New Course

Proposal Reference Number : 7348
PRN Alias : 13-14#761
Version No : 8
Submitted By : Prof Navin Ramankutty
Edited By : Prof Navin Ramankutty

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	New Data
Program Affected?	Y
Program Change Form Submitted?	N (Simple Change) - Please add this course to the "Complementary Courses Section 2A" of the B.A & Sc. Interfaculty program in Sustainability, Science, and Society.
Subject/Course/Term	GEOG 520 • one term
Credit Weight or CEU's	3 credits
Course Activities	Schedule Type: M - Seminar; Hours per week: 3 Total Hours per Week : 3 Total Number of Weeks : 13
Course Title	Official Course Title : Agric., Envir.,& Food Security Course Title in Calendar : Agriculture, Environment, and Food Security
Rationale	Food security is a continuing challenge for humanity. At the same time, agriculture has become a major source of global environmental change. These changes, in turn, are affecting global food production. How can we increase food security while reducing agriculture's environmental footprint? These issues are of increasing concern and interest among McGill students and there is currently no course on the downtown campus that addresses the production, socio-economic, nutritional, and environmental challenges related to agriculture.
Responsible Instructor	Navin Ramankutty
Course Description	This course will consider multiple dimensions of the food security-environment challenge, including the biophysical, economic, nutritional, socio-political, and policy/institutional. It will use a global perspective, drawing upon both global-scale research as well as case studies from different regions of the world to understand the geography of agricultural production, its environmental footprint, and of malnutrition.
Teaching Dept.	0288 : Geography

Administering Faculty/Unit	SC : Faculty of Science
Prerequisites	ENVR 201, and NUTR 341 or any 300 or 400-level course in agricultural science, ecology, environment, economics, geography, or nutrition, or with permission of instructor. Restricted to U2 and U3 students. Web Registration Blocked? : N
Corequisites	
Restrictions	Open to graduate students. Open to U2 and U3 undergraduate students with permission of instructor.
Supplementary Calendar Info	
Additional Course Charges	
Campus	Downtown
Projected Enrollment	15
Requires Resources Not Currently Available	N
Explanation for Required Resources	
Required Text/Resources Sent To Library?	
Library Consulted About Availability of Resources?	
Consultation Reports Attached?	
Effective Term of Implementation	201409
File Attachments	• Consult_geog520_MSE.pdf View • Consult_geog520_NRS&FAES.pdf View • Response2Consult_geog520_NRS&FAES.pdf View • GEOG520_ProposedCourseOutline.pdf View
To be completed by the Faculty	
For Continuing Studies Use	

Approvals Summary

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GEOG 520: Agriculture, Environment, and Food Security
Department of Geography, McGill University

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Course content
Achieving food security for 10 billion people while reducing the environmental footprint of agriculture is a major challenge of the next century. In this seminar course, we will discuss papers on the multiple dimensions of this challenge, including the 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 geography of agricultural production, its environmental footprint, and of malnutrition.

Course strategy
The course work will consist of the following components:
- Reading and discussing journal articles every week.
- Leading the discussion of one journal article.
- Working on assignments.
- Writing a term paper [~4000 words] on a topic chosen in consultation with instructor.

Prerequisites
ENVR 201, and NUTR 341 or any 300 or 400-level course in agricultural science, ecology, environment, economics, geography, or nutrition, or with permission of instructor. Restricted to U2 and U3 students.

Course outcomes
You will:
1. Gain a broad understanding of the current literature in global sustainable food security.
2. Learn to critically read and understand papers.
3. Familiarize yourselves with some of the data and approaches used in the field.
4. Learn to synthesize knowledge and construct your own understanding of the field.

Course schedule
Every week you will read and discuss 2-4 journal articles. Assignments will be given periodically during the semester. You will also work on a term paper on a topic of your choice selected in consultation with the professor.

Course evaluation
You will be evaluated on the following criteria:
- Weekly short writing assignments based on journal articles [15%; see next section]
- Weekly discussion of journal articles [10%; see rubric at the end]
- Leading paper discussion [5%; see rubric at the end]
- Assignments [40%]
- Term paper [30%]

Evaluation strategy

- Short writing assignments: Each week, along with the papers for discussion, you will receive a set of questions about the papers. Written responses will be due at the beginning of each class, and will be graded every week.
- Weekly discussions: Grades will be based on the rubric provided. 3 grades will be given during the course of the semester, roughly once a month.
- Leading discussions: You will be responsible for leading the discussion of one journal article. Preparing for this requires you to read the article carefully, and prepare a question around which the discussion section can be organized for that paper. The question can be about the paper itself, or it can be a more synthetic question that is based on the paper but addresses a broader question of concern to the course. See rubric for details on how this will be evaluated.
- Assignments: You will work on periodic assignments during the semester. Each assignment will be due two weeks after they are handed out. There will be four assignments in total (see two examples below).
- Term paper: You will work on a term project during the course of the semester, with the topic being chosen in consultation with the professor. You will present your work in the form of a term paper at the end of the semester.

Sample assignment topics [4 assignments in total]

1. ***Does the world have enough food for everyone? How much are different countries reliant on trade?***
    a. **Task**: Examine changes in per-capita crop production and crop supply (i.e., including trade) in different regions of the world since 1961.
    b. **Methods**: Download national time-series data on food production, food balance sheet, and population from FAOSTAT. Group the data by different regions of the world and analyze changes over time and how they are different among different regions.
2. ***Is food availability a significant driver of food insecurity?***
    a. **Task:** Examine, using cross-national data, whether food availability is correlated with undernourishment.
    b. **Methods:** Follow the methods developed by Smith et al. (2000), but using updated data. A spreadsheet with the data will be provided to you.

Readings [a preliminary list that will be finalized based on student interest; papers will be posted on MyCourses one week before each discussion session]

1) Overview

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. Misselhorn, A., P. Aggarwal, P. Ericksen, P. Gregory, L. Horn-Phathanothai, J. Ingram, and K. Wiebe, A vision for attaining food security, *Current Opinion in Environmental Sustainability*, *4*(1), 7-17, 2012.

2) Understanding and measuring food insecurity

4. Coates, J., Build it back better: Deconstructing food security for improved measurement and action,

Global Food Security (published online),
5. Barrett, C. B., Measuring Food Insecurity, *Science*, *327*(5967), 825-828, 2010.
6. de Haen, H., S. Klasen, and M. Qaim, What do we really know? Metrics for food insecurity and undernutrition, *Food Policy*, *36*(6), 760-769, 2011.
7. Weeks, J., Measuring Hunger, in Insights, pp. 18-23, International Food Policy Research Institute, Washington D.C., 2013.
8. Smith, L. C., A. E. El Obeid, and H. H. Jensen, The geography and causes of food insecurity in developing countries, *Agr Econ-Blackwell*, *22*(2), 199-215, 2000.
9. The Economist, *Stomach staples: People's spending choices are a good way to assess levels of hunger*, Mar 2011.
10. The Economist, *Not a billion after all*, Oct 2012.

3) Understanding access and distribution
11. Ahmed, A. U., R. V. Hill, L. C. Smith, and T. Frankenberger, Characteristics and causes of severe poverty and hunger, 2020 Focus Brief on the world's poor and hungry people, International Food Policy Research Institute, 2007.
12. Banerjee, A. V., and E. Duflo, The Economic Lives of the Poor, *J Econ Perspect*, *21*(1), 141-167, 2007.
13. Misselhorn, A., Is a focus on social capital useful in considering food security interventions? Insights from KwaZulu-Natal, *Development Southern Africa*, *26*(2), 189-208, 2009.
14. Reutlinger, S., Malnutrition: A poverty or a food problem?, *World Development*, *5*(8), 715-724, 1977.

4) The nutrition challenge
15. Black, R. E., L. H. Allen, Z. A. Bhutta, L. E. Caulfield, M. De Onis, M. Ezzati, C. Mathers, and J. Rivera, Maternal and child undernutrition: global and regional exposures and health consequences, *The lancet*, *371*(9608), 243-260, 2008.
16. Saltzman, A., E. Birol, H. E. Bouis, E. Boy, F. F. De Moura, Y. Islam, and W. H. Pfeiffer, Biofortification: Progress toward a more nourishing future, *Global Food Security*, *2*(1), 9-17, 2013.
17. Hotz, C., and B. McClafferty, From harvest to health: challenges for developing biofortified staple foods and determining their impact on micronutrient status, *Food and Nutrition Bulletin*, *28*(2), S271-S279, 2007.
18. Ahmed, T., M. Hossain, and K. I. Sanin, Global Burden of Maternal and Child Undernutrition and Micronutrient Deficiencies, *Annals of Nutrition and Metabolism*, *61(suppl 1)*(Suppl. 1), 8-17, 2012.
19. The Economist, *Hidden Hunger*, Mar 2011.
20. The Economist, *The Nutrition Puzzle*, Feb 2012.

5) Economics: Influence of food price, subsidies & tariffs
21. Swinnen, J., and P. Squicciarini, Mixed Messages on Prices and Food Security, *Science*, *335*(6067), 405-406, 2012.
22. Ivanic, M., and W. Martin, Implications of higher global food prices for poverty in low-income countries, *Agr Econ-Blackwell*, *39*, 405-416, 2008.
23. Gibson, J., The crisis in food price data, *Global Food Security*, *2*(2), 97-103, 2013.
24. Thomas Hertel, R. K., L Alan Winters, Why WTO agricultural reforms are such a good idea – but such a hard sell, in *VOX*, edited, 2007.
25. Schmitz, A., T. G. Schmitz, and F. Rossi, Agricultural subsidies in developed countries: Impact on global welfare, *Applied Economic Perspectives and Policy*, *28*(3), 416-425, 2006.

6) Sustainable intensification/land sparing&sharing
26. Garnett, T., M. C. Appleby, A. Balmford, I. J. Bateman, T. G. Benton, P. Bloomer, B. Burlingame, M. Dawkins, L. Dolan, D. Fraser, M. Herrero, I. Hoffmann, P. Smith, P. K. Thornton, C. Toulmin, S. J.

Vermeulen, and H. C. J. Godfray, Sustainable Intensification in Agriculture: Premises and Policies, *Science*, *341*(6141), 33-34, 2013.
27. Fischer, J., B. Brosi, G. C. Daily, P. R. Ehrlich, R. Goldman, J. Goldstein, D. B. Lindenmayer, A. D. Manning, H. A. Mooney, L. Pejchar, J. Ranganathan, and H. Tallis, Should agricultural policies encourage land sparing or wildlife-friendly farming?, *Front. Ecol. Environ.*, *6*(7), 382-387, 2008.

7) Food miles

28. Desrochers, P., and H. Shimizu, YES, WE HAVE NO BANANAS: A Critique of the "Food Miles" Perspective, Mercatus Policy Series, Policy Primer No. 8, 16 pp, Mercatus Center, George Mason University, Washington D.C., 2008.
29. Edwards-Jones, G., L. Milà i Canals, N. Hounsome, M. Truninger, G. Koerber, B. Hounsome, P. Cross, E. H. York, A. Hospido, K. Plassmann, I. M. Harris, R. T. Edwards, G. A. S. Day, A. D. Tomos, S. J. Cowell, and D. L. Jones, Testing the assertion that 'local food is best': the challenges of an evidence-based approach, *Trends in Food Science & Technology*, *19*(5), 265-274, 2008.
30.

8) Influence of diet, food waste

31. Stokstad, E., Could Less Meat Mean More Food?, *Science*, *327*(5967), 810-811, 2010.
32. 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.
33. Parfitt, J., M. Barthel, and S. Macnaughton, Food waste within food supply chains: quantification and potential for change to 2050, *Philosophical Transactions of the Royal Society B: Biological Sciences*, *365*(1554), 3065-3081, 2010.
34. Kummu, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P. J. Ward, Lost food, wasted resources: Global food supply chain losses and their impacts on freshwater, cropland, and fertiliser use, *Science of The Total Environment*, *438*(0), 477-489, 2012.

9) Policy responses

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).

Other potential topics: *Urban agriculture, organic agriculture, influence of climate change, land tenure, food trade, food aid, Role of GM crops (e.g., golden rice debate)*, etc.

Rubric for evaluation

Discussion of journal articles (modified from Anderson & Speck 1998)

A A student receiving an A comes to class prepared; contributes readily to the conversation but doesn't dominate it: makes thoughtful contributions that advance the conversation; shows interest in and respect for others' views; participates actively in small groups.

A- 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. An A- score may also be appropriate to an active participant whose contributions are less developed or cogent than those of an A but still advance the conversation.

B+/B A student receiving a B+/B 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 an A- if they participate fully in small group discussions or if they make progress in overcoming shyness as the course progresses.

B/B- A student receiving a B/B- 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.

C-D 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 C often don't participate because they haven't read the material or done the homework. Students receiving a D may be actually disruptive, radiating negative energy via hostile or bored body language, or be overtly rude.

NOTE. This scoring guide assumes regular attendance: the instructor may lower participation scores for absences or tardiness.

Leading paper discussion

Grade	***Leading discussion (5 points)***
0	Did not prepare a question for discussion or facilitate discussion
2	Prepared a poor discussion question
4	Prepared a discussion question that somewhat facilitated understanding of the paper and topic of the week
4.5	Prepared a discussion question that greatly facilitated understanding of the paper and topic of the week with some help from prof.
5	Prepared a discussion question that greatly facilitated understanding of the paper and topic of the week with minimal help from prof

Other Matters

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/students/srr/honest/ for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

"As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009."

"McGill has policies on sustainability, paper use and other initiatives to promote a culture of sustainability at McGill." (See the Office of Sustainability.)

Additional policies governing academic issues which affect students can be found in the McGill Student Rights and Responsibilities website (http://www.mcgill.ca/students/srr/).