



## **CIEE Global Institute - Monteverde**

<b>Course name:</b>	Introduction to International Agriculture
<b>Course number:</b>	(GI) AGRI 2002 MOCR
<b>Programs offering course:</b>	Monteverde Open Campus Block: STEM and Society
<b>Open Campus track:</b>	STEM and Society
<b>Language of instruction:</b>	English
<b>U.S. Semester Credits:</b>	3
<b>Contact Hours:</b>	45
<b>Term:</b>	Fall 2019

### **Course Description**

Agriculture has helped to shape the creation of societies and economies, and has profoundly impacted global and local environments. In turn, the environment, as well as societies and economies have shaped food and its production. In this interdisciplinary course, students will explore the variation of agricultural production, trade, and consumption, around the world, historically and in modern day.

### **Learning Objectives. Upon completion of this course, students will**

- Have an understanding of factors that favored the evolution of agriculture and how foraging influenced human evolution
- Have expanded knowledge of the process of domestication, cultivation, and spread of plants and livestock, from prehistory to the present day, across many different regions and cultures, particularly involving the Americas.
- Compare and contrast the environmental and biological factors that influenced crop cultivation and animal husbandry in early agriculture of China, Mesoamerica, and Mesopotamia.
- Identify the characteristics of modern (industrial) agriculture, as well as alternatives to modern agriculture (e.g., permaculture, hydroponics, organic farming, etc.) and critique them in terms of how well they satisfy requirements for human nutrition, and meet the demands created by human population sizes and consumption preferences.
- Have an enhanced understanding about modern agriculture impact on soil, water, biodiversity, greenhouse gases and climate change and be able to contrast these with impacts of alternative agricultural practices.
- Deconstruct the basic agricultural legacies of the Colombian Exchange, with a focus on the spread of crops, livestock, agricultural pathogens and technologies
- Have a deeper knowledge of the social and economic legacies of plantation agriculture in the Americas, and forecast future impacts of migrant-dependent agriculture today.
- Deconstruct the value chain of principal tropical agro-export crops and the relationship with poverty traps.
- Be familiar with the role of international agriculture trade and aid policies on food access, food costs, and food sovereignty, as well as a deeper understanding of the relationship between agriculture, hunger, and poverty.
- Become enlightened on initiatives, importance, and practice of the conservation of



agricultural diversity.

- Be able to envision and articulate alternative agricultural methods for the Tropics.
- Develop skills in researching peer-reviewed sources, and show improved writing and public speaking skills
- Become an enlightened and active stakeholder in decision-making on the production, trade, and consumption of food.

### **Course Prerequisites**

A university-level course in the natural sciences, environmental studies, sustainability, or agriculture

### **Methods of Instruction**

Each week there will be a mixture of lectures, discussion sessions, and special activity sessions (including podcasts and student oral presentations). Readings listed below are to be done **before class**: some weeks there is a relatively light workload, and other weeks are more demanding. Most readings are book chapters, articles, or selections from longer works.

### **Assessment and Final Grade**

- |   |     |
|---|-----|
| • Participation   | 20% |
| • Discussion Reflections                                    | 10% |
| • Comparative Food Journal Reflection                       | 10% |
| • Food Miles Market Activity (Written and Oral Reports)     | 20% |
| • Alternative Agriculture for the Tropics Final Oral Report | 15% |
| • Final Exam  | 25% |

### **Course Requirements**

**Discussions Reflections (10%).** There are 5 programmed Discussions. For each, the topic will center on the week's readings. A prompt will be provided by the instructor. In small groups, the students will discuss the prompt, and form a perspective that is supported by facts, figures, and other information drawn from readings and lectures. Then there will be an open discussion with all members of the class. Full participation - expected of each student - includes asking questions, listening to others, and articulating coherent viewpoints. Students will score themselves in terms of their contributions in the small groups. The instructor or teaching assistant will score students in terms of performance in the open discussion. The student will earn the average score for small group and open group discussion. For each discussion, students will write a 250 word reflection on the Discussion.

**Comparative Food Journal Reflection (10%).** For this assignment, students are evaluated on their written expression. Students will take notes on meals that they are eating in their new Costa Rican context. They will reflect on their typical Costa Rican meals and snacks, and brainstorm on the following questions: What are the main raw



ingredients of principal food items in the local diet? How does this differ compared to those of the diet of a US college student on a home campus? How are they the same?

After this brainstorming session, each student will select one principal food item from Costa Rica and one from the USA of particular significance. The significance may be related to the origin of its ingredients, methods of cultivation, impacts on the economy, environment, or society, in the past or present. *Students should select foods or meals that offer an interesting contrast. Students should make use of published information including, but not limited to, the assigned readings, to make a strong selection.*

Then students will write a 1000-word essay, in the style of an autobiographical essay or reflective journal entry. It should describe and justify the choice of the two contrasted foods or ingredients and their significance. Students should write in the first person, as in a reflective journal entry, but must include a minimum of five peer-reviewed citations for references (APA format). A grading rubric will be supplied (separately).

**Food Miles Market Activity (Written Report, 10% and Oral Report, 10%).** In this exercise, students will be evaluated on their written and oral communication skills, through a written report and an oral presentation to the class, on the topic of food miles of grocery store products. In groups of 2-3, the students will visit grocery stores and markets and ask vendors questions about the source of products. For products grown or raised domestically, students will note the name of the source town or region. For products that are imported from another country, students will ask vendors for the source country, or use online resources to determine the most likely origin. Students will use Google maps or foodmiles.com to calculate distances travelled.

For the reports, the students will explore the meaning and significance of food miles, how this topic is related to the externalities of food trade (such as carbon and water footprints and greenhouse gas emissions), the intersection of food miles and food security, and other relevant issues related to the globalization of food markets.

Students will individually write reports, but will make oral presentations in their groups. The oral report will be a Prezi or PowerPoint presentation, and should follow the guidelines for good oral reports (given separately). A grading rubric will be supplied (separately). Each individual will write a 2,000-word report that summarizes the group's findings and conclusions. The report should have citations (APA format, including for online references). It should lay out a thesis statement and supporting evidence to substantiate a perspective. A grading rubric will be supplied (separately).

**Alternative Agriculture for the Tropics: Final Oral Report (20%).** In this exercise, students are individually graded on their performance during an oral presentation. Each student will, with guidance from the instructor, select an alternative to conventional agriculture for use in the tropics. Criteria for the selection of the alternative agricultural method must include consideration of a global challenge that this alternative could



overcome or circumvent. Challenges could include climate change, loss of biodiversity, scarcity of water, technology-transfer to developing countries, pathogen outbreaks, phosphorus limitations, land scarcity, or other possibilities.

Students will use online resources and, when possible, farm visits or interviews, to gather information and images on the production system. This will include such as inputs and outputs, water, soil, and air impacts and management, whether this is a land-sharing or land-sparing strategy, and how technology and laborers are involved, if at all. The student will explain and critique the alternative agriculture production system in the context of tropical developing nations, and make recommendations for its successful application.

For the 20-minute oral report (Prezi or PowerPoint), the student will explain the alternative and critique it in terms of how well the methods solve the global challenge identified. Suggestions should be made for whether and how to adapt these methods for the tropics. A grading rubric for the oral report will be supplied (separately).

**Final Exam (35%).** 100 points. This will consist of an in-class, closed-book exam (short answer and short essays).

### **Participation**

Participation is valued as meaningful contribution in the digital and tangible classroom, utilizing the resources and materials presented to students as part of the course. Meaningful contribution requires students to be prepared in advance of each class session and to have regular attendance. Students must clearly demonstrate they have engaged with the materials as directed, for example, through classroom discussions, online discussion boards, peer-to-peer feedback (after presentations), interaction with guest speakers, and attentiveness on co-curricular and outside-of-classroom activities.

### **Class Attendance**

Regular class attendance is required throughout the program, and all unexcused absences will result in a lower participation grade for any affected CIEE course. Due to the intensive schedules for Open Campus programs, unexcused absences that constitute more than 10% of the total course will result in a written warning.

Students who transfer from one CIEE class to another during the add/drop period will not be considered absent from the first session(s) of their new class, provided they were marked present for the first session(s) of their original class. Otherwise, the absence(s) from the original class carry over to the new class and count against the grade in that class.

For CIEE classes, excessively tardy (over 15 minutes late) students must be marked absent. Attendance policies also apply to any required co-curricular class excursion or event, as well as to Internship, Service Learning, or required field placement. Students who miss class for personal travel, including unforeseen delays that arise as a result of personal travel, will be marked as absent and unexcused. No make-up or re-sit opportunity will be provided.



Attendance policies also apply to any required class excursion, with the exception that some class excursions cannot accommodate any tardiness, and students risk being marked as absent if they fail to be present at the appointed time.

Unexcused absences will lead to the following penalties:

<i>Percentage of Total Course Hours Missed</i>	<i>Equivalent Number of Open Campus Semester classes</i>	<i>Minimum Penalty</i>
Up to 10%	1 content classes, or up to 2 language classes	Participation graded as per class requirements
10 – 20%	2 content classes, or 3-4 language classes	Participation graded as per class requirements; <b>written warning</b>
More than 20%	3 content classes, or 5 language classes	Automatic <b>course failure</b> , and possible expulsion

## Weekly Schedule

NOTE: this schedule is subject to change at the discretion of the instructor to take advantage of current experiential learning opportunities.

### **Week 1 Introduction, Hunters Gatherers**

Session 1.1 Introductory Concepts. The syllabus, attendance and participation expectations; assessment; work load and time commitment; schedule. Humans as Hunters and Gatherers. Human foraging in the Paleolithic Period of the Stone Age; geographic distributions; the archaeological evidence of a hunter-gatherer lifestyle; population sizes and sociality of nomadic and semi-nomadic groups; early diets; nutrition; foragers as good botanists; variation in subsistence techniques across place and time; mixing foraging and cultivation; use of tools and specialized foraging strategies (e.g., persistence hunting); theories for how foraging strategies influenced human evolution; impacts on environment and vice versa; conditions that favored nomadism; close-up on hunters and gatherers in the Americas of yesterday and groups that persist until the present.

- Special Activities Sessions:
  - University of Oxford Podcasts, Hunter-Gatherer Diets: <https://podcasts.ox.ac.uk/keywords/hunter-gatherer>
- Discussion Session 1: Ponting (2007) Chapters 1-2
- Readings and online resources
  - Ponting (2007), Chapters 1-4, pp. 1-67
- Assignments due
  - None
- Assignments pending



- Comparative Food Journal Reflection assigned. Due end of Week 2.

## Week 2

Session 2.1 The Evolution of Agriculture. The First Transition: shift from foraging to farming. Regions, reasons, and timeframe of the transition; archaeological evidence for the onset of early cultivation; role of environmental stress in the First Transition; early sites, crops, and livestock. Early agriculture in China, SW Asia, and Mesoamerica: how they were the same or different. Domestication of plants: what is it, how was it accomplished, and where did it occur? Close-up on early agriculture in the Americas: American crops, specialized practices (such as companion planting, agroforestry, foundations for modern-day permaculture, terracing, and floating gardens); impact of the lack of beasts of burden; domestication of llamas, alpacas, and guinea pigs; emergence of complex Mesoamerican societies.

Readings: Ponting (2007), Chapter 10

Session 2.2. Agriculture after the Colombian Exchange. The interchange and diffusion of plants, animals, disease, technology following the arrival of Cristobal Colón in the Americas; foods and livestock that travelled from east to west and vice versa; agricultural practices that traveled east to west, and vice versa; unexpected consequences; legacies of the exchange. Sugar, Slaves, and the Global South. Methods of sugar production and trade in the past and present: yesterday's triangle of trade and its legacy of slavery, disparity of wealth and power, and racism; today's sugar production; methods of cultivation, impacts on economies, societies, and environment in developing nations; a close-up on Central American sugar production, trade, migration and other labor aspects, and community and individual health and wellbeing; legacies of "agricultural imperialism".

### Special Activities Sessions:

- Heritage Radio Network Podcast: Sugar and its Dark history. <http://heritageradionetwork.org/podcast/a-taste-of-the-past-episode-202-sugar-and-its-dark-history/>
- The Columbian Exchange. <https://www.youtube.com/watch?v=4RTBPPC28FI>

Readings: Galeano (1997), Chapter 2, pp. 59-133

Due: Comparative Food Journal Reflection

## Week 3

Session 3.1 Food Trade. When and why food became a commodity; brief overview of historically critical international trade policies; value chains of food, processed and fresh; agro-export and value-added Crops: definition and examples of agro-



export crops and value-added crops; agriculture as an economic development mechanism: does it work? Close-up contrast on the history of bananas and coffee in Latin America: the social, environmental, and economic dimensions, and how Costa Rica found success.

Readings: Gardner (2013), Chapters 1-3, pp. 1-56

Session 3.2 Modern (Industrial) Agriculture: Characteristics of “modern” agriculture contrasted with “traditional” agriculture; principal challenges that are addressed by modern (industrial) agriculture, e.g., demands related to populin favor of animal protein), constraints related to productivity and photosynthesis, availability of water and arable land; cost-benefits of pest control; alternatives to conventional pest control, e.g., integrated pest management and GMOs. Close-up on crops and livestock that are produced by modern agricultural methods: what are they, what are they used for, and do they increase food security?

Readings: United Nations Millenium Development Goals. <http://www.un.org/millenniumgoals/> and Food and Agriculture Organization of the United Nations. Statistics/databases. <http://www.fao.org/statistics/databases/en/>

Session 3.3 Food, Hunger and Nutrition in the Developing World. Millennium Development Goal on beating hunger: how are we doing? Role of modern agriculture in food security and nutrition; global food “crisis” or “fake news”? Is traditional agricultural better? Global hunger and nutrition; caloric and nutritional needs for humans; factors affecting food supply and demand; net agricultural trade balances and imbalances in developing countries; staples versus “dessert” crops; spotlight on relation between agricultural production, hunger and nutrition.

Special Activity Sessions: Oral Reports on Food Miles (student presentations)

Readings: Feeding the World Story Maps.

<https://storymaps.esri.com/stories/feedingtheworld/>

Due: Oral Reports on Food Miles

#### **Week 4**

Session 4.1 Agriculture, Energy, and Emissions. Agriculture’s demand on energy; the relationship between energy and food costs; biofuels and how they are produced and how to grow biofuels; the food versus fuel debate; greenhouse gases emissions associated with crops and livestock and food transport; close-up on palm oil production in developing nations and its social, environmental, and economic impacts.

Reading: Gardner (2013), Chapters 5-7, pp. 65-104



Session 4.2 Agriculture under Climate Change. likely impacts on growing season, water availability, disease and pathogens for different regions and crops under climate change; timescale for impacts; principles of climate-smart agricultural; precision-agriculture, biodigesters, composting for climate-smart agricultural adaptation and mitigation; close-up on climate change impacts on agriculture in Latin America, and especially on coffee in Costa Rica.

Reading: What is precision agriculture?

<https://www.geospatialworld.net/videos/what-precision-agriculture/>

Session 4.3 Alternatives to Industrial Agriculture. Principles of sustainable agriculture, permaculture; agroforestry; polyculture; hydroponics; biodynamic agriculture; use of technology in alternative agriculture; yields, food costs; socio-economic and cultural barriers to the adoption of alternatives. Close-up on examples from Latin America.

Watch: Screening of Climate-friendly coffee farming in Costa Rica.

<https://www.youtube.com/watch?v=NXI9cUnj1gU>

Due: Written Report on Food Miles

## Week 5

Session 5.1 Organic Agriculture. What is “organic”? How is this different from “not organic”? What can you infer from organic certification? Production, harvest, processing contrasted for organic and conventional in different regions of the world. Impacts on soil, water, and biodiversity of surrounding environment. Impacts on worker health. Organic versus conventional yield in short and long-term. Can you feed the world with organic agriculture? If not, what is possible? Close up on organic production in developing nations.

Readings: Mason (2003), Chapters 1-2

Session 5.2 Agriculture for Biodiverse Regions. Distribution of arable land and biodiversity; the land-sparing versus land-sharing debate; advantages and disadvantages of land-sparing and land-sharing.

Mason (2004), Chapters 3-6



Session 5.3 Conservation of Agricultural Diversity. Seed banks, germplasm banks, and live germplasm conservation for crops and livestock; initiatives to protect and update traditional growing practices with new twists in technology or trade. Do GMO's threaten or protect conservation goals? Economic and social incentives for maintaining agricultural diversity: what are they and do they work? Close-up on crop and livestock genetic diversity and its preservation.

## Week 6

Session 6.1 Future of Food, Future of Life on Earth. Foods of the future; the role of technology; how food will be traded; trends on human diets across regions of the world, and how this will change in the future; the role of food in defining in culture in the future; the preservation and protection of genetic diversity, food sovereignty, and food security in a hyper-global society. Students will give oral reports on alternative agriculture around the world.

Watch: The future of farming. <https://www.youtube.com/watch?v=Fr29UKzm2CI> and Food for the Future: Agriculture in a Sustainable World. <https://www.youtube.com/watch?v=Fr29UKzm2CI>

Session 6.2 Food, Culture and Society. Here, students will use online resources to investigate and report on how agriculture and food have shaped society. They will consider how the Columbian Exchange and other human movements led to major changes in the culture of food globally. They will compare human health and food since the Green Revolution, obesity, heart disease and incidence of cancer. They will explore how society can best deal with public health and cultural changes as a result of agriculture.

Session 6.3 Final Wrap Up and Final Exam

- Final Exam

### **Course Materials**

#### **Readings**

Galeano, E. (1997). *Open veins of Latin America: Five centuries of the pillage of a continent*. New York: NYU Press

Gardner, B. (2013). *Global food futures: feeding the world in 2050*. New York: A&C Black.

Mason, J. (2003). *Sustainable agriculture*. Australia: Landlinks Press.

Ponting, C. (2007). *A new green history of the world: the environment and the collapse of great civilizations*. New York: Random House

#### **Online Resources**

Climate-friendly coffee farming in Costa Rica. <https://www.youtube.com/watch?v=NXI9cUnj1gU>



Feeding the World Story Maps. <https://storymaps.esri.com/stories/feedingtheworld/>

Food and Agriculture Organization of the United Nations. Statistics/databases.

<http://www.fao.org/statistics/databases/en/>

Food for the Future: Agriculture in a Sustainable World.

<https://www.youtube.com/watch?v=Fr29UKzm2CI>

Food Miles calculator. <http://www.foodmiles.com/>

GIS Geography: Six amazing global agriculture maps. <https://gisgeography.com/agriculture-maps-global-farming/>

KNOW: The future of farming. <https://www.youtube.com/watch?v=Fr29UKzm2CI>

The Columbian Exchange. <https://www.youtube.com/watch?v=4RTBPPC28FI>

United Nations Millenium Development Goals. <http://www.un.org/millenniumgoals/>

What is precision agriculture? <https://www.geospatialworld.net/videos/what-precision-agriculture/>

## **Media**

Heritage Radio Network Podcast: Sugar and its Dark history.

<http://heritageradionetwork.org/podcast/a-taste-of-the-past-episode-202-sugar-and-its-dark-history/>

University of Oxford Podcasts, Hunter-Gatherer Diets:

<https://podcasts.ox.ac.uk/keywords/hunter-gatherer>