick, Geography Department, UCSB.

**READINGS**

Mäder, P, Fließbach, DuBois, D, Gunst, L, Fried, P, and Niggli, U. 2002. Soil fertility and biodiversity in organic farming. *Science* 296:1694-1700. (Review from 149.)

Martini, E. A., J. S. Buyer, D. C. Bryant, T. K. Hartz and R. F. Denison (2004) Yield increases during the organic transition: improving soil quality or increasing experience? *Field Crops Research* 86(2-3): 255-266.

Other readings TBA

***Thursday, April 10. Soil genesis and physical properties.***

**READINGS**

*Lab Manual. Lab #2.*

*FFDG. Chapter 6 (Growing plants from seeds): read sections 6.1, 6.3-6.7; Chapter 9 (Soils in the garden): Read all.*

***Water-soil-plant relationships and management, cont.***

**Tuesday, April 15. Water-soil-plant relationships in food production. \*\*QUIZ #1 at end of class\*\***

**LECTURE/DISCUSSION**

Small-scale water management for food production.

**READINGS**

*FFDG: Chapter 10 (Water, Soils and Plants); Chapter 11 (Sources of Water for the Garden): read pp. 207-220; Chapter 12 (Irrigation and Water-Lifting): read pp. 227-236.*

Other readings TBA

**Thursday, April 17. Applying water-soil-plant management principles.**

**READINGS**

*Lab Manual. Lab #3.*

*FFDG: Chapter 11 .*

*Review: FFDG: Chapter 10, 11 & 12 (from Tuesday).*

**Week 4. Plant growth and reproduction, and crop ecology.**

**Tuesday, April 22. Intercropping polycultures and small-scale food production.**

**LECTURE/DISCUSSION**

Land equivalency ratios and small-scale food production.

**READINGS**

- McDonagh, J. F. and A. E. M. Hillyer 2003. Grain legumes in pearl millet systems in northern Namibia: an assessment of potential nitrogen contributions. *Experimental Agriculture* 39:349–362. (pdf on class website)
- Tsubo M, E Mukhala, HO Ogindo and S Walker. 2003. Productivity of maize-bean intercropping in a semi-arid region of South Africa. *Water SA* 29:381-388. (pdfs on class website)
- Other readings TBA

**Thursday, April 24. Plant physiology, anatomy and reproduction.**

**READINGS**

- Lab Manual*. Lab #4.
- FFDG: Chapter 5 (How plants live and grow), Chapter 6 (Growing plants from seeds): read section 6.2.

**Week 5. Small-scale food production in the world, California and Santa Barbara Co., Part I.**

**Tuesday, Apr 29. Sustainable urban food systems and urban/periurban agriculture; incentives, policies and mechanisms for conserving farmland; Goleta case study.**

**LECTURE/DISCUSSION**

People v. food? Small-scale, local food production v. urbanization.

**READINGS**

- SBCPD (Santa Barbara County, Planning and Development). 2002. *Goleta Valley Urban Agriculture*. Santa Barbara, California: Santa Barbara County, Planning and Development. <http://countyofsb.org/plandev/comp/programs/Newsletters/guan/default.html>). Read pp. Part I: 1-4; Part II: 5-10, Maps 1 and 2; Part III: 15, 18-19, 21, 25-26.
- Kambara, K. M., and C. L. Shelley 2002. *The California Agricultural Direct Marketing Study*. U.S. Department of Agriculture, Agricultural Marketing Service, Transportation and Marketing Programs, Marketing Services Branch, and California Institute of Rural Studies, Davis, California, <http://www.ams.usda.gov/tmd/MSB/PDFpubList/CIRSDMReport.pdf>. Read only: pp. ii-7 (Overview, Intro, Context), 15-18 (Scale effects, Farm sales), 33-34 (Conclusions).
- Pirog, R., and A. Benjamin 2003. Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions. Leopold Center for Sustainable Agriculture, Iowa State University, Ames, Iowa.
- Gruere, G., K. Klonsky, and R. E. Goodhue. N.d. Do Farms Provide More Than Food? Public perspectives in California.
- Williamson Act ([http://www.csac.counties.org/legislation/williamson\\_act/wa\\_fact\\_sheet.pdf](http://www.csac.counties.org/legislation/williamson_act/wa_fact_sheet.pdf)) [READ PP. 1-3]
- Goland, C, and Bauer, S. 2004. When the apple falls close to the tree: Local food systems and the preservation of diversity. *Renewable Agriculture and Food Systems* 19 (4): 228-236.
- Other readings TBA

**Thursday, May 1. Farm field trip.**

**READINGS**

*Lab Manual*. Lab #5.

**Week 6. Trees and other perennial crops.**

**Tuesday, May 6. Principles of orchard agroforestry and perennial/annual intercropping.**

**\*\*QUIZ #3 at end of class\*\*LECTURE**

**LECTURE/DISCUSSION**

Small-scale agroforestry.

**READINGS**

Readings TBA

**Thursday, May 8. Grafting and pruning.**

READINGS

*Lab Manual*. Lab #7.

FFDG: Chapter 8 (section pp. 142-149, "Pruning"), Chapter 7 (Vegetative Propagation)

***Animals, plants and microorganisms, good and bad.***

***Tuesday, May 13. Ecology of animals, plants and microorganisms in agriculture.***

**\*\*QUIZ #2 at end of class\*\***

LECTURE/DISCUSSION

Low input, sustainable management of biotic stresses in small-scale food production.

READINGS

FFDG: Chapter 13 (Pest and Disease Management): read sections 13.1-13.2.

Wolfe, MS. 2000. Crop strength through diversity. *Nature* 406:681-82.

Zhu, Y. et al. 2000. Genetic diversity and disease control in rice. *Nature* 406:718-22.

Other readings TBA

***Thursday, May 14 Managing animals and microorganisms in small scale food production.***

READINGS

*Lab Manual*. Lab #6.

FFDG: Chapter 13 (Pest and Disease Management): read sections 13.3-13.4.

***Small-scale food production in California and Santa Barbara County, part II.***

***Tuesday, May 20. Small-Scale Urban Agriculture; Garden-based education:***

LECTURE/DISCUSSION

Creating policies to support sustainable local urban food systems in a global context

READINGS

Subramaniam, Aarti. 2002. *Garden-based learning in basic education: a historical review*. 4H Center for Youth Development, UC Davis (via www)

Graham, H., G. Feenstra, A. M. Evans and S. Zidenberg-Cherr (2004) Davis school program supports life-long healthy eating habits in children. *California Agriculture*: 200-205.

<http://www.sarep.ucdavis.edu/Organic/>

Cleveland, D.A., T.V. Orum and N. Ferguson. 1985. Economic value of home vegetable gardens in an urban desert environment. *HortScience* 20(4):694-696. (via www)

Cleveland, DA. 1997. Are urban gardens an efficient use of resources? *Arid Lands Newsletter* [University of Arizona] No. 42, article No. 4, <<http://ag.arizona.edu/OALS/ALN/aln42/cleveland.html>>. (via www)

FFDG Chap. 2, Gardens and nutrition, Section 2.11 (pp. 28-29); Chap. 3, Gardens, economics and marketing, Section 3.3 (pp. 36-39).

Other readings TBA

***Thursday, May 22.***

TBA

***Week 9. Small-scale food production as globally sustainable agriculture.***

***Tuesday, May 27. Testing hypotheses about energy, labor efficiency and scale, and about economic, social, nutritional, and environmental sustainability and scale.***

**\*\*QUIZ #4 at end of class\*\***

LECTURE/DISCUSSION

READINGS

FFDG: Part I (Gardens as a development strategy, introduction), Chapter 3 (Gardens, economics and marketing), Chapter 2 (Gardens and nutrition in drylands), Chapter 15 (Processing, storing and marketing food from the garden), Chapter 16 (Weaning foods from the garden)

Cleveland, DA. and D Soleri. 1987. Household gardens as a development strategy. *Human Organization* 46(3):259-270.

Narayanan, S, and Gulati, A. 2002. *Globalization and the smallholders: a review of issues, approaches, and implications*. Discussion Paper. Washington, D.C.: International Food Policy Research Institute (IFPRI).

Other readings TBA

***Thursday, May 29 .Garden Gathering preparation, interviewing, night visits.***

*Final rounds of class group plots: analyzing success and failure; preparation for Garden Gathering*

***Week 10. Review.***

***Tuesday, June 3. Review for final exam.***

Review for final exam.

***Thursday, June 5. Garden Gathering??***

***Week 11. Final exam. Monday, June 9, 12 noon – 3 p.m., Gervetz 1112.***