

***The Future of Food
Environment, Health, and Law
Yale Global Summer Program***

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Overview:

This seminar will explore significant environmental and health challenges posed by global food production.

- 1. Course Overview & Introduction: Human Ecology of Food*
- 2. Agricultural Chemicals: Pesticides & International Trade*
- 3. Palm Disguise & Narratives: Problems & Solutions*
- 4. Plastics: Food Waste, Global Contamination, Hormonal Disruption*
- 5. Livestock: Dietary Convergence, Health, & Climate Change*
- 6. Food Fraud: Deception for Economic Gain*

These challenges have complex histories of corporate innovation, law & regulation, scientific inquiry, confidential information, highly profitable markets, international trade, broad public acceptance, global environmental contamination, human exposure to hazardous substances, and abuse of labor, immigrants, and animals. They all offer insight into what might be: a future of “responsible food”.

Course Structure:

- 1. Students will prepare for lecture discussions by taking notes you will participate in classes.*
- 2. Teams will work separately to analyze problems and develop solutions.*
- 3. Every other session, teams will make presentations of their analyses and recommendations.*
- 4. Following the team presentations, we will collectively evaluate them, and integrate readings.*

Class Structure: We will consider 6 case histories, each over a 2-week period.

Week A: Lecture, Discussion of Readings, & Team Assignments

Week B: Team Presentations of Solutions, Critique & Reading Integration.

Analytic Lenses:

- 1. Environmental & Health Risks*
- 2. Law & Regulation: US and International*
- 3. Economic Evaluation: Supply Chains; Cost & Benefit Types, Magnitudes and Distributions*
- 4. Scientific Evaluation: Risk Magnitude & Distribution, Perception, & Acceptability*
- 5. Ethical Dimensions of Each Issue*
- 6. Religious & Ideological Influences*
- 7. Management Possibilities: Public & Private*

Readings:

Readings are assigned weekly for each topic, and some will be assigned only to individual groups of students. Readings are available a Google Drive@: .

Individual Research Paper: Requirements and & Due Dates

Each student is required to prepare an individual research paper no longer than 3,000 words and related to the course subjects. Students will prepare and submit routine progress reports on their paper development according to the following schedule. All submissions will be sent to john.wargo@yale.edu.

- 7/3: **Paragraph Statement of Research Paper Topic and 1-page outline**
- 7/11: **1 Page Outline with 25 References**
- 7/13: **Office Hour Consultations Regarding Paper Topics**
- 7/20: **Office Hour Consultations Regarding Paper Topics**
- 8/3: **Final Papers Due**

Schedule:

Session	Date	Topic	Description
1	Jul 3	Introduction:	Overview & Lecture
2	Jul 5	Agriculture & Pesticides in International Trade	Lecture & Discussion
3	Jul 10	Challenge: Int'l Trade in Food & Pesticides	Team Presentations
4	Jul 12	Palm Oil: Narratives of Benefit	Lecture & Discussion
5	Jul 17	Challenge: Biodiversity, Air Quality, Labor, Health	Team Presentations
6	Jul 19	Plastic Packaging, Health, & Waste	Lecture & Discussion
7	Jul 24	Challenge: Polymer Futures	Team Presentations
8	Jul 26	Livestock: Pharma, Health, Energy	Lecture & Discussion
9	Jul 31	Challenge: Dietary Conversion	Team Presentations
10	Aug 2	Food Fraud Discussion & Research Presentations	
Possible Alternative Challenge Topics			
	Alt 1	GM Seeds, Resistance, Herbicides, Regulation Challenge: Management Plan for GM Products	
	Alt 2	Certification: Comparative Institutional Designs Challenge: Design of Certification Program	
	Alt 3	Food Fraud: Fish, Oils, Meats, Wine, Cheese Challenge: Fraud Identification & Prevention	
	Alt 4	Territorial Designations: Wine, Oils, Fish, Livestock Challenge: Ingredient, Origin, & Quality Labeling	

Course Grading:

25% *Discussion of Readings & Class Participation*

25% *Presentations*

50% *Term Paper*

July 3: Introduction: The Future of Food: Lessons from the Cold War

A. Readings

Wargo. *The Legacy of Nuclear Testing. Green Intelligence. Yale Press. Ch 1-4.*

B. Session Questions

1. *What effects have nuclear technologies had on agriculture, food, and health?*
2. *What principles of environmental health and protection emerged from nuclear testing?*
3. *How is air and water contamination related to the quality of the international food supply?*
4. *What is a chemical half-life and what is its relevance to setting allowable residue limits?*
5. *What is acceptable risk, and who should make the decision to adopt a national ceiling?*
6. *What role does secrecy play in the management of hazardous technologies?*
7. *How is government secrecy similar to corporate trade secrecy?*
8. *How has the anti-nuclear movement been dependent upon environmental science?*

July 5-10: Agricultural Chemicals,, Risks, & Regulation

A. Readings:

1. *Wargo. What is Acceptable Risk. Green Intelligence. Yale Press*
2. *Codex History*
3. *CA Pest Reg Model 2015*
4. *Curl. OP Child Exposure Food*

B. Session Questions

1. *What are the primary benefits of pesticide use?*
2. *What population groups are more susceptible to health loss from pesticides?*
3. *How are humans exposed to pesticides, and which route is most important?*
4. *What are the primary dangers of pesticides, and how do these risks vary in the world?*
5. *How do pesticide regulations vary among nations?*
6. *What types of regulations are most often adopted to manage pesticide risks?*
7. *Does this variance lead to the export/import of risky products?*
8. *When products are banned in one country, should they be banned in others, or globally?*
9. *What ethical standards should be used for managing pesticide risks and benefits?*

C. In-Class Challenge

Pesticides that are banned in one nation may still be exported or produced in other nations. Given the global nature of the food supply, pesticide residues may be imported on foods, even though banned for use in domestic agricultural production. Regulations are most rigorous in the EU, US, Japan, Switzerland, and several other high-income nations. Regulations are least

rigorous in developing or poor regions of the world. Develop a proposal to manage the problem of hazardous chemical export, and the boomerang effect of importing contaminated foods.

July 12-17: The Palm Oil Revolution

A. Readings

1. *Cramb & McCarthy. 2016. Introduction. The Palm Oil Complex. NUS Press.*
2. *Pye. 2016. Deconstructing the Roundtable on Sustainable Palm Oil. Ibid.*
3. *Greenpeace: Indonesia Under Fire*
4. *Palm Investor Review. WWF*
5. *WWF Palm 2012*
6. *RSPO Principles & Criteria Palm Oil 2013*
7. *Palm Oil Saturated Fat & Cardiovascular Diseases*
8. *Chisholm_et_al-2016-Conservation_Biology*

B. Session Questions

1. *What are the environmental and health consequences of palm oil production and consumption?*
2. *What are the social and economic consequences?*
3. *How have large producers changed their behavior in response to public criticism?*
4. *Is it possible to trace the supply chain of palm oil from producers to consumers?*
5. *Why do tropical forests burn, and what are the human health implications?*
6. *ASEAN nations have adopted a treaty that prohibits trans-national air pollution including forest fire smoke. What are the key provisions of this treaty, how effective has it been, and why?*
7. *How is the palm sector reliant on immigrant labor, and how are their human rights abused?*

C. Class Challenge

Major palm producers and processors have adopted their own policies to convince consumers and investors that their production and use of palm is “sustainable”. (Unilever, Nestle, Wilmar, GoldenAgri). Critique the Roundtable on Sustainable Palm certification program. Identify its strengths and weaknesses. What alternative certification program do you propose?

July 19-24: Plastics, Energy, & Waste

A. Readings:

- 1. Wargo. Quiet Revolution in Plastics, Green Intelligence.*
- 2. Phthalates & Diet Food Nano Overview, 2016*
- 3. Phthalates in China's Foods*
- 4. Food Coatings Nanotechnology, Echevoyen*
- 5. Food Nano Overview 2016.*
- 6. Cancer is a preventable disease...*
- 7. Red Meat Consumption & Mortality.*
- 8. Olive Oil, the Mediterranean Diet, and Cardiovascular Disease.*
- 9. Vegetarian Diet and Incidence of Diabetes.*

B. Session Questions

- 1. What role do plastics play in the global food sector?*
- 2. What energy savings occur due to plastic food packaging?*
- 3. What types of plastic are used in the food sector and what is their lifecycle?*
- 4. What environmental and health effects do plastics cause?*
- 5. What factors influence effective recovery/recycling efforts?*
- 6. What private and public sector policies have been effective and why?*
- 7. What are the implications of the using nanotechnology for polymer food packaging?*
- 8. Plastic Migration to Food and Beverages*
- 9. Plastics and Additives in Human Tissues*
- 10. Hormonal Effects of Polycarbonates & Phthalates*

C. Challenge: Plastics, Food, and Water

The global presence of plastic particles in all ecosystems, human environments, and human tissues demonstrates the challenge we face. The food sector is likely to be our primary source of exposure. What could we do to reduce our release of plastic to the environment, and our exposures from all dietary sources?

July 26-31: Livestock & the Future of Meats

A. Session Questions:

- 1. How are dietary patterns related to the relative prevalence of human illnesses?*
- 2. What corporate food processing and marketing practices promote over-consumption?*
- 3. What human health risks are associated with the evolution of microbial resistance?*
- 4. What do we feed to livestock that supply human food?*
- 5. US feed and drug use practices are in wide use in developing nations to maximize animals rates of growth and minimize time to slaughter.*

B. Readings

- 1. Cancer is a preventable disease...*
- 2. Red Meat Consumption & Mortality.*
- 3. Olive Oil, the Mediterranean Diet, and Cardiovascular Disease.*
- 4. Vegetarian Diet and Incidence of Diabetes.*
- 5. European regulation of antibiotics in animals*
- 6. CDC 2013 Antibiotic Resistance*
- 7. Denmark Pharma Use Livestock 2014*
- 8. Sapkota. What Do We Feed to Food Production Animals?*
- 9. Flynn. FDA: Treading the Path of Least Resistance.*
- 10. Silbergeld. Arsenic in Animal Feed.*
- 11. Pharma Animal FDA 2016*

C. Class Challenge:

Food labeling requirements are the primary legal strategy used by most governments to encourage healthy consumption patterns. What are the strengths and limits of labeling as a method to educate consumers and encourage healthy dietary patterns? What else should be done by corporations and governments to encourage healthier diets?

Alternative 1: GMO's: Benefits and Risks

A. Session Readings

1. Nobel Laureates GMO's 2016.pdf
2. AAAS Board GMO Foods 2012.pdf
3. EU Legislation on GMOs.pdf
4. Norway Reg GMO's 2015.pdf
5. Vermont Act 120 2016 GMO Labelling.pdf
- CA Prop 37 Debate.pdf
- Benbrook Weeds 2012.pdf
- Food-Feed-Fuel Competition GMO's 2011.pdf

B. Session Questions

1. *What is the scale of adoption of GM seed technologies, for which crops, and where?*
2. *How concentrated is the industry and what have been the trends in mergers & acquisitions?*
3. *What are the benefits of genetically modified plants for food production?*
4. *What are GMO environmental and health threats?*
5. *What are the possible regulatory policies to control GMO risks?*
6. *Why has labeling of GMO's become a popular policy?*
7. *Why have food firms in the US begun to label products with GMO's voluntarily?*
8. *Is it possible to segregate GM from conventional ingredients?*
9. *What are the strengths and limitations of labeling as a policy to manage risk?*
10. *As promised, have GM products resulted in diminished pesticide use?*

C. Class Challenge

Consider the history of Monsanto's product, Roundup, an effective herbicide. It is used on nearly a billion acres of land in the worlds, has been detected in water, food, and the human tissues of most people tested. What suite of legal strategies do you propose to manage the risks associated with GM food technologies? How reasonable is prohibition, regulation, even labeling? How should intellectual property rights to genetically altered species be managed: Who should be allowed to own them?

Alternative 2: Food Certification: Narratives of Responsibility

A. Session Readings:

- 1. FIBL Org Agric 2016*
- 2. US Organic Standards 2012*
- 3. Global Food Certification*
- 4. E.U. Food Certification Schemes*
- 5. Thai Organic Consumer Trust*
- 6. China Food Certification Programs*
- 7. Wargo Chapter Eighteen & Epilogue-Green Intelligence.*

B. Session Questions:

- 1. What institutional forms exist to certify food (government, corporate, NGO, etc.)?*
- 2. What are the primary elements of the EU, US, and Swiss organic food standards?*
- 3. How does regulation differ from “certification”?*
- 4. How should we judge the effectiveness of these standards; what criteria should we use?*
- 5. Do organic food certification programs vary significantly among nations?*
- 6. If yes, what might be done to protect the global food supply?*
- 7. What advantages does certification provide to food producers, processors, retailers, and consumers?*
- 8. Why do US and European cultural attitudes toward responsible food differ so much? Provide examples of contrasting legal decisions to manage food.*

C. Class Certification Challenge

All of the issues considered in the course demonstrate the potential to increase the benefits of the global food supply, while reducing its negative health and environmental effects. Design a food certification program that will address one or more of the problems posed above, and consider the following in your proposal:

- 1. Purposes.*
- 2. Public, Private, or NGO Sector Origin & Suggested Membership?*
- 3. Focus by Food? Beef, Milk, Palm Oil, Fish, Peanuts, Corn, Peanut Butter...*
- 4. Focus by Target Organization? Growers, Processors, Distributors, Retailer, Restaurants, And Institutional Food Services...*
- 5. Values to Protect? Ecological Health, Human Health, Biodiversity, Energy Efficiency, Climate Effects, Pollution Control, Contamination Control, Waste Minimization, Resource Recovery, Water, Genetic Manipulation, Pharmaceuticals, Plastics, Irradiation, Worker Protection, Animal Welfare, Fair Trade....*
- 6. Evaluation Criteria, Metrics, and Scoring System: How will you judge performance sufficiency*
- 7. Relation of Program to Law & Regulation*
- 8. Transparency, Secrecy, and Confidential Business Information?*
- 9. Accountability: Auditing & Certificate Sunsets*

