

Econ 638, Environmental Resource Economics: Tentative Syllabus

Overview:

Environmental resource issues are increasingly at the forefront of public policy debates. Modern economic policy analysis requires the ability to extend the tools of public microeconomics to externality issues and the management of natural capital. We review the methods of static and dynamic optimization to deal with pollution, congestion, waste disposal and management of environmental resources including water, forests, soil, and marine. We develop the principles of sustainable development and sustainability science in contrast to popular representations. Topics include energy and global warming, corrective taxes vs. cap & trade regimes, property and institutional mechanisms of environmental cooperation, sustainable economic growth, measuring the *environomy*, recycling, water management, policies for resource management in developing countries, and *smart, greedy, and win-win growth*. The course is MA-friendly. Many of the models are presented with tools from intermediate microeconomics or with intuitive derivation of necessary conditions. The instructor will be available to help students design publishable research and/or pursue particular policy questions of interest.

Learning Objectives: The objectives of this course are to (1) learn to design and evaluate environmental policies by applying the principles of environmental analysis and public policy; (2) engage the classic literature of the field and more recent methodological developments/applications; (3) participate in research that contributes to the field of environmental economics; and (4) enhance confidence in presentation and discussion skills.

Text: Perman et al., *Natural Resource and Environmental Economics*, 3rd ed.

Other references

Oates (ed.), *The Economics of the Environment*

Stavins. 2005. *Economics of the Environment: Selected Readings*.

"High impact" articles at:

http://en.wikipedia.org/wiki/Journal_of_Environmental_Economics_and_Management#HighImpact_Articles

e.g. Segerson, Uncertainty and Incentives; Kahnemann, Purchase of Moral Satisfaction; Goulder (2); Stavins; Seldon (on EKC).

Course requirements & Grading

Midterm	24%
Final ¹	36%
Paper ²	24%
Homework and citizenship ³	16%

Preliminary Course Outline Students are encouraged to indicate their preferences for topics (especially areas not already reflected below) and for readings to be added or downgraded to optional status.

¹ Please consult UHM schedule of courses.

² Any topic related to course subject matter. Tentative proposals due on fifth Tuesday (refer to sample proposal outlines); revised proposals (please discuss w/ me) on sixth Tuesday. Papers due day of penultimate class.

³ Contributions to the learning community (including class participation, additional presentations, facilitating availability of course materials, bringing pertinent current articles, websites etc. to class's attention).

I. Environmental Welfare Economics

- A. Intro and "market failure"
- B. Externalities (Pigouvian, Coasian, and market solutions)
- C. Public goods
- D. Environmental justice
- E. Readings
 1. Perman, ch 5.
 2. Welfare Economics and the Minimal Role of Government (course notes)
 3. Coase, "The Problem of Social Cost," JLE, 10/60 and in both Oates and Stavins. See also Coase Theorem in the New Palgrave, 2nd ed.
 4. Johansson and R'set, "Apples, Bees, and Contracts: A Coase-Cheung Theorem for Positive Spillover Effects"
 5. Wiki literature summaries and refs regarding Steven Cheung and the Coase Theorem.
http://en.wikipedia.org/wiki/Steven_N._S._Cheung (last para before "Original thinking")
http://en.wikipedia.org/wiki/Coase_theorem (esp. "Equivalence Version")

II. Sustainable Growth

- A. Perman, ch. 1-4 & 14.
- B. Barbier, E., 1987. *The Concept of Sustainable Economic Development*. *Environmental Conservation*, 14(2):101-110*
- C. Sustainable Development in Economics http://en.wikipedia.org/wiki/Sustainable_development especially section on "sustainable development in economics". Compare to Munasinghe Mohan, [Environmental Economics and Sustainable Development](#), 1993. Skim and note his triangle.
- D. Anand and Sen, (2000) "Human Development and Economic Sustainability," *World Development*, Vol. 28, No. 12, pp. 2029-2049.
- E. Arrow et al. (2004), "Are We Consuming Too Much," *JEP*, v. 18, n. 3, pp. 147-172.
- F. Solow, "On the Intergenerational Allocation of Natural Resources," *Scandinavian Journal of Economics*, 88(1), 141±149 and "Sustainability, An Economists Perspective," in Dorfman and Dorfman, *Economics of the Environment*, Third Edition, Norton. "The Economics of Resources or the Resources of Economics," *AER*, May, 1974, pp. 1-14.
- G. Endress et al., "Sustainable Growth w/ Environmental Spillovers," *JEBO*, 2005, available as WP 02-04. Ancestors include 00-9, "Sustainability w/o Constraints," <http://ideas.repec.org/p/hai/wpaper/200009.html> "Is Sustainability Necessary" (xeroxed), and "Golden Rules for Sustainable Resource Management," <http://authors.repec.org/research/identified!5c693245>.

III. Pollution solutions

- A. Command and control vs. emission trading
- B. Emission-trading vs. exposure trading
- C. Readings
 1. Perman chs. 6-8
 2. Montgomery (1972), *JET*, 5, 395-418, and ch. 12 in Oates
 3. Roumasset and Smith, *JEEM* 1990
 4. Bergstrom (1976), "Regulation of Externalities," *J. Public Econ* (v. 5, pp 131-8)* and "Lindahl Eqibm and the Law," (1975, v42, 249-57) and on his web page. See also http://www.env-econ.net/2005/08/the_following_i.html#more
 6. Weitzman, "Prices and Quantities," *RESTUD*, 10/74 and in Oates
 7. Boyd and Conley. 1997. Fundamental Nonconvexities in Arrovian Markets and a Coasian Solution to the Problem of Externalities. *JET*. Issue 2: 388-407.
<http://ideas.repec.org/a/eee/jetheo/v72y1997i2p388-407.html>

8. Fullerton and Wolverton, "Two Generalizations of a Deposit-Refund System," *AER*, May, 2000.
 9. Smith, V. L. 1972. "Dynamics of Waste Accumulation: Disposal Versus Recycling." *Quarterly Journal of Economics* 86: 600-616.
 10. McKittrick and Collinge. 2002. The Existence and Uniqueness of Optimal Policy in the Presence of Victim Defense Measures *Journal of Environmental Economics and Management* 44, 106-122.
 11. Sandmo on Double Dividend (handout).
 12. Fullerton and West. 2002. Can Taxes on Cars and on Gasoline Mimic an Unavailable Tax on Emissions? *Journal of Environmental Economics and Management* 43, 135-157,
 13. Stavins and Howitt essays in Choices, 1st quarter, 2005, pp 53-61.
 14. Libecap. 2005. Rescuing Water Markets: Lessons from Owens Valley. PERC POLICY SERIES ISSUE NUMBER PS-33
 15. Parry, Walls, Harrington. 2007. Automobile Externalities and Policies. *JEL*. June.
- Other refs (not assigned)
1. Baumol and Oates, ch 10 in Oates.
 2. Starrett (1974), "Fundamental Non-Convexities the Theory of Externalities, *JET*; Starrett(1973), "A Note on Externalities and the Core," *Econometrica*, v. 41, pp 179-83.
 3. R. Shadbegian, Gray, W. and C. Morgan (2004). "The 1990 Clean Air Act Amendments: Who Got Cleaner Air and Who Paid For It?"
 4. Oates, "Green Taxes" in *Southern Economic Journal* (Apr 1995).

IV. Environmental resources (water, forests, and soil)⁴

- A. Renewable and non-renewables
- B. Open access vs. common property
- C. Evolution of common and private property
- D. Readings
 1. Perman, 14-18.⁵
 2. R'set, Fesharaki, Isaac, "Oil Prices w/o OPEC: A Walk on the Supply Side" (handout) and Chakravorty and R'set, "Competive Oil Prices and Scarcity Rents when the Extraction Cost Function is Convex, *Resources and Energy*, December 1990.
 3. Chakravorty, U. and Roumasset, J. (1991), Efficient Spatial Allocation of Irrigation Water, *American Journal of Agricultural Economics*, February 1991: pp. 165-173.
 4. Krulce, D. Tom Wilson and J. Roumasset, Optimal Management of a Renewable and Replaceable Resource: The Case of Coastal Groundwater, *AJAE*, 11/97

⁴ Classics in Resource Economics according to Trudy Cameron: Brown, Gardner, Jr, "An Optimal Program for Managing Common Property Resources with Congestion Externalities," *JPE*, ??? pp. 163-173. Brown, Gardner M. Jr. and B.C. Field, "Implications of Alternative Measures of Natural Resource Scarcity," *JPE*, 86(2) April 1978. Gordon, H. Scott (1958) "Economics and the Conservation Question," *Journal of Law and Economics*, October, 110-121. Gordon, H. Scott (1954) "The Economic Theory of a Common Property Resource: The Fishery," *JPE*, April, pp. Hotelling, Harold (1931) "The Economics of Exhaustible Resources," *JPE*, 39(2), April, pp. 137-175. Krutilla, John V. "Conservation Reconsidered," *AER*, 1967, pp. 777-786. Nordhaus, W.D. (1974) "Resources as a Constraint on Economic Growth," *AER*, 64, May, 22-26. Smith, Vernon L. (1977) "Control Theory Applied to Natural and Environmental Resources: An Exposition," *JEEM* 4, pp. 1-24. Smith, Vernon L. (????) "Economics of Production from Natural Resources," *AER*, ????, pp. 409-431. Solow, Robert M. (1974) "The Economics of Resources or the Resources of Economics," *AER*, May, pp. 1-14.

⁵ See also

http://books.google.com/books?id=yKm7HJ2nQNoC&pg=PA322&lpg=PA322&dq=royalty+price+%2B+resource+economics&source=bl&ots=utIqNWFpLz&sig=XBFc4Ly2uEv15Ll8IyETuvSa1o8&hl=en&ei=lehbSq7vFY_UsQO1kJWICg&sa=X&oi=book_result&ct=result&resnum=1

5. Pitafi and R'set. 2009. AJAE. Pareto-Improving Water Management over Space and Time: The Honolulu Case. <http://www.blackwellpublishing.com/journal.asp?ref=0002-9092>
 6. Barbier, "The Economics of Soil Erosion: Theory, Methodology and Examples" <http://www.idrc.ca/uploads/user-S/10536145400ACF2B4.pdf>
 7. Symposium on Stern and Critics (Climate economics) REEP, Winter 2009 <http://reep.oxfordjournals.org/content/vol3/issue1/index.dtl?etoc>
 - A. Heal, Climate Economics: A Meta-Review and Some Suggestions for Future Research
 - B. Murray, Newell and Pizer. Balancing Cost and Emissions Certainty: An Allowance Reserve for Cap-and-Trade
 - C. Dietz and Nicholas Stern, On the Timing of Greenhouse Gas Emissions Reductions: A Final Rejoinder to the Symposium on 'The Economics of Climate Change: The Stern Review and its Critics'
 8. Chakravorty et al., Endogenous Substitution Among Energy Resources and Global Warming. JPE, 1997. http://papers.ssrn.com/Sol3/papers.cfm?abstract_id=46947
 9. Pongijvorasin and R'set, Confuser Surplus (2009, pdf).
- Other refs (not assigned)
1. Harrington, ch. 32 in Oates.
 2. Plourde, "A Simple Model of Replenishable Natural Resource Exploitation." *AER* 60: 3 (518-22)* and Plourde, 1972, "A Model of Waste Accumulation and Disposal"
 3. McConnell, Kenneth. 1983. "An Economic Model of Soil Conservation." *AJAE* 65, n 1: 83-89
 4. Barrett, S., Optimal Control of Soil Erosion, ch. 18 in Dasgupta & Maler, v.2.
 5. Caputo and J. E. Wilen. 1995. "Optimal Cleanup of Hazardous Wastes." *International Econ Rev* 36: 217-243.
 6. Brander, J and S Taylor. 1998. The Simple Economics of Easter Island: A Ricardo-Malthus Model of Renewable Resource Use. *American Economic Review*. 88: 119-138.
 7. R'set and Smith R. Interdistrict Water Allocation w/ Conjunctive Use. *Water Resources Update*, Jan '01
 8. Graham-Tomasi, Optimal Depletion of Old-Growth Forests, scanned.

V. Property rights, and institutional design

- A. Hardin, Tragedy of the Commons, Stavins, ch 2. <http://dieoff.org/page95.htm>
- B. Copeland, Brian R.; M. Scott Taylor (2009). "[Trade, Tragedy, and the Commons](http://en.wikipedia.org/wiki/Common-pool_resource)". *American Economic Review* **99** (3): 725–49. http://en.wikipedia.org/wiki/Common-pool_resource, Critique.
- C. Clark. 1998. *Commons sense: common property rights, efficiency and institutional change*, *Journal of Economic History* 58 (1998) (1), pp. 73–102.*
- D. Field, "The Evolution of Property Rights", *Kyklos*, Vol. 42, 1989, pp. 319-345.
- E. Runge, Inclusion, Exclusion, Enclosure <http://ideas.repec.org/a/eee/wdevel/v34y2006i10p1713-1727.html>
- F. R'set and Tarui, Governing the Resource: Scarcity-Induced Institutional Change (pdf).
- G. Alston, Review of Anderson & Hill's, *The Not So Wild, Wild West: Property Rights on the Frontier* <http://www.independent.org/publications/tir/article.asp?a=552>
- H. Unassigned refs
 1. Ostrom (1990), *Governing the Commons*, chs. 1, 3 (pp. 69-101)

2. Weitzman, M., (1974), Free Access vs. Private Ownership as Alternative Systems for Managing Common Property, *Journal of Economic Theory*, 8: 225-234
3. Roumasset and La Croix, The Coevolution of Property Right and Political Orders: An Illustration from nineteenth-Century Hawaii, in Feeny, *Rethinking Institutional Analysis and Development*.
4. R'set, Designing Inst for Effective Forestry Mngmt (electronic).
5. Sethi, R. and E. Somanathan (1996) The Evolution of Social Norms in Common Property Resource Use. *American Economic Review* 86(4): 766-788.
6. Coevolution – Mkts & Const Order (pdf); see also ch 9 in B&O (electronic)

VI. Ecological Economics, Cost-Benefit Analysis and Measurement problems

- A. Perman, Part III.
 - B. Kaiser and Roumasset, "Valuation of Nature's Intermediate Products: the Koolau Forest's Contribution to the Pearl Harbor Aquifer," 1999. <http://www.uhero.hawaii.edu/> and/or "Valuing Indirect Ecosystem Services: the Case of Tropical Watersheds," *Environmental Economics and Development*, v7, n4 (2002), 701-14
 - C. Symposium on Contingent Valuation in *Economic Perspectives*, Fall 1994
 1. Portney, P., The CV Debate: Why Economists Should Care
 2. Hanemann, W.M., Valuing the Environmental Through Contingent Valuation
 3. Diamond & Hausman, Contingent Valuation: Is Some Number Better than No Number?
 - D. Shogren, Economics of Invasive Species: explosive invader, in Perrings.*
 - E. Olson, L.J. and S. Roy. 2002. The Economics of Controlling a Stochastic Biological Invasion, *American Journal of Agricultural Economics (Proceedings)*, 84(5), 1311-1316. Olson, L.J. and S. Roy. 2005. On Prevention and Control of an Uncertain Biological Invasion, *Review of Agricultural Economics (Proceedings)*, 27(3), 491-497. Olson, L.J. 2006. The Economics of Terrestrial Invasive Species: A Review of the Literature. *Agricultural and Resource Economics Review*, 35(1), 178-194.
 - F. Burnett et al., Optimal Avoidance and Removal of Brown Treesnakes. The Economics of Invasive Species: Lessons from Hawaii (ppt). Livingston and Osteen, "Integrated Invasive Species Prevention and Control Policies" and TNC, "Stop the Silent Invasion."
 - G. R'set, Burnett, Wang. 2007. Is China's Growth Sustainable? http://www.economics.hawaii.edu/research/workingpapers/WP_07-23.pdf
 - H. Kahneman and Knetsch, Valuing Public Goods: The Purchase of Moral Satisfaction, *JEEM* <http://ideas.repec.org/a/eee/jeeman/v22y1992i1p57-70.html>
 - I. Chs 2, 3, and concluding chapter of Sustainability Science for Watershed Landscapes.
- Other refs (not assigned)
- A. Pearce and Moran, *Economic Value of Biodiversity*, 1994 and Pagiola et. al. (2004), *How much is an ecosystem worth?;* Go to <http://www.biodiversityeconomics.org/library/index.html> and use the key word search function.
 - B. Vincent, Jeffrey, "Economic Depreciation of Timber Resources: Direct and Indirect Estimation Methods", Harvard Institute for International Development, June 1997, 13pp. <http://www.hiid.harvard.edu/pub/pdfs/585.pdf>
 - C. Weitzman, "On Diversity," *QJE*, 102:363-405, 1992.
 - D. Montgomery et al., "Pricing Biodiversity," *Journal of Environmental Economics and Management* 38, 1|19 1999

- E. McFadden's advances in CV methods
(<http://emlab.berkeley.edu/users/mcfadden/dlmcv10.html>)
- F. Nordhaus et al., *Nature's Numbers*.

VII. Win-win environmentalism

- A. Endress and Roumasset, "The Yin and Yang of Sustainable Development: The Case for Win-Win Environmentalism," in *Asia-Pacific Economy*, v. 1, n. 2.
- B. Pongkijvorasin et al., "Pricing resource extraction with externalities: the case of indirect stock to-stock effects." 2009.
- C. Krautkraemer, J., (1994), "Population growth, soil fertility, and agricultural intensification," J. Dev. Econ., 44, 403-428; and ReStud '85 on Optimal Growth and Preservation. Key graph in R'set, "Agricultural Growth and Population Change," in *New Palgrave Dictionary of Economics*, 2nd edition. <http://ideas.repec.org/p/hai/wpaper/200702.html>
- F. Roumasset, "Population and Agricultural Development," The New Palgrave Dictionary of Economics, 2007. <http://ideas.repec.org/p/hai/wpaper/200702.html>
- G. Wagner on green NNP http://www.env-econ.net/2005/07/from_the_answer_1.html and http://gwagner.net/work/040409Fixing_GDP.html .*
- H. Copeland and Taylor, Trade, Growth and the Environment, JEL, 2004 and NBER WP 2003.
- I. Dasgupta et al., "Confronting the Environmental Kuznets Curve," Ch 20 in Stavins, *Economics of the Environment: Selected Readings*.
- J. Nordhaus et. al., *Nature's Numbers*, Appendix A.
- K. Other refs (not assigned)
 1. Wagner on green NNP http://www.env-econ.net/2005/07/from_the_answer_1.html and http://gwagner.net/work/040409Fixing_GDP.html
 2. Pearce and Moran, *Economic Value of Biodiversity*, 1994 and Pagiola et. al. (2004), *How much is an ecosystem worth?*, Go to <http://www.biodiversityeconomics.org/library/index.html> and use the key word search function.
 3. Hartwick, J.M. (1990), Natural Resources, National Accounting and Economic Depreciation, *Journal of Public Economics*, 43:291-304.
 4. Das gupta, P. &Maler, K. (1993), Poverty, Institutions, and the Environmental-Resource Base, for Behrman & Srinivasan (eds), *Handbook of Development Economics*, Vol 3.
 5. Dasgupta, Sustainable Economic Development in the World of Today's Poor, Population, Resources, and Welfare: An Exploration into Reproductive and Environmental Externalities,* and Evaluating Projects and Assessing Sustainable Development in Imperfect Economies,* all at www.econ.cam.ac.uk/faculty/dasgupta
 6. Brock, W. and M.S. Taylor (June, 2004), "The Green Solow Model," NBER WP 10557, <http://www.nber.org/papers/w10557>
 7. Weitzman, 1999. Pricing the Limits to Growth from Minerals Depletion., QJE, 114(2): 691-706.
 8. R'set, Review of Opschoor et. al., *Environmental Economics and Development*, Edward Elgar, 1999.
 9. M. Hammig , "Institutions and the Environmental Kuznets Curve for Deforestation: A Crosscountry Analysis for Latin America, Africa and Asia," *World Development*, June, 2001, pp 995-1010*
 10. Dasgupta, P. &Maler, K. (1993), Poverty, Institutions, and the Environmental-Resource Base, in Behrman & Srinivasan (eds), *Handbook of Development Economics*, Vol 3*
 11. Pender, John, "Pop growth, ag intensification, induced innovation, and resource sustainability," *Ag Econ*, 19, (1998), 99-112.
 12. Deacon on within-country EKC's
<http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1182&context=ucsbecon>

VIII. Energy, Global Warming, Growth, and International Cooperation

- A. Nordhaus, ch 22 in Stavins
- B. Chakravorty et.al., JPE Dec. 1997 [http:// papers.ssrn.com/Sol3/papers.cfm?abstract_id=46947](http://papers.ssrn.com/Sol3/papers.cfm?abstract_id=46947)
- C. Barrett, ch. 21 in Stavins
- D. Nordhaus and Weitzman on the Stern Report, JEL, Sept 2007. Also Dasgupta (see his webpage.
- E. scienceandpublicpolicy.org/other/nature_not_human_activity_rules_the_climate.html
- F. [07-11](#) Nori Tarui, Charles Mason, Stephen Polasky, Greg Ellis. Cooperation in the Commons with Unobservable Actions
- G. Aldy and Stavins, pp. 343-367.

Unassigned refs

1. Nordhaus, W. (1992), An Optimal Transition Path for Controlling Green House Gases, Science, Vol 258:20 November
2. Cline, The Economics of Global Warming
3. Falk, I., and R. Mendelsohn. 1993. "The Economics of Controlling Stock Pollutants: An Efficient Solution for Greenhouse Gases." Journal of Environmental Economics and Management 25: 76-88
4. Latest Nordhaus book (see his webpage)
5. Nature, Not Human Activity, Rules the Climate

IX. Trade and the Environment

- A. Bhagwati, J. (1993), AThe Case for Free Trade, Scientific American, November: 42-49*
- B. Daly, H. (1993), AThe Perils of Free Trade, Scientific American, November: 50-56*
- C. Polasky et. al., (2003), "On Trade, Land-Use and Biodiversity," search at <http://www.biodiversityeconomics.org/library/index.html>
- D. Copeland and Taylor (July, 2003), "Trade, Growth and the Environment" NBER WP and JEL 2004