Course Syllabus: Sustainable Agriculture

Masters of Science in Sustainability Management Program  
Columbia University  
Summer 2023

Instructor Information:
Bruce Kahn, PhD  
Office Address: 2929 Broadway, Faculty Office  
E-mail: bk2501@columbia.edu  
Office Hours: To be announced first day of class

Course Overview:
This course is an introduction to how Global Agriculture and Sustainability issues are at the intersection of natural resource management and business. The course will devote a significant of time covering the fundamental principles of agribusiness and how sustainability issues are key factors in business decision making today and in the future.

The course will consider that agricultural production will need to double over the next three decades in order to meet growing demand. Demand for increased food, feed, fuel, and fiber is driven by increased population and an increase in the middle class in emerging economies. Coupled with a shift in dietary preferences from grains and staple carbohydrates to more protein-based diets including pork and beef (and perhaps fish), and biofuel production, more grains will be used to feed animals and fuel our automobiles. As an energy intensive sector, agriculture is closely linked to energy markets, with crop production and demand potentially adversely affected by higher oil prices, while crop inputs (such as fertilizer) may benefit from lower natural gas prices. These shifting dynamics will affect profit margins in different segments of the agricultural supply chain. In addition to energy prices, likely constraints to the productivity growth of agriculture include climate change, water resources, infrastructure, education and training of producers, and social / governmental policy that distort agricultural markets. New technologies, product platforms and innovative business models in agriculture technology and food systems will dominate the shift from industrial agriculture to a more socially just and environmentally sustainable food production and distribution system. The agricultural technology sector is large, comprising over 8,500 companies generating over $1.3 trillion of revenue per year, in the US alone. Moreover, the volume of transactions in the agricultural sector is greater than $15 billion per year with an estimated peak of over $70 billion in 2007.

The course will satisfy the MS in Sustainability Management program’s General and Financial Management curriculum requirement and the program’s Integrative Sustainability Management requirement.

Course Objectives
The primary goal for the course is to familiarize students with critical components of agribusiness and the metrics to evaluate the sustainability of these activities.

Students are assumed to have had no or little previous exposure to agriculture, agricultural economics or agriculture finance. A basic knowledge of Word, PowerPoint and Excel will be useful. By the end of the course, students will be able to: (1) Demonstrate a solid understanding of the global sources of
agricultural information such as production, yield and trade, (2) Understand how the global agriculture industry is challenged by sustainability risks, and (3) Apply a working knowledge of the rules and regulations that govern agriculture.

**Method of Instruction**

The course will be imparted over 14 two-hour sessions. Introductory textbooks are recommended for the course and additional readings from key reports, websites and magazine/news articles will be supplemented by real, practical examples of sustainability issues in today’s agribusiness industry.

**Course Requirements: Assignments & Method of Evaluation**

Regular attendance in class is required and students are expected to have done the readings for each class. Grading for the course will be determined by the following:

1. **Participation**
   
   Contribute to class discussions. This means enhancing the quality of the class experience for yourself and others. It involves making relevant, useful and non-obvious comments and posing pertinent questions in clear and succinct language.

2. **Research Projects:**
   
   You will complete 5 short assignments that consist of a research paper and in-class presentations covering key issues related to sustainability & agribusiness. Each paper will be worth 20 points.

   The class will be organized by Modules. Each Module will contain a 20 minute in-class presentation and written report (maximum 25 pages). The report and oral presentation will be graded on a letter grade scale from F to A+. Projects will be evaluated for demonstration of knowledge of agribusiness and the implications for sustainability, and the demonstration of the use and analysis of agricultural data both quantitative and qualitative. All students in a group receive the same grade for the written report and an individual grade for their oral presentation. Students will form groups of 4-5 and will be assigned a project topic, assessing a sustainable agriculture theme.

   The final course grade will be computed using a weighted index of numeric grades that combine the grades for papers, attendance and participation, and oral presentation, scaled into a letter final grade scale from F to A+.

**Grading Policies**

The following identifies how points awarded to individual assignments translate into letter grades for the course: A= 93-100, A-= 90-92, B+=87-89, B= 84-86, B-=80-83, C+=77-79, C=74-76, C=70-73, D=66-69, F= 65 or fewer
COURSE SCHEDULE & READINGS

Session 1: Introduction to Agriculture
- OECD & FAO 2013-2022 Agriculture Outlook

Session 2: What is agriculture and how has it evolved
- (TEXTBOOK) Merchants of Grain

Session 3: Agriculture Asset Classes & Investment Trends; Global Trade Flows; Agricultural Finance
- Hoffman et al. (2012) Real Asset Replication

Session 4: Soil fertility & fertilizers; GMOs and Organics; Chemicals: Pesticides, Insecticides, Fungicides
- MSCI: Bayer AG. Report
- MSCI (2016) Specialty Chemicals
- (TEXTBOOK) Enriching the Earth, Vaclav Smil

Session 5: The US Farm Bill & Export Tariffs; Land Grab and Farmland Investment Principles, Infrastructure
to Current Conditions. *Independent Study* - Yale School of Management and Yale School of Forestry.


**Session 6:** Ranching & Rotational Grazing; Animals Husbandry and Antibiotics; Dairy


**Session 7:** Commodities Trading: Futures & Forwards; Coffee & Cocoa and Sugar; Palm Oil

- CES (2016) Ag. Markets Drivers into 2016 and Beyond

**Session 8:** Biofuels & Biomass; Food for fuel; Migrant workers and Labor


**Session 9:** Greenhouses, vertical farming & indoor farming; Aquaculture & Hydroponics; Ag. Tech

- DBCCA (2012) Cleaner Technologies Evolving Towards a Sustainable End-State Excerpt

**Session 10:** Climate Change; Water; Deforestation

- DBCCA (2012) Cleaner Technologies Evolving Towards a Sustainable End-State Excerpt
– (TEXTBOOK) Out of the Earth

Session 11: Food Manufacturing & Supply Chains; Food Waste and Food Service; Farmers Markets & CSAs


Additional Readings (General):

RECOMMENDED BOOKS:


https://webpebscoshostcom.ezproxy.cul.columbia.edu/ehost/ebookviewer/ebook/ZTAYNXhuYV9fMjAxMzcyOF9fQU41?sid=80d510f9-4a69-49d6-aa4c-3e906fbb6cb@redis&vid=0&format=EB&rid=1

Course Policies

Attendance
Students are expected to arrive on time, attend all classes, and to stay until the end of class unless they have notified the instructor at the beginning of the session that they will be leaving early. Each unexcused absence will result in a 1 point deduction from the participation grade.

Late Assignment Policy
Assignments are due on the dates/times identified. One letter grade will be deducted from any assignment submitted after the due date/time. No assignment will be accepted after the deadline for submitting final grades.

Incompletes
As outlined in the School’s grading and academic starts policy, “A grade of ‘I’ (incomplete) is a temporary grade indicating failure to complete assigned work. The mark is given only upon the request of the student and at the discretion of the instructor. The student and faculty member must sign a completed ‘Request for Grade of Incomplete Form’ before the final class session. The ‘I’ must be removed within
one year after the end of the semester in which the student received the grade. Students seeking an extension of this time limit must have the approval of the instruction and successfully petition of the director of their program. If no petition is made, or if the petition is unsuccessful, the grade is changed to an N-Permanent Incomplete- which remains on the student’s permanent record.

**Academic Integrity**
The School of Continuing Education does not tolerate cheating and/or plagiarism in any form. Those students who violate the Code of Academic and Professional Conduct will be subject to the Dean’s Disciplinary Procedures. The Code of Academic and Professional Conduct can be viewed online: http://ce.columbia.edu/node/217

Please familiarize yourself with the proper methods of citation and attribution. The School provides some useful resources online; we strongly encourage you to familiarize yourself with these various styles before conducting your research: http://library.columbia.edu/help/howto/endnote.html

Violations of the Code of Academic and Professional Conduct will be reported to the Associate Dean for Student Affairs.

**Accessibility Statement**
Columbia is committed to providing equal access to qualified students with documented disabilities. A student’s disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University’s Health Services website: http://health.columbia.edu/services/ods/support
APPENDIX A

School Policies

Copyright Policy
Please note -- Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following:
The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Academic Integrity
Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

SCE holds each member of its community responsible for understanding and abiding by the SCE Academic Integrity and Community Standards posted at http://ce.columbia.edu/node/217 . You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

Accessibility
Columbia is committed to providing equal access to qualified students with documented disabilities. A student’s disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: http://health.columbia.edu/services/ods/support.

Accessibility Statement – I want you to succeed in this course. Contact disability@columbia.edu for learning accommodations.

Names/Pronouns – You deserve to be addressed in a manner that reflects your identity. You are welcome to tell me your pronoun(s) and/or name (if different from University records) at any time, either in person or via email.

Discrimination – We embrace the diversity of gender, gender identity & expression, sex, sexual orientation, race, ethnicity, national origin, age, religion, disability status, family status, socioeconomic background, and other visible and non-visible identities.
University does not tolerate unlawful discrimination, discriminatory harassment, sexual assault, domestic violence, dating violence, stalking, or sexual exploitation and all such conduct is forbidden by Columbia University Policy.

**Duty to Report** – You deserve a University community free from discrimination, harassment, and gender-based misconduct including sexual harassment, sexual assault, domestic and dating violence, stalking, and sexual exploitation. It is therefore University policy to require Columbia faculty and staff to report to EOAA any instance or allegation of prohibited conduct involving any undergraduate or any graduate student that is disclosed to, observed by, or otherwise known to that employee. This requirement to report is in place to help ensure that students are provided appropriate resources and to allow the University to mitigate harm to our community.

**Confidential Resources** - There are confidential resources on campus who do not have a Duty to Report, including:

- Sexual Violence Response & Rape Crisis/Anti-Violence Support Center (SVR)
- Ombuds Office
- Medical Services
- University Counseling and Psychological Services
- University Pastoral Counseling
- Columbia Office of Disability Services

University employees working in a confidential capacity will not report information shared with them.

**Inclusion** - In the M.S. in Sustainability Management program, faculty and staff are committed to the creation and maintenance of “inclusive learning” spaces – classrooms and other places of learning where you will be treated with respect and dignity, and where all individuals are provided equitable opportunity to participate, contribute, and succeed.

In our Sustainable Agriculture classroom, all students are welcome regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, Veteran status, citizenship status, nationality and other diverse identities that we each bring to class.