ANTH 591: Feeding the World: from the past, to traditional food systems, to GMO's

College Hall 138

Tu/Th 10:35-11:50 (1 hr and 15 mins each meeting)

Instructor: Jade d'Alpoim Guedes jade.dalpoimguedes@wsu.edu

Purpose of the Course:

Climate change, unparalleled population growth and ecological degradation means that securing the world's food supply is one of the greatest challenges of our times. Using a series of readings derived from Anthropology, Archaeology, Economics, Intellectual Property Law and Biology, this course situates challenges in meeting the world's food supply in a multi-disciplinary framework that uses ethnobiology as a common guiding stream. The first half of the course will situate major transformations in food production regimes in their archeological and historical context and will examine the ways in which traditional peoples around the world have met the challenge of meeting their food supply. The second half of the course compares these early developments to the modern food crisis using three examples. We will first examine traditional ecological knowledge in farming systems around the world asking the question: what makes these systems adapted and sustainable to their local environment. We will then focus on the goals of the green revolution, led by Norman Borlaug which involved the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernization of management techniques, distribution of hybridized seeds, synthetic fertilizers, and pesticides to farmers and will chart how these "modernist" systems have been integrated, successfully or not to the rest of the world. Late in the 20th century, scientists began to directly manipulate life forms on the genetic level. We will discuss a number of the controversies relating to the development of biotechnology and agribusiness, including terminator seeds, contamination of non-GMO crop varieties, Golden Rice, and Indian farmer suicides. The intent of this discussion is to go beyond attacking or defending biotechnology, but rather using an anthropological framework to understand it and use it as a lens to understand how the world works. This course will focus on what can be learn from traditional ecological knowledge of food systems and how knowledge from these systems could be integrated into modern systems in an ethical framework.

Evaluation will be as follows:

	Description	**Percentage of final grade**
Class participation	Evidence of having prepared readings by speaking up and by leading a week of discussion.	30%
Position papers (2)	Brief background, synopsis and discussion questions and a statement of your position on a debated issue in articles or chapters	20%
Research presentation	15 minute SAA or AAA style presentation of your research project	10%
Final Paper	15 page essay relating the course material to an original research topic.	40%
Total		**100%**

COURSE POLICIES

Accommodation

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Academic integrity

Unless noted otherwise by the professor, all of the work in this course is to be completed by the individual. We employ a zero tolerance policy for plagiarism and cheating. Anyone caught cheating or guilty of plagiarism will at the very least receive a "0" for the given assignment (and more likely an "F" for the entire course) and be reported to the Office of Student Conduct without exception. Please refer to Washington State University's official statement (www.wsulibs.wsu.edu/plagiarism) on academic integrity standards and procedures. If you don't know what plagiarism is, then come to our office hours soon. Ignorance is not a valid excuse.

Syllabus is Subject to Change

This syllabus and schedule are subject to change. Notice will be given by email and/or in class if needed.

Classroom safety

You can thank your congressional representatives for my having to include the following statement. "Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the "***Alert, Assess, Act***" protocol for all types of emergencies and the *"Run, Hide, Fight"* response for an active shooter incident. Remain ***ALERT*** (through direct observation or emergency notification), ***ASSESS*** your specific situation, and ***ACT*** in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI's *Run, Hide, Fight* video and visit the WSU safety portal."

Syllabus

Week 1:

Jan 12th: Feeding the World, Feeding Yourself: Introduction to Goals of the Course and A Brief History of Ethnobotany

Required:

Denison, Ford R. (2012) What do we need from agriculture? Chapter 2 *Darwinian Agriculture: How understanding Evolution Can Improve Agriculture*. Princeton University Press. Pages: 9-27.

Wolverton S. (2013) Ethnobiology 5: interdisciplinarity in an era of rapid environmental change. *Ethnobiology Letters*. 2013 (4): 21–5.

Wyndham FS, Lepofsky D, Tiffany S (2011) Taking stock in Ethnobiology: where do we come from? What are we? Where are we going? *Journal of Ethnobiology*. 31 (1): 110–27.

Optional:
Hunn, E. (2007) Ethnobiology in Four Phases. *Journal of Ethnobiology* 27:1-10.

Jan 14th: What is the problem? Population and food.

Readings:

Paul Sabin (2013) Betting on the Apocalypse. *New York Times*.

Ed Regis (1993) The Doomslayer. *Wired Magazine*.

Wood (1998). The Agrarian Origins of Capitalism. Monthly Review.
http://monthlyreview.org/1998/07/01/the-agrarian-origins-of-capitalism/

Malthus (1798) *An Essay on the Principle of Population*. Chapters 1+2.

Optional:
Foster, John (1999) Marx's theory of Metabolic Rift. 105 (2): 366–405

Week 2: Turning to the past.

Jan 19th Climate change hypotheses for the origins of agriculture

Watson, Patty Jo (2005) Explaining the Transition to Agriculture In T.D. Price and A.B. Gebauer (eds) *Last Hunters First Farmers: New Perspectives on the Transition to Agriculture*, pp. 21-37.

a.) Climate Change Hypotheses:

Richerson, Peter J., Robert Boyd, Robert L. Bettinger (2001) Was Agriculture Impossible during the Pleistocene but Mandatory during the Holocene? A Climate Change Hypothesis. *American Antiquity* 66(3): 387-411.

Grossman, Leore and Anna Belfer-Cohen (2002) Zooming onto the 'Younger Dryas.' In:René T.J. Cappers and Sytze Bottema (eds), *The Dawn of Farming in the Near East.* Berlin: *ex oriente*, pp. 49-54.

A light review of the Younger Dryas phenomenon with pertinent observations about the quality of our data.

Jan 21th Explaining change in subsistence regimes: Why farm when there are so many mongogo nuts?

b.) Alternative views:

Rindos, David (1980) Symbiosis, instability, and the origins and spread of agriculture: a new model. *Current Anthropology* 21(6): 751-72.

Hayden, B. (2009) The Proof is in the Pudding: Feasting and the Origins of Domestication. *Current Anthropology* 50:597–601, 708–9.

Winterhalder and B., Goland C (1993) On population, foraging efficiency, and plant domestication. *Current Anthropology* 34: 710-715.

Boquet-Appel, Jean Pierre(2009) The Demographic Impact of the Agricultural System in Human History. *Current Anthropology* 50(5):657-660.

Week 3:

Jan 26th: The transition to Agriculture in the Near East: From the Upper Paleolithic to the PPNB.

Twiss, Katheryn C. (2007) The Neolithic of the Southern Levant. *Evolutionary Anthropology* 16:24-35

Jan 28th: Debate: Conflicting conceptual frameworks about human plant interaction (NCT and HBE) Was there a broad spectrum revolution in the Near East?

Zeder, M. (2012) The Broad Spectrum Revolution at 40: Resource diversity, intensification, and an alternative to optimal foraging explanations. *Journal of Anthropological Archaeology* 31(2012):241-264

Stiner et al. (2000). The Tortoise and the Hare: Small Game Use, the Broad Spectrum Revolution and Paleolithic Demography. *Current Anthropology*. 41: 39-73.

Gremillion, K.J, L. Barton and D. R. Piperno (2014) Particularism and the Retreat from Theory in the Archaeology of Agricultural Origins. *Proceedings of the National Academy of Sciences* 11(17):6171-6177.

Gremillion, K.J, L. Barton and D. R. Piperno (2014) Reply to Smith: On distinguishing between models, hypotheses, and theoretical frameworks. *PNAS Letters*.

Smith, B (2015) A Comparison of Niche Construction Theory and Diet Breadth Models as Explanatory Frameworks for the Initial Domestication of Plants and Animals. *Journal of Archaeological Research*.

Week 4
February 2nd *Documenting plant domestication: How do we know?*
Readings:

Fuller, Dorian (2007) Contrasting Patterns in Crop Domestication and Domestication Rates: Recent Archaeobotanical Insights from the Old World. *Annals of Botany* 100(5): 903–924.

February 4th: Moving Agriculture, Moving Culture: the Movement of Agriculture and people into Europe

Bellwood, Peter (2005) *First Farmers: The Origins of Agricultural Societies*. Chapter 4 Part 1

Price, T. Douglas (2000) Chapter 1: Europe's first farmers: an introduction. In: T. Douglas Price (ed.), *Europe's First Farmers*, pp. 1-18. Cambridge: Cambridge University Press.

Week 5:

February 9th *Debate: The Origins of Rice and Millet Agriculture*

The following 3 articles comprise a series of arguments about characterizing rice exploitation in early South China. The first article, by Jiang and Liu, presents a short report on new finds from the Lower Yangzi River. The second article, by Fuller et al., argues that before making claims for rice domestication, other possibilities need to be considered. The third article by Liu et al. is the short form of a reaction to Fuller et al., with the long version being the Holocene article. The following two are articles by Fuller et al.. that follow up with new evidence.

Jiang, Leping and Li Liu (2006) New evidence for the origins of sedentism and rice domestication in the Lower Yangzi River, China. *Antiquity* 80: 355-361.

Fuller, Dorian, Emma Harvey and Ling Qin. (2007) Presumed Domestication? Evidence for Wild Rice Cultivation and Domestication in the Fifth Millennium BC of the Lower Yangtze Region. *Antiquity* 81:316–331.

Li Liu, Gyoung-Ah Lee, Leping Jiang, and Juzhong Zhang(2007) The earliest rice domestication in China. *Antiquity* 81 (September 2007) online Project Gallery.

Liu, L., G.A. Lee, L. Jiang and J. Zhang(2007) Evidence for the early beginning (c. 9000 cal. BP) of rice domestication in China: a response *Holocene* 17(8):1059-1068.

Fuller, Dorian, Qin Ling and Emma Harvey (2008) Rice Archaeobotany Revisited: Comments on Liu et al. (2007). *Antiquity* 82(315):Online Project Gallery.

Fuller, Dorian Q, L Qin, Y Zheng, Z Zhao, X Chen, LA Hosoya and G Sun (2009) The Domestication Process and Domestication Rate in Rice: Spikelet Bases from the Lower Yangtze. *Science* 323(5921):1607-1610.

On East Asian Millet Domestication

Lu, H., J. Zhang, K.-b. Liu, N. Wu, Y. Li, K. Zhou, M. Ye, T. Zhang, H. Zhang, X. Yang, L. Shen, D. Xu and Q. Li (2009) Earliest domestication of common millet (Panicum miliaceum) in East Asia extended to 10,000 years ago. *Proceedings of the National Academy of Sciences* 106(18):7367-7372.

Bettinger, R.L., L. Barton, and Christopher Morgan (2010) The origins of food production in North China: a different kind of agricultural revolution. *Evolutionary Anthropology* 19: 9-21.

February 11th Wet-Rice Farming and intensive traditional agriculture

Readings:

Boserup, Ester (1965) *The Conditions of Agricultural Growth*. Introduction and Chapters 1-4

Fuller, D. and L. Qin (2009) Water Management and Labor in the Origins and Dispersal of Asian Rice *World Archaeology* 41(1): 88-111.

Robert M.C. Netting (1993) Smallholders, householders: Farm families and the Ecology of Intensive Sustainable Agriculture. Pgs. 41-50 and 137-140.

Morrison, K. D. (1996) Typological Schemes and Agricultural Change: beyond Boserup in precolonial South India, *Current Anthropology* 37(4): 583–608.

Morrison, K. D. (1994) The Intensification of Production: archaeological approaches. *Journal of Archaeological Method and Theory* 1(2): 111–159.

Week 6

February 16th: Pigs and Yams and Rice agriculture: The spread of Agriculture to the Pacific

Bellwood, P. (2005) *First Farmers: The Origins of Agricultural Societies*. Chapter 7 :128-145.

Leach, H. M. (1999) Intensification in the Pacific: A critique of the archaeological criteria and their application. *Current Anthropology* 40(3): 311–339.

Kirch, P. V. (1999) Comment on Leach (1999). *Current Anthropology* 40: 326–328.

February 18th: Africa and India: the forgotten homelands of millet domestication.

Bellwood, Peter (2005) *First Farmers: The Origins of Agricultural Societies*. Chapter 4 Part 2

Fuller, Dorian Q and Hildebrand, Elisabeth Anne Domesticating Crops in Africa In Mitchell and Lane (eds) the *Oxford Handbook of African Archaeology*: 507-525.

Hildebrand, Elisabeth Anne (2003) Motives and opportunities for domestication: an ethnoarchaeological study in southwest Ethiopia. *Journal of Anthropological Archaeology* 22: 358-375.

Fuller, Dorian Q. (2006) Agricultural Origins and Frontiers in South Asia: A Working Synthesis. *Journal of World Prehistory* 20: 1-86.

Weber, Steve (1999) Seeds of Urbanism and Harrapan Paleoethnobotany. *Antiquity* (83) 813-26

Week 7:

February 23rd Corn Domestication/ Traditional Ecological Knowledge in the American Southwest and Mexico. *Bill Lipe Guest Lecture*

Soleri, Daniela, and David A. Cleveland (1993) Hopi crop diversity and change. *Journal of Ethnobiology* 13:203-31.

Louette, Dominique, André Charrier, and Julien Berthaud (1997) In situ conservation of maize in Mexico: genetic diversity and maize seed management in a traditional community. *Economic Botany* 51:20-38.

Klindienst, P (2006) Renewal: Four Sisters Garden and Monte Vista Farm. *The Earth Knows My Name: Food, Culture, and Sustainability in the Gardens of Ethnic Americans*. Pp. 1-32. Boston: Beacon Press.

Nabhan, G.P (2000) Chapter 1. Native American Management and Conservation of Biodiversity in the Sonoran Desert Bioregion: An Ethnoecological Perspective. Pages 29-43 in P. E. Minnis and W. J. Elisens, eds., Biodiversity and Native America. University of Oklahoma Press, Norman.

February 25th Diet in the Andes and what is a weed anyway? Domestication and Cultivation in North America

M. C. Bruno (2014) Beyond Raised Fields: Exploring Farming Practices and Processes of Agricultural Change in the Ancient Lake Titicaca Basin of the Andes. *American Anthropologist* 116(1): 130-145.

Smith, Bruce D.(2006) Eastern North America as an independent center of plant domestication. *PNAS* 103 (33): 12223–12228.

Week 8:

March 1st Food Globalization past and present

Readings:

Jones M, et al. Food globalization in prehistory. *World Archaeology* 43(4):665-675

Boivin et al. (2012) Old World globalization and the Columbian exchange: comparison and contrast. *World Archaeology* 44(3): 452-469.

D'Alpoim Guedes et al. (2015) Early Evidence for the use of Wheat and Barley as Staple Crops on the Margins of the Tibetan Plateau. *PNAS*.

Optional but worth a read!

Crosby AWJ (2003) *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Praeger, Westport, CT.).

March 3rd: Traditional Farming Systems across Asia: Bali and the green revolution crisis.

Lansing, J. Stephan and Kremer, James N (2011). Rice, Fish and the Planet. *PNAS* 108(50):19841-19842.

Lansing, J. Stephen, Karyn Fox (2011). Niche Construction on Bali: the gods of the countryside. *Philosophical transactions of the Royal Society* B. 366: 927-934.

Lansing, J. Stephen. 2005. On Irrigation and the Balinese State. *Current Anthropology* 46 (2):305-6.

Watch:
https://www.youtube.com/watch?v=lNKrR27Crqw

AAA Abstract discussion: Who would we like to invite?

Week 9:

March 8th: Why has shifting cultivation got such a bad rap?

Harold Conklin (2008) Ethnoecological Approach to Shifting Agriculture In *Environmental Anthropology*.

Hect and Cockburn (1989). *The fate of the forest: developers, destroyers and defenders of the Amazon.* Chapter 2.

Kleinman et al. (1995) The Ecological sustainability of slash-and-burn agriculture. A*griculture, Ecosystems and Environment* 52: 235-249.

March 10th: Norman Borlaug, the Green Revolution and the Origins of Industrial Agriculture

Readings:

Simmons , N. and J. Smartt (1999) *Principles of Crop Improvement*. Oxford, U.K. pp. 347-355 (The Green Revolution)

Pearse, A.(1980) *Seeds of Plenty, Seeds of Want*: *Social and Economic Implications of the Green Revolution*. Claredon Press: 33-40.

Evans, L.T. (1998) *Feeding the Ten Billion.* Chapters 6-8.

Week 10:
March 14-18: NO CLASS: SPRING BREAK

Week 11:

March 22nd : What does the great leap forward tell us about smallholder agriculture?

Stone, Glenn (2001) Theory of the Square Chicken: Advances in Agricultural Intensification Theory. *Asian Pacific Viewpoint*. 42: 2-3: 168-180.

Becker (1996) *Hungry Ghosts*. Chapters 1-7

Scott, James C. (1998) *Seeing like a State*. Introduction, Introduction, Chapter 6

March 24th : Small Holder Agriculture in Africa.

Scott, James C. (1998) *Seeing like a State*. Chapter 7,8

Week 12: March 29-31: Instructor Away (CAA meetings)

While I am gone, read start reading Kloppenburg (2004) chapters

Week 13
April 5th: Instructor Away (SAA Meeting)

April 7th Instructor Away (SAA Meeting)

Week 14:

April 12th: "What's in a GMO?: History and Technology of Genetically Modified Organisms" *Kevin Murphy Guest Lecture*
Readings:
Stone G.D. (2010) The Anthropology of Genetically Modified Crops. *Annual Review of Anthropology* 39(1): 381-400.

Kloppenburg. 2004. *First the Seed*, Chapter 3-7: The Genetic Foundation of American Agriculture

Readings: "The Plant Patent Act of 1930"; High court orders a new look at gene patents (http://www.nytimes.com/2012/03/27/business/high-court-orders-new-look-at-gene-patents.html?_r=1
Baseball bats and breast cancer: The court mulls over gene patenting
http://fieldquestions.com/2011/05/02/baseball-bats-and-breast-cancer-the-court-mulls-over-gene-patenting/
Small farmer's fight becomes anti-biotech crusade http://www.usatoday.com/tech/news/techpolicy/2004-01-19-schmeiser_x.htm

Columnist takes on the biotech industry http://www.patentbaristas.com/archives/2005/12/16/muckraking-columnist-takes-on-biotech-industry/

April 14th: Genetically Modified Organisms

Readings:

Borlaug, N.E. (2000) Taking the GM Food Aid Debate to Africa--Are We Going Mad? April 10 *Open Letter to the Editor: The Independent newspaper* London, UK

Borlaug, N.E. (2000) Ending world hunger: the promise of biotechnology and the threat of antiscience zealotry. Plant Physiology 124:487b

Stone, G. D. (2002) Both sides now: Fallacies in the Genetic Modification Wars, Implications for Developing Countries and Anthropological Perspectives. *Current Anthropology* 43(4): 611:630.

Week 15:
April 19th: GMO Debate:

1.) Golden Rice:

This Rice Could save 1000 kids a year http://www.time.com/time/magazine/article/0,9171,997586,00.html

Johns, Timothy 2003 Plant Biodiversity And Malnutrition: Simple Solutions To Complex Problems *African journal of food, agriculture, nutrition and development AJFAND*

2.) Ecological issues:

Obrickyi et al. (2001) Transgenic Insecticidal Corn: Beyond Insecticidal Toxicity to Ecological Complexity. *Bioscience*. 51 (5): And Responses.

Farmers Cope With Roundup-Resistant Weeds http://www.nytimes.com/2010/05/04/business/energy-environment/04weed.html

Ellstrand (2001) When Transgenes wander should we worry? *Plant Physiology*. 125: 1543-1545.

3.) Bt and Indian Farmer Suicides:

BT Cotton, Remarkable Success and Four Ugly Facts

http://fieldquestions.com/2012/02/12/bt-cotton-remarkable-success-and-four-ugly-facts/

Stone, G. D. (2002) Biotechnology and suicide in India. *Anthropology News* 46(5)

Shiva, V. (2008) Toxic genes and toxic papers: IFPRI covering up the link between Bt Cotton and Farmers Suicides. *Research Foundation for Science, Technology and Ecology*, March 20, 2009. http://www.whale.to/b/shiva1.pdf

April 21st Ethics

Readings:
Posey, Darrell Addison (1990) "IPR: What is the position of Ethnobiology?" *Journal of Ethnobiology* 10:93-98.

LaDuke, W. (2005) Wild Rice: Maps, Genes and Patents. In *Recovering the Sacred: the Power of Naming and Claiming*: 167-190.

What Have We Forgotten? Returning Data from Ethnobiological Research to Local Communities

Cleveland, David A. and Stephen C. Murray (1997) The World's Crop Genetic Resources and the Rights of Indigenous Farmers. *Current Anthropology* 38(4):477-515.

Elvin-Lewis, M.(2006) Evolving Concepts Related to Achieving Benefit Sharing for Custodians of Traditional Knowledge. *Ethnobotany Research and Applications.* 4(1):75-96.

Optional:
Bannister, K (2007) The ethics of engagement: An ethnobiologist's perspective. Academic Matters.

Shiva, V. (1997). *Biopiracy: The Plunder of Nature and Knowledge*. South End Press.

Week 16:

April 26th: Can we feed the world in the 21st century and be sustainable?

The Quinoa Debate
http://www.motherjones.com/tom-philpott/2013/01/quinoa-good-evil-or-just-really-complicated

Small, E. (2013) Quinoa: is the United Nations' featured crop of 2013 bad for biodiversity? *Biodiversity* 14: 169-179.

Bazile, D. (2014) Contesting Blossoming Treasures of Biodiversity article 42: 'Quinoa –is the United Nation's featured crop of 2013 bad for biodiversity?'– Quinoa, a model crop to examine the dynamics of biodiversity within agricultural systems. *Biodiversity*: http://dx.doi.org/10.1080/14888386.2014.88 4469.

Small, E. (2014) A rejoinder to Didier Bazile's Letter to the Editor contesting Blossoming Treasures of Biodiversity article 42. *Biodiversity* 15: 5-5.

Walsh-Dilley, M. (2013). Negotiating hybridity in highland Bolivia: indigenous moral economy and the expanding market for quinoa. *The Journal of Peasant Studies* 40: 659-682.

Winkel, T.; Bertero, H.D.; Bommel, P.; Chevarría Lazo, M.; Cortés, G.; Gasselin, P.; Geerts, S.; Joffre, R.; Léger, F.; Martínez Avisa, B.; Rambal, S.; Rivière, G.; Tichit, M.; Tourrand, J.F.; Vassas Toral, A.; Vacher, J.J. and Vieira Pak, M. (2012) The sustainability of quinoa production in southern Bolivia: from misrepresentations to questionable solutions. *Journal of Agronomy and Crop Science* 198: 314-319.

Jacobsen, S.E (2011) The situation for quinoa and its production in southern Bolivia: from economic success to environmental disaster. *Journal of Agronomy and Crop Science*, 197: 390-399.

Parker-Gibson, N. (2015) Quinoa: Catalyst or Catastrophe? *Journal of Agricultural & Food Information* 16(2): 113-122.

Sherwin, A. (2011). The food fad that's starving Bolivia. *The Independent* 22 March 2011. http://www.independent.co.uk/life-style/ food-and-drink/features/the-food-fad-thats-starving- bolivia-2248932.html. Consulted: 13/05/2014.

http://tyglobalist.org/in-the-magazine/glimpses/the-quinoa-controversy-the-implications-of-the-growing-popularity-of-a-bolivian-grain

April 28th Student Presentations