

Global and Historical Perspectives on the Interaction Between Humans and the Environment

Olivier F. Morand, Associate Professor
Department of Economics, University of Connecticut.
Office: Monteith, Room 342
Tel: 486-3546
email: morand@uconnvm.uconn.edu

Course objectives. This course examines the interaction between people and their natural environment from a global and historical perspective by synthesizing valuable insights from various disciplines, including economics and the social sciences, archaeology, history, and ecology. Beyond offering a solid understanding of the subject, the objectives of this course are threefold:

- (1). To illustrate that a multidisciplinary approach is critical to the analysis of most real world problems.
- (2). To emphasize that the basis for our understanding of such problems (and for possible subsequent actions) is the scientific method. This involves the systematic and unbiased gathering of data, the identification of specific mechanisms within complex systems, the testing of hypothesis and the formulation of predictions, and the design and implementation of laboratory or natural experiments.
- (3). To foster students' long-term interest in current research and recent findings in various fields, and to demonstrate that such research and findings are approachable even to non-specialists.

Course description. This course will first address the impact of nature on human societies and their development by recognizing that the expansion of the anthroposphere into the rest of the biosphere has been affected by climate, by geographic factors, and by the distribution of natural resources. From a global perspective, current worldwide differences in well-being will be shown to be correlated with various geographic and climate variables, as well as with measures of natural resources, using data collected by economists and geographers. The possible mechanisms underlying these correlations will be examined, as well as the impact of natural disasters on economies. Next, adopting a historical perspective will help explain current differences in well-being through more complex mechanisms by which nature and the environment has affected the birth, growth, and development (and sometimes collapse) of past societies. In particular, we will follow the broad scenario of Diamond in his book *Guns, Germs and Steel: The Fate of Human Societies*, piecing together contributions from historians, ecologists, anthropologists, biologists and geographers. We will also study some of the criticisms of Diamond's work and briefly discuss other scenarios.

The second part of the course acknowledges that, from the domestication of fire to our globalized world, humans have constantly affected and modified their environment. Taking a global perspective, we will identify a major set of serious current environmental problems: the destructions or losses of natural resources, the ceilings on natural resources, the harmful by-products of human consumption and production activities, and the problem of population growth. Students will learn how economic theory explains why most of these problems exist

in the first place. By examining some of the evidence concerning the collapse of several past societies, we will find that many of today's environmental problems are not new, and that environmental damage, climate change, and society's responses to its environmental problems have been major determinants of past collapses.

The course will end with a discussion of the concept of sustainable development, a concept widely embraced but rarely translated into policies, and of the idea of a multidisciplinary and scientific study of the co-evolution of socio-natural systems.

Required reading. Articles on the reading list are chosen from some of the best journals of various fields (for instance, *Science*, *Nature*, *The American Economic Review*, *Quarternary Science Review*). These non-technical and relatively easy to read articles are rich in ideas and will be used as support for lectures and class discussions. All articles (or book chapters) listed in this syllabus are available either electronically or directly in the library.

Students are required to obtain the following two books:

* Diamond, J. (1997) *Guns, Germs, and Steel: The Fate of Human Societies*, W.W. Norton & Company, New York, London.

* Speth, J. G. (2000) *Red Sky at Morning: America and the Crisis of the Global Environment*, Yale University Press, New Haven and London.

Grading. Grading will be based on a midterm exam, a final exam, a book review, a critical essay, class participation, and quizzes.

Exams. A midterm exam and a final (cumulative) exam will contain general questions testing your knowledge of basic concepts and facts, and also normative questions designed to evaluate your deeper understanding of the material and requiring you to clearly formulate and articulate your thoughts.

Book review. You are required to write a book review (8 to 10 pages) of a book relevant to this course. The book will be selected with the instructor's approval.

Critical essay. Your essay (8 to 10 pages) will describe an historical event discussed in class and explain its relevance in today's world. Examples of such events are: the deforestation in a particular society prior to its collapse, the propagation of germs and diseases in a particular period, the effect of the domestication of fire on the landscape. You will present your findings in front of other students during a 10 minutes oral presentation.

Quizzes. Any class could begin with an unannounced short quiz (15 minutes or less) testing your understanding of either some ideas or concepts discussed in previous classes or of the reading material for the current or past classes.

Midterm examination	20% of your grade
Final examination	30% of your grade
Book review and oral presentation	20% of your grade
Critical essay	20% of your grade
Class participation and quizzes	10% of your grade

Course Syllabus

Introduction: Presentation of the topic within the overall theme; emphasis on the necessity of a multidisciplinary and scientific approach; presentation of the general layout of the course.

1. The impact of nature and the environment on societies

1.1. Nature and the inequality puzzle: A global perspective

There are wide differences in the average level of well-being of the various countries in the world (the “inequality puzzle”), and economists have come up with several factors contributing to these inequalities. We will use existing data to show the existence of significant relationships between variables such as climate and geographic location, and measures of the current well-being and economic growth of countries all over the world. We will discuss various possible mechanisms underlying these positive correlations. We will also examine possible explanations of the “resource curse” (the negative relationship between natural capital and growth rates of GDP).

Topic 1. Geography, climate, natural resources and the inequality puzzle. Data analysis and discussion of mechanisms. The resource curse.

Reading:

* Diamond, Prologue.

* Gylfason, T. (2001). “Natural resources, Education, and Economic Development,” *European Economic Review*, 45: 847-859.

Suggestions for advanced reading:

* Gallup, J., J. Sachs and A. Mellinger (1998). “Geography and Economic Development,” NBER Working Paper 6849 (December).

1.2. Nature in the inequality puzzle: A historical perspective

An alternative way to formulate the inequality puzzle is as follows: Why did wealth and power become distributed as they are now? Perhaps nature and the environment have had more subtle impacts on the formation and development of societies than the effects identified in the previous lecture? We will follow closely the argument of Diamond’s *Guns, Germs, and Steel: The Fate of Human Societies* using evidence from archaeology, anthropology, ecology, and biology to support the following thesis: “History followed different courses for different peoples because of differences among peoples’ environments.”(Diamond, page 25).

Topic 2. The world up to 11,000 BC and the domestication of fire.

Reading:

* Diamond CH 1.

Topic 3. The agricultural revolution and the spreading of agriculture.

Reading:

* Diamond CH 5 and 7.

* Diamond CH 6, 8 and 10.

Topic 4. From food production to complexity.

Reading:

* Diamond CH 11, 12, 13, and 14.

Topic 5. Criticisms of Diamond’s argument.

Reading:

* Blaut, J. M. (1999). “Environmentalism and Eurocentrism: A Review Essay,” *Geographical Review*, 89(3): 391-408.

Suggestions for advanced reading:

* Harris, D. (ed.) (1996). *The Origins and Spread of Agriculture and Pastoralism in Eurasia*, London/New York, UCL Press.

* Pomeranz, K. (2000). *The Great Divergence: Europe, China, and the Making of the Modern World*, Princeton University Press, Princeton, New Jersey.

* Blaut, J.M. (1993). *The Colonizers Model of the World: Geographical Diffusionism and Eurocentric History*, New York: Guilford Press.

* Crosby, A. (1997). *The Measure of Reality: Quantification and Western Society, 1250-1600*, Cambridge: Cambridge University Press.

1.3. Natural disasters

A more dramatic way nature and the environment affects societies is through the effects of natural disasters. We will survey the evidence concerning the location, frequency, and effects of natural disasters on human population and economic growth and development. Using past studies as well as recent data, we will show that both the frequency of (reported) disasters and (reported) number of people killed have increased at least in the second half of the 20th Century.

Topic 6. An overview of natural disasters and their impact on economies.

Reading:

* Shah B. (1983) Is the Environment becoming more hazardous? A Global Survey 1947 to 1980, *Disasters*, 7: 202-209.

Suggestions for advanced reading:

* Davis, Lee (2002). *Natural Disasters*, Facts on File, Inc.

2. How and why societies affect their environment

Humans alter and deplete some of the resources made available by nature, either through direct consumption or through the use as inputs in the production of goods and services, and at the same time reject some by-products of these consumption/production processes in the environment. Given a sufficient large number of people engaged in these activities, problems associated with environmental pressures may arise. What are these problems, why do they arise, and when do they really become a problem, are issues addressed in this section of the course.

2.1. A global perspective on environmental issues

This section of the course will present a set of major environmental problems facing modern societies. Most of these problems are critical, or are about to become so: This implies that they will get resolved, in pleasant or unpleasant ways, within a couple of generations.

Topic 7. Major environmental issues.

Reading:

* Speth, CH 1, 2, and 3.

2.2. Basic principles of environmental economics

Explaining why these problems arise requires an understanding of some of the basic principles in environmental economics. These principles are based on the theory of externalities, and can easily be understood without prior knowledge of economics.

Topic 8. Theory of externalities.

Reading:

* Speth, CH 6 and 7.

* Turvey, R. (1963). "On Divergences between Social Cost and Private Cost," *Economica*, 30: 309-313.

Suggestions for advanced reading:

* Cropper, M. and W. Oates (1992). "Environmental Economics: A Survey," *Journal of Economic Literature*, XXX: 675-740.

Topic 9. Valuing the environment.

Reading:

* Costanza, R. & al. (1997). "The Value of the World's Ecosystems Services and Natural Capital," *Nature* 387: 253-261.

Suggestions for advanced reading:

* Cropper, M. and W. Oates (1992). "Environmental Economics: A Survey," *Journal of Economic Literature*, XXX: 675-740.

2.3. Population and the carrying capacity

Many of the environmental issues stemming from the consequences of human activity are seemingly disparate phenomena that can be traced to a single cause: Pressures on the environment due to the growing scale of the human enterprise. How far this pressure will go depends in part on how many of us there are and also on how many people the earth can carry.

Topic 10. Earth's carrying capacity.

Reading:

* Hardin, G. (1968). "The tragedy of the Commons," *Science*, 162: 1243-1248.

* Arrow, K. & al. (1995). "Economic Growth, Carrying Capacity, and the Environment," *Science*, 268: 520-521.

* Vitousek, P. & al. (1997). "Human domination of Earth's ecosystems," *Science*, 277: 494-499.

Topic 11. A case study of natural constraints: Water.

Reading:

* Cohen, J. (1995). *How Many People Can the Earth Support? (Chapter 14)* W.W. Norton & Company, New York and London.

2.4. Some lessons from history

Many of the major environmental problems discussed in a previous part of this course are not new. They can be shown to have arisen in many past societies, sometimes resulting in the collapse of societies due to their effect on the environment. We will review some of the archaeological evidence pointing at environmental factors playing a major role in the collapses.

Topic 12. Discussion of the role of environmental factors in the collapses of some past societies (Easter Island, the Anasazi, The Maya, Norse Greenland). Identification of a common set of contributing factors.

Reading:

* Weiss, H. and R. Bradley (2001) "What Drives Societal Collapse?" *Science* 292: 609-610.

Suggestions for advanced reading:

* Diamond, J. (2005). *Collapse: How Societies Choose to Fail or Succeed*, Viking, Published by the Penguin Group.

3. Toward the future

3.1. The concept of sustainable development

This section of the course will discuss the concept of sustainable development: Economic development that meets the needs of the present without compromising the ability of future generations to meet their needs. It will be shown that it is difficult to translate this concept of intergenerational equity into precise policies.

Topic 13. Sustainable development. Property rights and polluter-pay principle, internalization of environmental costs, precautionary approach.

Reading:

* Solow, R. (1974). "The Economics of Resources or the Resources of Economics," *The American Economic Review*, 64: 1-21.

* Speth, CH 8, 9, and 10.

* Sarenwitz, D. and R. Pielke (2000) "Breaking the Global-Warming Gridlock" *The Atlantic Monthly*, 286(1): 55-64.

3.2. Toward a science of human history?

Can the study of human interactions with its environment, multidisciplinary by nature, be part of the more general science of human history? We will discuss some of the significant differences with non-historical sciences such as physics, biology, chemistry, associated with methodological issues (laboratory vs. natural experiments, proximate vs. ultimate causes), as well as issues concerning causation, prediction and complexity.

Topic 14. The present without the past has no future: Toward a science of human history.

Reading:

* Diamond, CH 2 and 3.

* Diamond, Epilogue.

* Messerli, B., M. Grosjean, T. Hofer, L. Nunez and C. Pfister (2000). "From Nature Dominated to Human Dominated Environmental Changes," *Quaternary Science Review*, 19: 459-479.

General Education Content Areas. The course "Global and Historical Perspectives on the Interaction Between Humans and the Environment" has a high social science content and thus clearly falls into the Content Area 2 (Social Sciences). In addition, in this course students will enrich their knowledge of past and present interactions between nature and various societies; this emphasis puts the course also in Content Area 4 (Diversity and Multiculturalism). Finally, with the analysis of data, the discussion of natural disasters, and more generally the emphasis on the scientific method, the course belongs to Content Area 3 (Science and Technology).

Additionally, students taking this course will improve their competencies in *computer technology* and *quantitative skills*, since some simple analysis of data (plots, simple regressions) using computers will be performed in at least two lectures under the instructor's help and supervision, and in *writing* and *information literacy* since students are required to write a book review and a critical essay (in addition to the midterm and final exam).

Pedagogical methods.

1. Challenging questions initiating further discussions. Each topic in the above syllabus will be introduced in the form of a specific question concerning the interaction

between humans and nature and the environment. Examples of such questions are: (Topic 1) Can nature and the environment explain the inequality puzzle through simple mechanisms? (Topic 2 to 4) Are there more complex mechanisms at work? (Topic 6) Do natural disasters have a significant effect on human societies? (Topics 8 and 9) Why do societies face environmental problems? Part of each lecture will be spent discussing these questions.

2. Lectures require careful preparation. One objective of this course is to demonstrate the relevance and accessibility of much of academic research in various fields. Consequently, the articles and book chapters corresponding to the various topics in the syllabus require a careful and thorough reading before class. These articles are taken mostly from top journals of various fields (for instance, *Science*, *Nature*, *The American Economic Review*, *Quaternary Science Review*). They all raise important questions or address significant problems, but are meant to be the basis for encouraging further class discussions. Students will be regularly asked to concisely summarize their reading for the current class, either verbally or in the form of a short quiz.

3. Hands on data. At least 2 lectures will use cross-country data. It will take place in a room equipped with computers where each student will learn to perform simple analysis of these data (histograms, charts, simple regressions) under the instructor's help and supervision. It is critical that students understand the importance of data analysis.

4. Practice of presentation skills (writing and oral presentation). There is large writing component to this course, in the form of a critical essay and a book review, in addition to the midterm and final examination. Also, students will also have to prepare for an oral presentation of their critical essay to the class.

learn to present their critical essay during a short oral presentation to the class.

Statement of intent. In the event my proposal were to be selected by the committee, I am willing to engage in a year-long curriculum development effort and to teach a 1-credit seminar each semester of the developmental year.

University of Connecticut
Department of Economics
Box U-63
Storrs, CT 06269-1063 USA

Phone: 860-486-4567

Fax: 860-486-4463

Segerson@uconn.edu

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To: Anne Hiskes, Associate Dean, CLAS

From: Kathleen Segerson, Head, Department of Economics

Re: Support for Course Proposal

This is to express my strong support for the proposal by Professor Olivier Morand to develop and teach an Honors course entitled "Global and Historical Perspectives on the Interaction between Humans and the Environment." He is submitting this proposal as part of the Honors General Education Course Development competition.

The proposed course brings together information and insights from a variety of disciplines to examine important problems with significant societal impacts. The overriding objective is an examination of the relationship between nature/environment and the growth and development of societies. It fits very well within the broad theme of the competition, "Nature Transformed: Perspectives on Environment and Culture." The use of both historical and contemporary examples, as well as examples that span the globe and compare experiences across countries and cultures, gives the course considerable breadth and contributes toward meeting the objectives of the General Education requirements. In addition, both the challenging topics and the expected level of reading and critical analysis are consistent with what is needed and expected in honors courses.

Professor Morand is well-qualified to teach this course. Economic growth and development is a focus of much of his research, and he has a keen interest in the link between growth and natural systems and disasters. He is an excellent teacher, who is known to be stimulating, challenging, and demanding. He has experience in teaching honors classes, and knows how to challenge students to think critically and push the bounds of their understanding about issues. It would undoubtedly be an excellent course.