

Syllabus

NR 385 Ecological Economics;
MPA 395, CDAE 295 and 395 Payments for Ecosystem Services
Spring, 2007

Time, Place:	Lectures, W 4:00-7:00
Instructors:	Robert Costanza and Joshua Farley
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Office hours:	JF: W 12:00-4:00 or by appointment.
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Course summary

Ecological economics differs from traditional economics in its pre-analytic vision: while traditional economics treats the economy as a self-contained system, ecological economics recognizes that the economy is a sub-system wholly contained and sustained by the global ecosystem, and like any subsystem, is dependent on the system that contains it. Ecological economics focuses on issues at the interface of the human system and the ecological system that sustains it, with three interdependent goals of sustainable scale, fair distribution and efficient allocation. Such issues cannot be understood from within the framework of any single discipline and require a transdisciplinary approach. Ecological economics is not a subdiscipline of economics or any other discipline. It is a transdiscipline that has particularly distinguished itself by its problem-based approach to methodological development and inquiry. This course will adopt a problem based approach. Specifically, we will be learning about a particular suite of policies know as payments for ecosystem services, and work to promote and develop applications of these policies to real life problems.

Economics is frequently defined as the allocation of scarce resources among alternative desirable ends. Conventional economics focuses on the allocation of raw materials and energy provided by nature among different human made products. We refer to this as micro-allocation. While as ecological economists we recognize the importance of microallocation, we do not consider it to be the most important economic problem. Raw materials provided by nature are the building blocks of ecosystems, and when we convert these raw materials into human made products, we degrade our planet's ecosystems.

Waste emissions from energy use, production and consumption further degrade our ecosystems. Healthy ecosystems generate a wide range of ecosystem services, some of which are essential for sustaining all forms of life. Unfortunately, conventional markets and conventional economists essentially ignore most ecosystem services. In contrast, the most important question in ecological economics is how to allocate the ecosystem structure between human made products and between ecosystem services, both of which are essential to life. We refer to this as the macroallocation problem. Payments for ecosystem services are one approach to macroallocation.

This transdisciplinary problem based service-learning course will assess payments for ecosystem service (PES) schemes as a sustainable, just and efficient mechanism for protecting natural capital. Combining theory with practice, we will learn how PES schemes work and under what circumstances they are appropriate. During the first half of the semester, we will be studying theory and case studies of PES and applying our knowledge to help organize a 9 day conference and [scientific atelier](#) on PES to take place in Costa Rica over Spring Break in partnership with the Universidad Nacional de Costa Rica. Costa Rica is a pioneer in applying PES schemes. Those students enrolled in CDAE 295 will participate in the event. The event will open with a full day conference, followed by two days of field trips to sites where PES schemes have been adopted. The remaining time will be spent deepening our knowledge and applying theory and practice to develop feasible PES solutions to real life problems presented by participating decision makers from around the world. Specific problems will be defined during the atelier, but may range in scale from a local watershed to a nation wide PES scheme for Brazil to global mechanisms by which international beneficiaries pay for benefits they receive from projects in other countries. Following the atelier, we will continue working on the problems presented during the atelier, culminating in professional policy papers, peer reviewed journal articles, and contributions to a world class web-site designed to assist decision makers in developing PES schemes.

Course Goals

To understand the theory and practice of payments for ecosystem services, apply this knowledge to developing solutions to real life problems, and to increase our understanding of the complexity and transdisciplinary nature of such problems.

In so doing, we expect students to develop professional skills by working on real problems and publishing the results, and to foster group work and research skills.

Course objectives

1. To attain a solid understanding of PES by acquiring familiarity with the following theories:
 - o Ecosystem services

- Systems theory and complexity theory
 - Stock-flow and fund-flux resources
 - Public goods
 - Common pool resources
 - The Commons
 - Market allocation
 - Property rights
 - Environmental policy
2. We will also need to understand the legal and political constraints to implementing PES.
 3. To prepare for developing solutions to real life problems by:
 - Contributing to a web site of background material for the atelier, which will evolve into a top quality reference for understanding and applying PES schemes
 - Drafting the Heredia Declaration on PES: A consensus statement to be signed by international and local experts outlining the mechanisms for successfully implementing PES at the global, regional and local level.
 - Reviewing numerous case studies, which in combination with theory will allow us to assess when market mechanisms are appropriate tools for macro-allocation, when PES schemes are appropriate market mechanisms, and how PES schemes should be designed for different ecosystem services.
 - Helping with atelier logistics, as required
 4. To understand the limitations of assessing a problem through the narrow lens of any single discipline
 5. To understand that problems can be defined from many different perspectives, that there is no one correct formulation to complex problems, and no one correct or optimal answer.
 6. To learn how scientific ateliers function, through preparation and participation (even those students who do not go to Costa Rica will be participating to some extent in the atelier)
 7. To follow through on the atelier by turning results into published documents and professional policy papers.

Service learning and problem based learning

This course will adopt a problem-based learning (PBL) approach, which is one type of service learning. For a definition of Service-Learning, see http://www.uvm.edu/~partners/?Page=service_learning.html. By their very nature, problem based courses must adapt to the problem being studied, and therefore must be

flexible. Very little on this syllabus therefore is set in stone (or even in paper—this will remain an evolving electronic document). For an introduction to Problem Based Learning, see Farley, Erickson and Daly (2005) under readings below.

Expectations

Your contribution to the course will be divided between class participation, atelier preparation, participation in the atelier (for CDAE 295), and preparation of final products based on atelier outcomes. Approximate weightings towards your grade are as follows:

Class Participation: 20%

Atelier preparation: 20%

Reflections: 15%

Products: 45%. The final product may be a group (preferably) or individual journal article, professional quality policy paper, or professional quality web content.

Readings

In this course we work together as a team, which means we do not all do the same work or the same readings. The following reading list is intended to help get you started, but we expect you to contribute to it significantly by the end of the course. Core texts for the entire class include:

Costanza, R., J. Cumberland, H. Daly, R. Goodland and R. Norgaard. 1997. *An Introduction to Ecological Economics*. Boca Raton, Fla. : St. Lucie Press

Daly, H.E., Farley, J. (2004). *Ecological Economics: Principles and Application*. Washington, D.C.: Island Press. (Available used for \$25 from Josh, will repurchase for \$20 at end of semester)

Farley, Erickson, and Daly (2004), *Problem Based Learning in Ecological Economics*. (Island Press, Washington, DC) This is a workbook designed to accompany the textbook.

Landell-Mills, N., Porras, I.T. (2002). [Silver Bullet or Fool's Gold?](#) A Global Review of Markets for Forest Environmental Services and Their Impact on the Poor. Institutes for Sustainable Private Sector Forestry Series. International Institute for Environment and Development, London.

Pagiola Stefano, J. Bishop & N. Landell-Mills (Eds.). *Selling forest environmental services*. Sterling VA: Earthscan.

1. Ecosystem Services

Costanza, R., D' Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P., van den Belt, M. (1997). The Value of the World's Ecosystem Services and Natural Capital. *Nature* 387, 253-260.

Pearce, David W. (2001). The Economic Value of Forest Ecosystems. *Ecosystem Health* 7, 284-298.

2. Stock-flow and Fund-Flux

Daly and Farley, 2004

Georgescu-Roegen, Nicolas. 1971. *The Entropy Law and the Economic Process*. Harvard University Press, Cambridge, Massachusetts.

3. Public goods

Daly and Farley, 2004

Ostrom, V. Ostrom, E. (1997). Public Good and Public Choices. Alternatives for delivering public services. Toward improved performance.

Randall, Alan. The Problem of Market Failure *in* Dorfman and Dorfman, *Economics of the Environment*, 3rd Ed.. (W.W. Norton and Co., New York. 1993) pp. 144-161

4. Common pool resources

Agrawal, A. (2002). Common Resources and Institutional Sustainability. *The Drama of the Commons*. Ed. Ostrom, E., Dietz, T., Dolsak, N., Stern, P.C., Stonich, S., Weber, E.U. National Academy Press: Washington, D.C., Chapt. 2, 41-86.

Bromley, Daniel W., Feeny, D., McKean, M., Peters, P., Gilles, J.L., Oakerson, Ronald., Runge, C.F., Thomson, J.T. (1992). *Making the Commons Work: Theory Practice and Policy*. San Fransisco: Institute for Contemporary Studies.

Burger, Joanna; Ostrom, Elinor; Norgaard, Richard B.; Policansky, David; Goldstein, Bernard D. (2001). *Protecting the Commons: A Framework for Resource Management in the Americas*. Washington, D.C.: Island Press.

Dietz, T., Ostrom, E., Stern, P. (2003). The Struggle to Govern the Commons. *Science* 302: 1907-1912.

Gibson, Clark C; Margaret, Mckean, A.; Ostrom, Elinor. *People and Forests Communities, Institutions, and Governance*. Cambridge, Massachusetts and London England: The MIT Press, 2000.

Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162:243-48

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press

Ostrom, Elinor; Burger, Joanna; Field, Christopher.B; Norgaard, Richard. B; Policansky, David. (1999). Revisiting the Commons: Local Lessons, Global Challenges. *Science* 284: 278-82.

Pretty, Jules. (2003). Social Capital and the Collective Management of Resources. *Science* 302: 1912.

Sarukhan, J., Larson, J. (2001). When the Commons Become Less Tragic: Land Tenure, Social Organization, and Fair Trade in Mexico.

Protecting the Commons: A Framework for Resource Management in the Americas. Ed. Burger, Joanna; Ostrom, Elinor; Norgaard, Richard B.; Policansky, David; Goldstein, Bernard D. Washington, D.C.: Island Press, Chapt. 2, 45-66.

Market allocation

Daly and Farley

6. Property rights

Anderson, T., Hill P. (1990) The Race for Property Rights. *Journal of Law & Economics* 33.

Bromley, Daniel W. (1991). Property Rights as Authority Systems: The Role of Rules in Resource Management. *Journal of Business Administration* 20 (1): 453-67.

Bromley, Daniel. (1991). *Environment and Economy: Property Rights and Public Policy*. Blackwell, Cambridge.

Fernandez, L. (2005). Natural Resources, Agriculture and Property Rights. *Journal of Ecological Economics*.

Gluck, Peter. (2002). Property Rights and Multipurpose Mountain Forest Management. *Forest Policy and Economics* 4: 125-34.

Larson, B., Bromley, D. (1990). Property Rights, Externalities and Resource Degradation: Locating the Tragedy. *Journal of Development Economics* 33 (2).

McKean, Margaret A. (2000). Common Property: What Is It, What Is It Good for, and What Makes It Work? *In People and Forests: Communities, Institutions, and Governance*. Ed. Margaret A. McKean Clark C. Gibson, and Elinor Ostrom. Cambridge: MIT Press, 27-50.

7. Environmental policies and PES

World Bank (2000). Project Appraisal on Proposed IBRD Loan of \$US 32.6 Million to the Republic of Costa Rica and a Grant from Global Environmental Facility Trust Fund of SDR 6.1 Million (US \$8 Million Equivalent) to the National Forestry Financing Fund for the Ecomarkets Project: World Bank.

Daily, G.C., Ellison, K. (2002). *The New Economy of Nature: The Quest to Make Conservation Profitable*. Washington, D.C.: Island Press.

Echavarria, M., L. Lochman. (no date). *Policy Mechanisms for Watershed Conservation: Case Studies*. Washington D.C: The Nature Conservancy, Latin America and Caribbean Region.

Echavarria, M., Vogel, J., Alban, M., Meneses. F. (2004). *The Impacts of Payments for Watershed Services in Ecuador: Emerging Lessons from Pimampiro and Cuenca*: Environmental Economics Programme.

Pagiola, S., Paola, A., Gobbi, J., Haan, C., Ibrahim, M, Murgueitio, E., Ramirez, E., and M. & Ruiz Rosales, J. (2004). *Paying for Biodiversity Conservation Services in Agricultural Landscapes*. World Bank.

Salzman, J. (2005). "Creating Markets for Ecosystem Services: Notes from the Field." *New York University Law Review* 80 (600).

Wunder, S., 2005. *Payments for Environmental Services: Some Nuts and Bolts*.

CIFOR Occasional Paper No. 42.

Thematic Milestones

Week	Date	Theme
1	1/17	Background: What are ecosystem services? What are Payments for Ecosystem Services? What is an atelier?
2	1/24	Ecosystem services
3	1/31	Stock-flow and fund-flux, rivalness and excludability
4	2/7	The macroallocation problem: Common pool resources, public goods and property rights. Ecological economics and sustainable scale
5	2/14	Environmental policies: from regulation to market mechanisms
6	2/21	PES (students to present case studies)
7	2/28	Political and legal issues with PES (student presentation)
	3/7	Final Preparation for atelier
	3/8-3/18	Conference and Atelier
10	3/21	TBA
11	3/28	TBA
12	4/4	TBA
13	4/11	TBA
14	4/18	TBA
15	4/25	Presentations of student papers
16	5/2	Presentations of student papers