

Economics on Sustainability

Instructor: Dr. Elías Cisneros; **Course meets:** TBA; **Office hours:** TBA

Introduction:

Are there ecological limits to economic growth?

How to sustainably use natural resources?

Are find trade-offs between economic benefits and environmental damages?

This course is designed to explore and analyze the use and management of natural resources. It introduces concepts, theories, and methods used in the economic analysis of environmental and natural resource issues. The course covers topics on ecological sustainability, non-renewable resources, renewable resources, sustainable economic development, and monetary evaluation. The objective of this course is to provide students with a set of theoretical and practical skills to understand the economy and environment as a deeply interlinked complex system and to be able to evaluate the externalities and welfare effects of economic activities.

Course Objectives:

- To review key concepts of sustainability.
- To understand theoretical concepts of sustainable resource use.
- To learn concepts of environmental cost-benefit analyses.
- To critically assess theoretical concepts
- Strengthen skills of peer-review in a variety of forms

Topics:

(1) Sustainability indicators; (2) Non-Renewable Resources I – Discounting; (3) Non-Renewable Resources II – Hotelling rule; (4) Renewable Resources I – Maximum sustainable yield; (5) Renewable Resources II – Stability of fisheries; (6) Renewable Resources III – EU policy and Common Pool Resources; (7) Resource Substitutability; (8) Environmental Kuznets Curve (EKK) and Pollution Heaven Hypothesis (PHH); (9) Life Cycle Analysis (LCA) and Food consumption; (10) Monetary Valuation I – projects and monetary valuation; (11) Monetary Valuation II – Background Monetary evaluation; (12) Monetary Valuation III – Valuation techniques; (13) Monetary Valuation IV – Stated preference method

Pre-requisites:

Successful completion of an Intermediate microeconomics course is required.

Methods of instruction:

Concepts will be presented in class via lectures and case studies, which will also serve as the basis for class discussion and small group activities. Lectures will present key topics and summaries of the readings and will be posted on Canvas in the morning before class. Case studies will highlight research from the United States, Europe, and the global south. Weekly assignments will deepen the understanding of theoretical concepts and train the critical assessment abilities of students.

Requirements and grading:

There will be twelve problem sets and two exams. Grades will be calculated based upon the following weights: Class participation (10%), problem sets (30%), and exams (60%).

Main texts and reading materials:

The main literature is marked with an asterisk (*). All other literature sources are for further reading.

- *Pearman, R., May., Common, M., Maddison, D., and J. McGilvray. 2003. *Natural resources and Environmental Economics*, 4th ed. Pearson Education Limited, Essex, England.
- Charles D. Kolstad. 2011. *Environmental Economics*, 2nd edition, 2011, Oxford University Press.

Course outline:

Lecture 1: Sustainability indicators

Lecture:

- *Perman et al. (2003): ch. 2.4, 2.5

Assignment:

- *Hoekstra and Wiedmann (2014): Humanity's unsustainable environmental footprint, Rethinking the global supply chain, Vol 344, Issue 6188, 1115-1117.
- Rockström, et al. (2009): Planetary Boundaries: Exploring the Safe Operating Space for Humanity. Ecology and Society 14(2): 32.
- Rockström, et al. (2009): A Safe Operating Space for Humanity. Nature, 462: 472-475.
- Cornell, Sarah. (2012): On the System Properties of the Planetary Boundaries. Ecology and Society 17.1: r2.
- Rees, William E. (2000): Eco-footprint analysis: merits and brickbats. Ecological Economics 32.3 (2000): 371-374.

Lecture 2: Non-Renewable Resources I – Discounting

Lecture:

- *Perman et al. (2003): ch. 3.5 “Intertemporal distribution“

Assignment:

- *Conceição et al. (2007): Brief on Discounting in the Context of Climate Change Economics. UNDP, Human Development Report Office, Occasional paper No. 2007/19. (Section I, II, III(a) and Conclusion)
- Stern (2006): Review on the economics of climate change. London HM Treasury
- Nordhaus (2007): A Review of the Stern Review on the Economics of Climate Change. Journal of Economic Literature, pp. 686-702.

Lecture 3: Non-Renewable Resources II – Hotelling rule

Lecture:

- *Perman et al. (2003): ch. 14.5 “The social welfare function and an optimal allocation of natural resources.”
- International Energy Agency (OECD/IEA), Technology Roadmap - Biofuels for Transport, 2011
- Fargione, J.; Hill, J.; Tilman, D.; Polasky, S. & Hawthorne, P., Land Clearing and the Biofuel Carbon Debt, Science, 2008, 319, 1235-1238
- OECD, Agricultural Market Impacts of Future Growth in the Production of Biofuels, 2006, 6
- Kalkuhl, M.; Haile, M.; Kornher, L. & Kozicka, M., Cost-benefit framework for policy action to navigate food price spikes FOODSECURE, 2015

Assignment:

- *Kronenberg (2008): Should we worry about the failure of the Hotelling rule? Journal of economic surveys, 22(4): 774. (Sections 1, 3, 4, and 7)

Lecture 4: Renewable Resources I – Maximum sustainable yield

Lecture:

- *Perman et al. (2003): ch. 4.3 “Ecologists on sustainability. “
- *Perman et al. (2003): ch 14.7 “Generalisation to renewable resources. “
- *Perman et al. (2003): ch 17.1, 17.2, 17.3, 17.6

Assignment:

- *SRU (2011): Sustainable Management of Fish Stocks: Reforming the Common Fisheries Policy. German Advisory Council on the Environment, Statement No. 16. (Paragraph 1- 20)

Lecture 5: Renewable Resources II – Stability of fisheries

Lecture:

- *Perman et al. (2003): ch 17.4

Assignment:

- *Froese, R., and Proelss, A. (2010): Rebuilding Fish Stocks no later than 2015: Will Europe meet the deadline? Fish and Fisheries, 11(2), pp. 194-202.

Lecture 6: Renewable Resources III – EU policy and Common Pool Resources

Lecture:

- *Perman et al. (2003): ch. 5.9 “Public goods.”

Assignment:

- *Ostrom (1990): Governing the commons: The evolution of institutions for collective action. Cambridge university press. (Irrigation system examples)
- Hardin (1968): The tragedy of the commons. New York
- Ostrom (2008): The challenge of common-pool resources. Environment: Science and Policy for Sustainable Development 50.4 8-21.
- Schlager, Edella, and Elinor Ostrom (1992): Property-rights regimes and natural resources: a conceptual analysis. Land economics, pp. 249- 262.
- Schlager, Edella (2004): Common-pool resource theory.” Environmental Governance Reconsidered. MIT Press, Cambridge, pp. 145-176.

Lecture 7: Resource Substitutability

Lecture:

- *Perman et al. (2011): ch. 14.4, 19.2, 19.3, 19.4
- Solow, R. M. An almost practical step toward sustainability Resources for the Future, 1992

Assignment:

- *Hamilton et al. (2006): Capital Accumulation and Resource Depletion: A Hartwick rule counterfactual, Environmental & Resource Economics 34: 517-533

Lecture 8: Environmental Kuznets Curve (EKC) and Pollution Heaven Hypothesis (PHH)

Lecture:

- *Perman et al. (2003): Chapter 2.2., 5.2 “Affluence and Technology: The EKC. “
- Ceddia, M.; Sedlacek, S.; Bardsley, N. & y Paloma, S. G., Sustainable agricultural intensification or Jevons paradox? The role of public governance in tropical South America, Global Environmental Change, 2013, 23, 1052 - 1063
- Barbier, E. B.; Burgess, J. C. & Grainger, A., The forest transition: Towards a more comprehensive theoretical framework Land Use Policy, 2010, 27, 98 - 107

Assignment:

- *Dasgupta et al. (2002): Confronting the Environmental Kuznets Curve. Journal of Economic Perspectives, 16 (1): 147-168.

Lecture 9: Life Cycle Analysis (LCA) and Food Consumption

Lecture:

- *EEA 2012 State of the Environment report, Consumption, and the Environment

- Carlsson Kanyama, A., Climate change and dietary choices - how can emissions of greenhouse gases from food consumption be reduced? *Food Policy*, 1998, 23, 277 - 293
- White, T., Diet and the distribution of environmental impact, *Ecological Economics*, 2000, 34, 145 - 153
- Wolf, O.; Pérez-Domínguez, I.; Rueda-Cantuche, J. M.; Tukker, A.; Kleijn, R.; de Koning, A.; Bausch-Goldbohm, S. & Verheijden, M., Do healthy diets in Europe matter to the environment? A quantitative analysis *Journal of Policy Modeling*, 2011, 33, 8 – 28

Assignment:

- *Tukker et al. (2011): Environmental impacts of changes to healthier diets in Europe
- Duda and Shaw (1997): Life Cycle Assessment. *Social Science and Public Policy* Vol. 40
- White and Shapiro (1993): Life Cycle Assessment: A second opinion, *Environ. Sci. Technol.* Vol. 27, No. 6

Lecture 10: Monetary Valuation I – projects and monetary valuation

Lecture:

*Perman et al. (2003): ch. 12.1, 11.3

European Community, *The Economics of Ecosystems and Biodiversity (TEEB) – An Interim Report 2008 Section 2*

Assignment:

*European Community (2008): *TEEB: An Interim Report, Section 2*

Lecture 11: Monetary Valuation II – Background Monetary evaluation

Lecture:

- *Perman et al. (2003): ch. 12.2

Assignment:

- *Cornwell and Creedy (1997): Measuring the welfare effects of tax changes using the LES: An application to a carbon tax

Lecture 12: Monetary Valuation III – Valuation techniques

Lecture:

- *Perman et al. (2003): ch. 12.3, 12.4, 12.6

Assignment:

- *Rumi Shammin (1999): Application of the Travel Cost Method (TCM): A Case Study of Environmental Valuation of Dhaka Zoological Garden. In Joy E. Hecht, ed., 1999. *The Economic Value of the Environment: Cases from South Asia*, IUCN.
- *Loomis, John B.; González-Cabán, Armando; Gregory, Robin. (1996): A contingent valuation study of the value of reducing fire hazards to old-growth forests in the Pacific Northwest. Res. Paper PSW-RP-229-Web. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 24
- *Saptutynigsih and Suryango (2011): Hedonic Price Approach of Flood effect on Agricultural Land. *Economic Journal of Emerging Markets* 3(1): 87-96

Lecture 13: Monetary Valuation IV – Stated preference method

Lecture:

- *Perman et al. (2003): ch. 12.5, 12.6

Assignment:

- TBA