

**The Micro-dynamics of Environment and Development:
Growth, Trade, Common Pool Resources, and Technology**

(AAE 729)

Tuesdays and Thursdays, 2:30-3:45, Taylor Hall B-30

Office Hours: Monday, Weds: 3-5 p.m.

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Course Description:

This course explores the intersection of resource economics and development economics, especially on issues related to rural environmental and development outcomes. The opening module of the course is related to economy-wide concerns about growth, trade, and the environment. The remaining modules examine static and dynamic microeconomic models of resource decisions made by decentralized, but often interdependent, economic agents about such issues as technology adoption, portfolio investment decisions, and coordination and collective action challenges associated with common resources. Throughout the course, a balance is pursued between theory and empirics.

The course begins with a short survey of some key issues on the shared frontier of resources and development. The first module will be taught by two colleagues (Professors Chavas and Coxhead) who, respectively, will cover endogenous growth and environment models and trade, development, and environment issues. The second module examines conservation and development issues at the community level, starting with a literature that deploys game-theoretic models of coordination and collective action problems associated with the use and conservation of common resources. These models explore the role of such variables as group size, group homogeneity, trust, and social norms in the management of common property resource situations. Another component of this module will examine the role of agricultural expansion in deforestation, with a specific look at the empirical literature on deforestation in the Amazon and elsewhere.

The third module focuses on technology adoption and diffusion. Most of the emphasis will be on models of agricultural technology adoption, emphasizing learning issues which connects us back to the coordination issues of the previous section. The diffusion part of the module examines recent research on the connection between technological change and economic development outcomes, "population growth" dynamics, and global warming prospects.

Prerequisites: AAE 635 or Economics 711 are strongly advised, as the readings provide formal analytical models that will be at the core of class discussions. Some background in game theory will be of use in the second module, but it is by no means essential.

Evaluation:

1. 3 critical essays (30% of grade in total): These 5-10 page papers are meant to encourage exploration of a paper, theme, or modeling approach in each of the three core modules. This exercise is also aimed at encouraging careful exposition and academic writing, so the quality of exposition will influence grading (with opportunities for revision if the grade is less than anticipated or desired).
2. 2 Midterms (50% of grade in total): These are take-home exams with a relatively short turn-around time for completion (Weds morning to Friday afternoon).
3. Two class presentations (20% of grade).

a.) Students are asked to organize a presentation of one or two of the assigned papers from the reading list. Two students can coordinate their presentations if they are working on related papers in a section of the course. You are encouraged to combine this effort in some way with the exposition of one of the critical essays, so that the deeper understanding you gain from working on the presentation is incorporated into your writing efforts.

b.) Students are asked to pair up and pick a key environmental or common good concern that connects to the readings in this course, such as global fisheries, deforestation, water access, climate change, or adoption of conservation technologies. They will be asked to then prepare a “status” report presentation that does three things: (1) Summarizes the main issues involved with that concern; (2) Identifies the “state of knowledge” and open questions related to the concern; and, (3) Guides us to key sources for continuing attention that concern (institutions, leading research groups, etc.). These presentations will be scheduled on an ad hoc basis outside of class time during the course of the semester, perhaps for a brown-bag (lunch time presentation).

Required Text

The course reader will be available through Underground Textbook Exchange, 664 State Street and in the Taylor-Hall library on reserve.

Class Schedule and Readings:

Week 1 (January 18, 20)

Overview of Course and Introduction to Key Issues

- “Poverty and the Environmental Resource Base,” Chapter 10 in Parth Dasgupta, *An Inquiry into Well-Being and Destitution*, Oxford: Clarendon Press, 1993.
- Chapter 7 in *World Development Report*, Oxford University Press, 1992.
- “Environment and Development” P. Bardhan and C. Udry, chapter 13 in *Development Microeconomics*, Oxford University Press, 1999.

MODULE 1 – CONSERVATION AND DEVELOPMENT IN RURAL AREAS

Week 2 (Jan 25 and Jan 27)

Endogenous Growth and Environment (taught by Jean-Paul Chavas)

- Chapters 1 and 5 from *Endogenous Growth Theory*, Philippe Aghion and Peter Howitt, (MIT Press: 1999).
- “On Impatience, Economic Growth and the Environmental Kuznets Curve: A Dynamic Analysis of Resource Management,” Jean-Paul Chavas, *Environmental and Resource Economics*, 28:123-152 (2004).

Weeks 3-4 (Feb 1, 3, and 8)

Trade, Development Policy, & Demand for Natural Resources (taught by Ian Coxhead)

- Chapters 1 and 3 (pp. 1-21; 64-75) from *Advanced International Trade Theory and Evidence*, Rob Feenstra, (Princeton and Oxford: Princeton University Press, 2004).
- “International Trade and Open-Access Renewable Resources: The Small Open Economy Case,” James A. Brander and M. Scott Taylor, *Canadian Journal of Economics*, 30, 3 (1997): 526-552.
- Deacon, R., 1995. “Assessing the relationship between government policy and deforestation”, *Journal of Environmental Economics and Management* 28(1), January: pp. 1-18.
- “International Trade, Resource Degradation, and Industrial Pollution in Developing Countries: An Integrated Analysis,” Ian Coxhead and Sisira Jayasuriya, mimeo, 2004.

- “Development strategy, poverty, and deforestation in the Philippines”. Ian Coxhead and Sisira Jayasuriya, 2004. *Environment and Development Economics* 9(5): 613-644.

Week 4 (Feb 10)

Open Access, Common Property, and Privatization: Key Concepts and Game-Theoretic Approaches to Resource Management Issues

- “Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation,” A. Agarwal and C. Gibson, *World Development*, 27, 4 (1999): 629-649.
- “Managing Local Commons: Theoretical Issues in Incentive Design,” P. Seabright, *Journal of Economic Perspectives*, 17, 4 (1993): 113-134.

Weeks 5,6 (Feb 15-22)

Inequality, Common Property, and Public Goods Provision

- “The Ambiguous Impact of Inequality on Local Resource Management,” Jean-Marie Baland and Jean-Philippe Platteau, *World Development*, 27, 5, 1999: 773-788.
- “Wealth Inequality and Efficiency in the Commons, Part I: The Unregulated Case,” Jean-Marie Baland and Jean-Philippe Platteau, *Oxford Economic Papers*, 49, 4 (1997): 451-482.
- “Inequality and Conservation on the Local Commons: A Theoretical Exercise,” Jeff Dayton-Johnson and Pranab Bardhan, *The Economic Journal*, 112 (July) (2002): 577-602.

Week 6 (Feb 24)

Evolutionary Approaches to Common Property Use and Social Norms

- “The Evolution of Social Norms in Common Property Resource Use,” R. Sethi and E. Somanathan, *American Economic Review*, 86, 4 (1996): 766-88.
- “Collective Action and the Evolution of Social Norms,” E. Ostrom, *Journal of Economic Perspectives*, 14, 3:137-158.

Week 7 (March 1, 3)

Some Empirical Examinations of Common Property Resource Management

- “Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work,” E. Ostrom and R. Gardner, *Journal of Economic Perspectives*, 7, 4 (1993): 93-112.
- “Irrigation and Cooperation: An Empirical Analysis of 48 Irrigation Communities in South India,” P. Bardhan, *Economic Development and Cultural Change*, 48, 4: 847-65.
- “Inequality, Collective Action, and the Environment: Evidence from Firewood Collection in Nepal,” Jean Marie-Baland et al. (2002), forthcoming in *Inequality, Collective Action, and Environmental Sustainability*.

Weeks 8, 9 (March 8, 15)

Agricultural Expansion and Deforestation: Theoretical Models

- “Agricultural expansion and deforestation: modelling the impact of population, market forces, and property rights,” A. Angelsen, *Journal of Development Economics*, 58 (1999): 185-218.
- “When Does Technological Change in Agriculture Promote Deforestation?” A. Angelsen and D. Kaimowitz, in *Tradeoffs or Synergies? Agricultural Intensification, Economic Development, and the Environment*, ed. By D.R. Lee and C.B. Barrett, CABI Publishing: New York, 2001.
- Reading to be added.

Midterm 1 – March 9-11, no class on March 10

Weeks 9,10 (March 17, 29, 31)

Agricultural Expansion and Deforestation: Empirical Studies

- “Colonist Land-Allocation Decisions, Land Use, and Deforestation in the Ecuadorian Amazon Frontier,” Francisco J. Pichón, *Economic Development and Cultural Change*, 45, 4 (1997): 707-744.
- “Poverty, Policies, and Deforestation: The Case of Mexico,” K. Deininger and B. Minten, *Economic Development and Cultural Change*, 47, 2, 1999: 313-344.
- “Seeing the Forest and the Trees: A Spatial Analysis of Common Property Deforestation,” Jennifer Alix-Garcia (mimeo, U.C. Berkeley, 2004)
- “Estimating Spatial Interactions in Forest Clearing,” Juan A. Robalino and Alexander Pfaff, (mimeo, Columbia University, 2004).

MODULE 2 – ADOPTION MODELS

Weeks 11, 12 (April 5,7, 12, 14)

Adoption and Diffusion of Technologies (Learning Models)

- “Adoption of Agricultural Innovations in Developing Countries: A Survey,” G. Feder, R. Just, and D. Zilberman, *Economic Development and Cultural Change*, 33, 2 (1985): 255-298.
- “Modeling Technology Adoption in Developing Countries,” Timothy Besley and Anne Case, *American Economic Review*, 83, 2 (1993): 396-402.
- “Learning by Doing and Learning From Others: Human Capital and Technical Change in Agriculture,” Andrew Foster and Mark Rosenzweig, *Journal of Political Economy*, 103, 6 (1995): 1176-1209.
- “Social Networks and Technology Adoption in Northern Mozambique,” O. Bandiera and I. Rasul, presented at NEUDC Conference, 2004.
- “Learning about a New Technology: Pineapple in Ghana,” Tim Conley and Chris Udry (mimeo, Dec. 2004).

Weeks 13, 14 (April 19, 21, 26)

Population Growth, Technological Change, and Environmental Issues

- “Population, Food, and Knowledge,” D. Gale Johnson, *American Economic Review*, 90, 1 (2000): 1-14.
- “Population, Technology, and Growth: From Malthusian Stagnation to the Demographic Transition and Beyond,” O. Galor and D. Weil, *American Economic Review*, 90, 4 (2000): 806-828.
- “On Population Growth and Technological Change: Selectivity Bias in Historical Analysis,” Jean-Paul Chavas, *Journal of Agricultural Economics*, 51, 3 (2000): 333-352..

Week 14, 15 (April 28, May 3)

Innovation, Industrialization, and Technological Change

- “Industrial Strategy and Technological Change: Theory versus Reality,” Howard Pack and Larry E. Westphal, *Journal of Development Economics*, 22 (1986): 87-128.
- “Absorptive capacity: On the creation and acquisition of technology in development” Wolfgang Keller, *Journal of Development Economics*, 49 (1996): 199-227. .

Midterm 2 – May 4-6