

GPP583/RES 500T: Global Food Security and Sustainability

Room 107/108 AERL building; Term 2, Mon 2-5 pm

Instructor: Navin Ramankutty, Liu Institute for Global Issues and IRES

Contact Information: Room 431 AERL building, navin.ramankutty@ubc.ca

Office hours: Tues: 3-4pm in Room 431 AERL

If there is plenty of food grown in the world already, why are so many people hungry? What is better for the environment – eating local, organic, or vegetarian? Is low food price good in the long run? Are small farms more sustainable? How do different farming systems (organic, conventional, GM, urban, etc.) compare in terms of production, environmental footprint, and livelihoods?

These are the kinds of questions we will address in this course.

COURSE OVERVIEW

Achieving food security for 10 billion while enhancing the sustainability of our food production system is a major challenge of the next century. This graduate seminar course will discuss papers on the multiple dimensions of this challenge, including biophysical, economic, nutritional, socio-political, and institutional. We will take a global perspective on the issues, drawing upon both global-scale research as well as case studies from different regions of the world to understand the causes of food insecurity, the environmental impact of farming, and solutions to address these challenges.

PREREQUISITES

Upper-level undergraduate course in agricultural science, ecology, environment, economics, geography, or nutrition, or with permission of instructor.

LEARNING OUTCOMES

By the end of the course, students will be able to:

1. Identify key literature and leading scholars in the field of global food security and sustainability;
2. Critically read papers and identify their key contributions;
3. Identify and describe some commonly used research methods in the field;
4. Describe the key debates in the field and their scientific bases;
5. Access and analyze global data on food production, supply, and nutrition;
6. Identify some of the key unresolved questions in the field;
7. Synthesize knowledge and construct own understanding of the field.

ASSESSMENT

You will be assessed on the following criteria:

- Paper summaries [30%; see next section and rubric at the end]
- Discussion [10%; see rubric at the end]
- Assignments [30%]
- Mock food summit [Not formally assessed]
- Final exam [25%]
- Class Participation [5%]

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LEARNING OUTCOMES, ASSESSMENT & TEACHING/LEARNING STRATEGIES

Outcomes	Assessment	Teaching and Learning Strategy
<ul style="list-style-type: none"> Identify key literature and leading scholars in the field of global food security and sustainability Critically read papers and identify their key contributions Describe the key debates in the field and their scientific bases Identify and describe some commonly used research methods in the field 	<ul style="list-style-type: none"> Paper summaries Discussion 	<ul style="list-style-type: none"> Read key papers Summarize key points of the papers and respond to questions Discussion in class Mock food summit
<ul style="list-style-type: none"> Access and analyze global data on food production, supply, and nutrition 	<ul style="list-style-type: none"> Assignment 1 	<ul style="list-style-type: none"> Work on an assignment
<ul style="list-style-type: none"> Identify some of the key unresolved questions in the field 	<ul style="list-style-type: none"> Not formally assessed. 	<ul style="list-style-type: none"> Discussion in class Mock food summit
<ul style="list-style-type: none"> Synthesize knowledge and construct own understanding 	<ul style="list-style-type: none"> Final exam Assignment 2 	<ul style="list-style-type: none"> Write an essay Mock food summit Write a blog post

TENTATIVE COURSE CALENDAR

Week	Date	Topic/Question for the week
1	Jan-09	Overview of the course
2	Jan-16	Framing the problem (Assignment 1 handed out)
3	Jan-23	Understanding and measuring food security
4	Jan-30	Environmental impacts
5	Feb-06	Economics: subsidies/tariffs, food price
6	Feb-13	Family Day (No class; Assignment 1 due; Assignment 2 handed out)
7	Feb-20	UBC spring break (No class)
8	Feb-27	Food sovereignty
9	Mar-06	Smallholder agriculture/Land reforms
10	Mar-13	Demand-side solutions: diets & food waste
11	Mar-20	Organic farming (Assignment 2 due)
12	Mar-27	Genetically-modified foods
13	Apr-03	Policy responses/solutions; Mock food summit

Course drop deadline: Jan 17

Other potential topics: Nutrition and Health; System of Rice Intensification; Conventional “Green Revolution” agriculture; Urban agriculture; Impacts of climate change; Local case-studies

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COURSE ACTIVITIES

1) Reading and summarizing journal articles each week

Each week, you will read 3-4 assigned papers. Summarize the readings, using 3-5 sentences for each paper, **using the provided template**. Please complete the written summary (**typed responses please**) before class and bring them with you. Make sure you have space on this sheet of paper to write 2-3 additional sentences of “reflections” at the end of each class (could be on the back of the same sheet).

Grading. See rubric at the back for guidance on how these will be assessed.

2) Discussions

Format

- First we will have a “Lightning round” where we will quickly go around the room to give everyone the opportunity to share their impression of the papers with everyone else.
- Next, in small sub-groups in class, you will discuss your impression of the papers and responses to posed questions.
- We will then discuss the response to questions, and the lessons learned and their connection to the broader questions as an entire class.
- Finally, at the end of class, you will get 15 minutes to write a few additional sentences reflecting on the lessons learned from this week’s activity.

Ground rules (from NWABR and Ryerson University Teaching & Learning Office)

- Do not expect everyone to speak every time
- Not expected to “perform”, but rather, share opinions and observations
- Don’t be afraid to be stupid; will not grade everything you say”
- Listen carefully
- Address one another respectfully
- Clarify if a comment is your opinion, or based on a paper or other evidence
- Address comments to the group (no side conversations)
- Use sensitivity to take turns and not interrupt others
- Be courageous in presenting your own thoughts and reasoning, but be flexible and willing to change your mind in the face of new and compelling evidence

Grading. Preliminary discussion grades will be given during the course of the semester. See rubric at the back for guidance on how these will be assessed.

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3) Assignments

You will work on two assignments during the semester -- one being a quantitative analysis and the other crafting a blog post. Each assignment will be due roughly 4 weeks after being handed out (see exact dates in course calendar; also potentially subject to change, so dates on handed assignment will be the final ones)

Assignment 1. Does the world have enough food for everyone?

Download national time-series data on per-capita food supply from the FAO food balance sheet. Group the data by different regions of the world and analyze the differences between regions and changes over time. Write a short report describing your findings.

Assignment 2. Write a blog post

Write a blog post (~600-800 words in length) on a topic of interest to you, and broadly addressing one of the big questions discussed in class.

Grading. Each assignment will be worth 15% of your final grade.

4) Mock World Food Summit

On the last day of class, you will engage in an in-class mock world food summit and develop a resolution. More instructions will be provided.

Grading. This component of the course will not be formally assessed.

5) Final Exam

You will write an essay as a take-home exam. The essay will be due during the exam period, with the due date to be determined. The question for your essay is:

How can we feed the world in 2100 while also decreasing the environmental footprint of our global food system? Discuss the changes that will be required to achieve this goal, such as technological developments, changes in farming practices or in the food system, behavioral shifts, economic solutions, development strategies, or policy shifts.

- Your essay should not exceed ~4000 words
- Your arguments should be based on evidence (citing appropriate literature).
- Your essay should be formatted like a journal article (including an abstract, main body of the paper with sub-sections, and bibliography)
- You do not need to conduct original research, but you are welcome to do so.

Grading. Assessment will use the following criteria: Depth of discussion; Originality; Quality of synthesis; Backing up arguments with appropriate literature or scientific information; and Style of writing (logical flow of thought, structure of arguments, good grammar, lack of typos, etc.);

6) Overall class participation

The success of this course depends on regular attendance and engagement in class. Learning occurs through discussing ideas with your peers, as facilitated by the course instructor.

Grading. 5% of your grade will reflect your attendance and quality of engagement in class.

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READINGS [preliminary list subject to change; please check UBC connect folder for actual readings each week]

Week 2) Framing the problem

Question: How do different scholars frame the problem of global food security and sustainability?

1. Godfray, H. C. J., J. R. Beddington, I. R. Crute, L. Haddad, D. Lawrence, J. F. Muir, J. Pretty, S. Robinson, S. M. Thomas, and C. Toulmin, Food Security: The Challenge of Feeding 9 Billion People, *Science*, 327(5967), 812-818, 2010.
2. Foley, J. A., N. Ramankutty, K. A. Brauman, E. S. Cassidy, J. S. Gerber, M. Johnston, N. D. Mueller, C. O'Connell, D. K. Ray, P. C. West, C. Balzer, E. M. Bennett, S. R. Carpenter, J. Hill, C. Monfreda, S. Polasky, J. Rockstrom, J. Sheehan, S. Siebert, D. Tilman, and D. P. M. Zaks, Solutions for a cultivated planet, *Nature*, 478(7369), 337-342, 2011.
3. Connor, D. J., and M. I. Mínguez, Evolution not revolution of farming systems will best feed and green the world, *Global Food Security*, 1(2), 106-113, 2012.
4. Tomlinson, I., Doubling food production to feed the 9 billion: A critical perspective on a key discourse of food security in the UK, *Journal of Rural Studies*, 29, 81-90, doi:10.1016/j.jrurstud.2011.1009.1001, 2013.

Optional additional reading

- Astyk, S., How Much Did the Green Revolution Matter? or Can We Feed the World Without Industrial Agriculture? [Blog post], Energy Bulletin, Retrieved from, <http://www.resilience.org/print/2007-01-29/how-much-did-green-revolution-matter-or-can-we-feed-world-without-industrial-agri>, 2007.
- Mellon, M., Let's Drop "Feed The World": A Plea To Move Beyond an Unhelpful Phrase [Blog post], Union of Concerned Scientists, Retrieved from, <http://blog.ucsusa.org/lets-drop-feed-the-world-a-plea-to-move-beyond-an-unhelpful-phrase-229>, 2013.

Week 3) Understanding and measuring food insecurity

Question: How can we understand and measure food security? What are the primary causes of food insecurity today?

5. Coates, J., Build it back better: Deconstructing food security for improved measurement and action, *Global Food Security* (published online),
6. Weeks, J., Measuring Hunger, in Insights, pp. 18-23, International Food Policy Research Institute, Washington D.C., 2013.
7. Smith, L. C., and L. Haddad, Reducing Child Undernutrition: Past Drivers and Priorities for the Post-MDG Era, *World Development*, 63(0), 180-204, 2015.
8. Banerjee, A. V., and E. Duflo, More Than 1 Billion People Are Hungry in the World: But what if the experts are wrong?, in Foreign Policy, p. 11, The Slate Group, Washington D.C., 2011.

Optional additional reading

- Barrett, C. B., Measuring Food Insecurity, *Science*, 327(5967), 825-828, 2010.
- The Economist, *Stomach staples: People's spending choices are a good way to assess levels of hunger*, Mar 2011.
- The Economist, *Not a billion after all*, Oct 2012.

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Week 4) Environmental impacts of the food system

Question: What is better for the environment? Eating local, organic, or vegetarian? Is land sparing or land sharing better for the environment

9. Green, R. E., S. J. Cornell, J. P. W. Scharlemann, and A. Balmford, Farming and the Fate of Wild Nature, *Science*, 307(5709), 550, DOI: 510.1126/science.1106049, 2005.
10. Vandermeer, J., and I. Perfecto, The agricultural matrix and a future paradigm for conservation, *Conservation Biology*, 21(1), 274-277, 2007.
11. Weber, C. L., and H. S. Matthews, Food-Miles and the Relative Climate Impacts of Food Choices in the United States, *Environ. Sci. Technol.*, 42(10), 3508-3513, 2008.
12. Edwards-Jones, G., Does eating local food reduce the environmental impact of food production and enhance consumer health?, *Proceedings of the Nutrition Society*, 69, 582-591, 2010.

Week 6) Economics: Influence of food price, subsidies & tariffs

Question: Is low food price a good thing? Would getting rid of subsidies in the developed world solve the problem?

13. Swinnen, J., The Right Price of Food, *Development Policy Review*, 29(6), 667-688, 2011.
14. Thomas Hertel, R. K., L Alan Winters, Why WTO agricultural reforms are such a good idea – but such a hard sell [Blog post], VOX, Retrieved from, <http://www.voxeu.org/article/agricultural-trade-reforms>, 2007.
15. Rocha, C., Food Insecurity as Market Failure: A Contribution from Economics, *Journal of Hunger & Environmental Nutrition*, 1(4), 5-22, 2007.

Week 6) Holiday (BC Family Day)

Week 7) No class (UBC spring break)

Week 8) Food sovereignty

Question: Is an alternate way to frame the food problem required?

16. Wittman, H., Food Sovereignty: A New Rights Framework for Food and Nature?, *Environment and Society: Advances in Research*, 2(1), 87-105, 2011.
17. Chaifetz, A., and P. Jagger, 40 Years of dialogue on food sovereignty: A review and a look ahead, *Global Food Security*, 3(2), 85-91, 2014.
18. Clapp, J., Food security and food sovereignty: Getting past the binary, *Dialogues in Human Geography*, 4(2), 206-211, 2014.

Week 9) Small-scale agriculture/land reforms

Question: Is small-scale agriculture more sustainable? Is it viable? What are the outcomes of land reforms?

19. Altieri, M. A., Agroecology, Small Farms, and Food Sovereignty, *Monthly Review*, 61(3), 2009.
20. Hazell, P. B. R., Is there a future for small farms?, *Agr Econ-Blackwell*, 32(Supplement S1), 93-101, OI: 110.1111/j.0169-5150.2004.00016.x, 2005.
21. van Vliet, J. A., A. G. T. Schut, P. Reidsma, K. Descheemaeker, M. Slingerland, G. W. J. van de Ven, and K. E. Giller, De-mystifying family farming: Features, diversity and trends across the globe, *Global Food Security*, 5, 11-18, 2015.
22. Mueller, V., A. Quisumbing, H. L. Lee, and K. Droppelmann, Resettlement for Food Security's Sake: Insights from a Malawi Land Reform Project, *Land Economics*, 90(2), 222-236, 2014.

Optional additional reading

- Dobermann, A., Is getting out of farming the best bet for smallholder farmers? [Blog post], Achim Dobermann's blog, International Rice Research Institute, Retrieved from, <http://irri.org/blogs/achim-dobermann-s-blog/is-getting-out-of-farming-the-best-bet-for-smallholder-farmers>, 2013.

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Week 10) Demand-side solutions: diet, food waste

Question: How much leverage do we have from demand-side solutions? How can we leverage demand-side solutions?

23. Cassidy, E. S., P. C. West, J. S. Gerber, and J. A. Foley, Redefining agricultural yields: from tonnes to people nourished per hectare, *Environ. Res. Lett.*, 8(3), 034015, 2013.
24. Tilman, D., and M. Clark, Global diets link environmental sustainability and human health, *Nature*, 515(7528), 518-522, 2014.
25. Stokstad, E., Could Less Meat Mean More Food?, *Science*, 327(5967), 810-811, 2010.
26. Lipinski, B., C. Hanson, J. Lomax, L. Kitinoja, R. Waite, and T. Searchinger, Reducing Food Loss And Waste, *World Resources Institute, Washington DC, Working Paper*, 2013.

Week 11) Organic farming

Question: Is organic farming a solution to the global food problem?

27. Seufert, V., N. Ramankutty, and J. A. Foley, Comparing the yields of organic and conventional agriculture, *Nature*, 485(7397), 229-232, 2012.
28. Trewavas, A., Urban myths of organic farming, *Nature*, 410(6827), 409-410, 2001.
29. Rigby, D., and D. Cáceres, Organic farming and the sustainability of agricultural systems, *Agricultural Systems*, 68(1), 21-40, 2001.
30. Pimentel, D., P. Hepperly, J. Hanson, D. Douds, and R. Seidel, Environmental, Energetic, and Economic Comparisons of Organic and Conventional Farming Systems, *Bioscience*, 55(7), 573-582, 2005.

Week 12) Genetically Modified Foods

Question: Is GM a solution to the global food problem?

31. Klümper, W., and M. Qaim, A Meta-Analysis of the Impacts of Genetically Modified Crops, *PLoS ONE*, 9(11), e111629, 2014.
32. Gilbert, N., A Hard Look at GM Crops, *Nature*, 497(7447), 24-26, 2013.
33. Selections from Grist magazine series, "Panic-free GMOs" (<http://grist.org/series/panic-free-gmos/>)
34. Foley, J. A., GMOs, silver bullets, and the trap of reductionist thinking, in *Ensia*, Institute on the Environment, University of Minnesota, Minneapolis, 2014.

Week 13) Policy responses/Solutions

Question: What are some ways forward to solving the global food security and sustainability problem?

35. von Braun, J., Food insecurity, hunger and malnutrition: necessary policy and technology changes, *New BIOTECHNOLOGY*, 27(5), 449-452, 2010.
36. Haddad, L., Burying nutrition myths and activating choices for our children's development, paper presented at Sustainable Food Security for all by 2020, Bonn, Germany, (2001).
37. West, P. C., J. S. Gerber, P. M. Engstrom, N. D. Mueller, K. A. Brauman, K. M. Carlson, E. S. Cassidy, M. Johnston, G. K. MacDonald, D. K. Ray, and S. Siebert, Leverage points for improving global food security and the environment, *Science*, 345(6194), 325-328, 2014.
38. Barrett, C., The Global Food Security Challenge: Constraints, consequences and opportunities ahead [powerpoint presentation], in *First International Conference on Global Food Security*, The Netherlands, 2013.

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GRADING RUBRICS

Rubric for assessing paper summaries

3	Did an excellent job capturing the main contributions and insights of all papers
2	Summarized the papers, but missed the main contribution or major insight
1	Did a poor job summarizing the papers
0	Did not submit a paper summary

Intermediate grades may be assigned for criteria that are in between.

Rubric for assessing discussion contribution (modified from Anderson & Speck 1998)

9-10	Comes to class prepared; contributes readily to the conversation but doesn't dominate it: <u>makes thoughtful contributions that advance the conversation</u> ; shows interest in and respect for others' views; participates actively in small groups. Score of 10 is reserved for truly exceptional students.
8	Comes to class prepared and makes thoughtful comments when called upon, contributes occasionally without prompting; shows interest in and respect for others' views; participates actively in small groups. A 8.0 score may also be appropriate to an active participant whose contributions are less developed or cogent than those of a 9/10 but still advance the conversation.
7	Comes to class prepared, but does not voluntarily contribute to discussions and gives only minimal answers when called upon. Nevertheless these students show interest in the discussion, listen attentively, and take notes. Students in this category may be shy or introverted. The instructor may choose to give such students a 8.0 if they participate fully in small group discussions or if they make progress in overcoming shyness as the course progresses.
6	Participates in discussion, but in a problematic way. Such students may talk too much, make rambling or tangential contributions, continually interrupt the instructor with digressive questions, bluff their way when unprepared, or otherwise dominate discussions, not acknowledging cues of annoyance from instructor or students. Students in this category often profit from a conference with the instructor.
4-5	Students in this range often seem on the margins of the class and may have a negative effect on the participation of others. Students receiving a 5 often don't participate because they <u>haven't read the material or done the homework</u> . Students receiving a 4 may be actually disruptive, radiating negative energy via hostile or bored body language, or be overtly rude.
0	Did not attend class (no permission sought to miss class)

Academic Integrity

"The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required, This also means you should not cheat, or mislead others about what is your work. Violations of academic integrity (i.e. misconduct) lead to the breakdown of the academic enterprise, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisor Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences" (UBC website). A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at: <http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0>

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