

University of Essex, Department of Economics

# EC383 Environmental Economics

## Autumn 2025

Module Supervisor: **Dr Shunsuke Tsuda** shunsuke.tsuda@essex.ac.uk

Last Updated: October 24, 2025

### **Meetings**

Lectures: Tuesdays 4pm-6pm at LTB10 (Week 2-11)

Classes: Fridays 9am-10am at STEM3.1 (Week 3, 5, 7, 9, 11)

Office hours: See Moodle.

### **Module Description**

This module covers the theory of environmental and resource economics. Topics include the economics of market failures, how to set the targets of pollution, what are the main instruments to fight pollution, the tragedy of the commons, non-renewable and renewable natural resource extractions, groundwater markets and governance, forest conservation, climate change, and environmental considerations in economic geography. This module equips you with a basic theoretical framework to analyze environmental policy issues and introduces frontier academic research on these topics, with particular emphasis on real-world problems in developing economies.

### **Learning Goals:**

By the end of this module, students will be expected to be able to:

- Apply microeconomic theory to environmental policy issues and critically evaluate when and how government and market-based solutions to them are effective
- State the key environmental problems in developing countries and understand their possible causes and consequences
- Read and digest empirical research papers in environmental and resource economics, and understand their economic intuitions and policy implications

### **Main Textbook**

The lectures will follow the textbook:

**Perman, R. et al., *Natural Resource and Environmental Economics*, Fourth Edition, Pearson, 2011.**

Other readings are listed below and additional readings may also be announced during the module.

### **Assessment and Feedback**

The final mark will be the average between (i) the online assessment and (ii) the final exam mark.

## Topics and Readings

### **Week 2: Introduction (Economic Development and the Environment); Market Failures**

Required readings: Fullerton and Stavins (1998); Jayachandran (2022); Perman et al. Ch. 4

Optional readings: Barrett et al. (2023); Dasgupta (2010); Greenstone and Jack (2015)

### **Week 3-4: Pollution Targets; Pollution across Space**

Required readings: Perman et al. Ch. 5, Ch. 16.4; Aldeco et al. (2025)

### **Week 5-6: Pollution Instruments; Pollution Policy with Imperfect Information**

Required readings: Perman et al. Ch. 6, Ch. 7; Greenstone et al. (2025)

Optional readings: Duflo et al. (2013)

### **Week 7: Causes and Consequences of Air and Water Pollution**

Required readings: Garg et al. (2024); Lipscomb and Mobarak (2016)

Optional readings: Greenstone and Hanna (2014); Jack et al. (2022); Jayachandran (2009); Khanna et al. (2021); Oliva (2015)

### **Week 8: The Tragedy of the Commons**

Required readings: Hardin (1968); Bardhan and Udry (1999) Ch. 13; Wydick (2007) Ch. 4; Rustagi et al. (2010); Ryan and Sudarshan (2022)

Optional readings: Perman et al. Ch. 9; Cheung (1970); Dasgupta and Mäler (1995); Dietz et al. (2003); Gordon (1954); Ostrom (1990); Seabright (1993); Bardhan (2000); Coppock et al. (2022); Edmonds (2002); Haseeb (2024); Kremer et al. (2011); Kosfeld and Rustagi (2015); Mazur (2023)

### **Week 9: Non-Renewable Resources; Groundwater Markets and Governance**

Required readings: Perman et al. Ch. 15; Jacoby (2017); Jacoby et al. (2004); Chakravorty et al. (2023); Sekhri (2011)

Optional readings: Chakravorty et al. (2008); Anderson (2011); Bhogale and Khedgikar (2022); Blakeslee et al. (2020); Foster and Rosenzweig (2008); Fishman et al. (2023); Giné and Jacoby (2020); O'Keefe-O'Donovan (2022)

### **Week 10: Renewable Resources; Forests**

Required readings: Perman et al. Ch. 17; Balboni et al. (2023); Jayachandran (2023); Jayachandran et al. (2017); Alix-Garcia et al. (2013); Abman et al. (2023); Szerman et al. (2022)

Optional readings: Noack and Costello (2024); Angelsen (1999); Brander and Taylor (1998); Foster et al. (2002); Tsuda et al. (2023); Burgess et al. (2023); Burgess et al. (2012); Perman et al. Ch. 18

### **Week 11: Climate Change, Economic Geography, and the Environment**

Required readings: Balboni (2019); Conte (2022); Jedwab et al. (2022); Tsuda et al. (2023)

Optional readings: Burgess et al. (2017); Kala et al. (2023); Morgan et al. (2022); Schlenker and Lobell (2010); Zhao et al. (2017); Burke et al. (2015); Hsiang et al. (2013); Eberle et al. (2020); McGuirk and Nunn (2020)

## References

- Abman, Ryan, Teevrat Garg, Yao Pan, and Saurabh Singhal**, "Agricultural Productivity and deforestation," 2023.
- Aldeco, Lorenzo, Lint Barrage, and Matthew Turner**, "Equilibrium particulate exposure," Technical Report, National Bureau of Economic Research 2025.
- Alix-Garcia, Jennifer, Craig McIntosh, Katharine RE Sims, and Jarrod R Welch**, "The ecological footprint of poverty alleviation: evidence from Mexico's Oportunidades program," *Review of Economics and Statistics*, 2013, 95 (2), 417–435.
- Anderson, Siwan**, "Caste as an Impediment to Trade," *American Economic Journal: Applied Economics*, 2011, 3 (1), 239–263.
- Angelsen, Arild**, "Agricultural expansion and deforestation: modelling the impact of population, market forces and property rights," *Journal of development economics*, 1999, 58 (1), 185–218.
- Balboni, Clare, Aaron Berman, Robin Burgess, and Benjamin A. Olken**, "The economics of tropical deforestation," *Annual Review of Economics*, 2023, 15, 723–754.
- Balboni, Clare Alexandra**, "In harm's way? infrastructure investments and the persistence of coastal cities." PhD Thesis, London School of Economics and Political Science 2019.
- Bardhan, Pranab**, "Irrigation and Cooperation: An Empirical Analysis of 48 Irrigation Communities in South India," *Economic Development and Cultural Change*, July 2000, 48 (4), 847–865.
- and Christopher Udry, *Development microeconomics*, OUP Oxford, 1999.
- Barrett, Christopher B., Ariel Ortiz-Bobea, and Trinh Pham**, "Structural Transformation, Agriculture, Climate, and the Environment," *Review of Environmental Economics and Policy*, June 2023, 17 (2), 195–216.
- Bhogale, Shweta and Shamil Khedgikar**, "Run on the Reservoir: Evidence on Administrative Competition for Groundwater in India," in "North Eastern Universities Development Conference" 2022.
- Blakeslee, David, Ram Fishman, and Veena Srinivasan**, "Way down in the hole: Adaptation to long-term water loss in rural India," *American Economic Review*, 2020, 110 (1), 200–224.
- Brander, James A. and M. Scott Taylor**, "The simple economics of Easter Island: A Ricardo-Malthus model of renewable resource use," *American economic review*, 1998, pp. 119–138.
- Burgess, Robin, Francisco Costa, and Benjamin A. Olken**, "National Borders and the Conservation of Nature," 2023.
- , Matthew Hansen, Benjamin A. Olken, Peter Potapov, and Stefanie Sieber, "The political economy of deforestation in the tropics," *The Quarterly journal of economics*, 2012, 127 (4), 1707–1754.
- , Olivier Deschenes, Dave Donaldson, and Michael Greenstone, "Weather, climate change and death in India," *University of Chicago*, 2017.
- Burke, Marshall, Solomon M. Hsiang, and Edward Miguel**, "Climate and Conflict," *Annual Review of Economics*, August 2015, 7 (1), 577–617.
- Chakravorty, Ujjayant, Manzoor H. Dar, and Kyle Emerick**, "Inefficient water pricing and incentives for conservation," *American Economic Journal: Applied Economics*, 2023, 15 (1), 319–350. Publisher: American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203-2425.
- , Michel Moreaux, and Mabel Tidball, "Ordering the extraction of polluting nonrenewable resources," *American Economic Review*, 2008, 98 (3), 1128–1144.
- Cheung, Steven**, "The Structure of a Contract and the Theory of a Non-Exclusive Resource," *The Journal of Law and Economics*, April 1970, 13 (1), 49–70.

- Conte, Bruno**, "Climate change and migration: the case of africa," 2022.
- Coppock, D. Layne, Luke Crowley, Susan L. Durham, Dylan Groves, Julian C. Jamison, Dean Karlan, Brien E. Norton, and R. Douglas Ramsey**, "Community-based rangeland management in Namibia improves resource governance but not environmental and economic outcomes," *Communications Earth & Environment*, 2022, 3 (1), 32.
- Dasgupta, Partha**, "The place of nature in economic development," in "Handbook of development economics," Vol. 5, Elsevier, 2010, pp. 4977–5046.
- and Karl-Göran Mäler, "Poverty, institutions, and the environmental resource-base," *Handbook of development economics*, 1995, 3, 2371–2463.
- Dietz, Thomas, Elinor Ostrom, and Paul C. Stern**, "The Struggle to Govern the Commons," *Science (New York, N.Y.)*, December 2003, 302 (5652), 1907–1912.
- Duflo, Esther, Michael Greenstone, Rohini Pande, and Nicholas Ryan**, "Truth-telling by third-party auditors and the response of polluting firms: Experimental evidence from India," *The Quarterly Journal of Economics*, 2013, 128 (4), 1499–1545.
- Eberle, Ulrich J., Dominic Rohner, and Mathias Thoenig**, "Heat and Hate: Climate security and farmer-herder conflicts in Africa," 2020.
- Edmonds, Eric V.**, "Government-initiated community resource management and local resource extraction from Nepal's forests," *Journal of development economics*, 2002, 68 (1), 89–115.
- Fishman, Ram, Xavier Giné, and Hanan G. Jacoby**, "Efficient irrigation and water conservation: Evidence from South India," *Journal of Development Economics*, 2023, 162, 103051.
- Foster, Andrew and Mark Rosenzweig**, "Inequality and the sustainability of agricultural productivity growth: Groundwater and the Green Revolution in rural India," in "Prepared for the India Policy Conference at Stanford University," Vol. 5 2008.
- Foster, Andrew D, Mark R Rosenzweig, and Jere R Behrman**, "Population growth, income growth and deforestation: Management of village common land in india," 2002.
- Fullerton, Don and Robert Stavins**, "How economists see the environment," *Nature*, 1998, 395 (6701), 433–434.
- Garg, Teevat, Maulik Jagnani, and Hemant K. Pullabhotla**, "Rural roads, farm labor exits, and crop fires," *American Economic Journal: Economic Policy*, 2024, 16 (3), 420–450.
- Giné, Xavier and Hanan G. Jacoby**, "Contracting under uncertainty: Groundwater in South India," *Quantitative Economics*, 2020, 11 (1), 399–435.
- Gordon, H. Scott**, "The Economic Theory of a Common-Property Resource: The Fishery," *Journal of Political Economy*, April 1954, 62 (2), 124–142.
- Greenstone, Michael and B. Kelsey Jack**, "Envirodevonomics: A research agenda for an emerging field," *Journal of Economic Literature*, 2015, 53 (1), 5–42.
- and Rema Hanna, "Environmental regulations, air and water pollution, and infant mortality in India," *American Economic Review*, 2014, 104 (10), 3038–3072.
  - , Rohini Pande, Nicholas Ryan, and Anant Sudarshan, "Can pollution markets work in developing countries? Experimental evidence from India," *The Quarterly Journal of Economics*, 2025, 140 (2), 1003–1060.
- Hardin, Garrett**, "The tragedy of the commons," *Science (New York, N.Y.)*, 1968, 162, 1243–1248.
- Haseeb, Muhammad**, "Resource Scarcity and Cooperation," 2024.
- Hsiang, Solomon M., Marshall Burke, and Edward Miguel**, "Quantifying the Influence of Climate on Human Conflict," *Science (New York, N.Y.)*, September 2013, 341 (6151), 1235367.

- Jack, B. Kelsey, Seema Jayachandran, Namrata Kala, and Rohini Pande**, "Money (Not) to Burn: Payments for Ecosystem Services to Reduce Crop Residue Burning," Technical Report, National Bureau of Economic Research 2022.
- Jacoby, Hanan G.**, "'Well-fare' economics of groundwater in South Asia," *The World Bank Research Observer*, 2017, 32 (1), 1–20.
- , **Rinku Murgai, and Saeed Ur Rehman**, "Monopoly power and distribution in fragmented markets: The case of groundwater," *The Review of Economic Studies*, 2004, 71 (3), 783–808.
- Jayachandran, Seema**, "Air quality and early-life mortality: Evidence from Indonesia's wildfires," *Journal of Human resources*, 2009, 44 (4), 916–954.
- , "How economic development influences the environment," *Annual Review of Economics*, 2022, 14, 229–252.
- , "The inherent trade-off between the environmental and anti-poverty goals of payments for ecosystem services," *Environmental Research Letters*, 2023, 18 (2), 025003.
- , **Joost De Laat, Eric F. Lambin, Charlotte Y. Stanton, Robin Audy, and Nancy E. Thomas**, "Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation," *Science (New York, N.Y.)*, July 2017, 357 (6348), 267–273.
- Jedwab, Remi, Federico Haslop, Roman David Zarate, and Rodriguez-Castelan Carlos**, "The real effects of climate change in the poorest countries: Evidence from the permanent shrinking of lake chad," 2022.
- Kala, Namrata, Clare Balboni, and Shweta Bhogale**, "Climate Adaptation," *VoxDevLit*, 2023, 7, 3.
- Khanna, Gaurav, Wenquan Liang, Ahmed Mushfiq Mobarak, and Ran Song**, "The productivity consequences of pollution-induced migration in China," Technical Report, National Bureau of Economic Research 2021.
- Kosfeld, Michael and Devesh Rustagi**, "Leader punishment and cooperation in groups: Experimental field evidence from commons management in Ethiopia," *American Economic Review*, 2015, 105 (2), 747–783.
- Kremer, Michael, Jessica Leino, Edward Miguel, and Alix Peterson Zwane**, "Spring cleaning: Rural water impacts, valuation, and property rights institutions," *The Quarterly Journal of Economics*, 2011, 126 (1), 145–205. Publisher: MIT Press.
- Lipscomb, Molly and Ahmed Mushfiq Mobarak**, "Decentralization and pollution spillovers: evidence from the re-drawing of county borders in Brazil," *The Review of Economic Studies*, 2016, 84 (1), 464–502.
- Mazur, Karol**, "Sharing risk to avoid tragedy: Informal insurance and irrigation in village economies," *Journal of Development Economics*, 2023, 161, 103030.
- McGuirk, Eoin F. and Nathan Nunn**, "Transhumant pastoralism, climate change, and conflict in africa," Technical Report, National Bureau of Economic Research 2020.
- Morgan, Seth, Alexander Pfaff, and Julien Wolfersberger**, "Environmental Policies Benefit Economic Development: Implications of Economic Geography," *Annual Review of Resource Economics*, 2022, 14, 427–446.
- Noack, Frederik and Christopher Costello**, "Credit Markets, Property Rights, and the Commons," *Journal of Political Economy*, July 2024, 132 (7), 2396–2450.
- O'Keeffe-O'Donovan, Rossa**, "Water, spillovers, and free riding: Provision of local public goods in a spatial network," Available at SSRN 3172733, 2022.
- Oliva, Paulina**, "Environmental Regulations and Corruption: Automobile Emissions in Mexico City," *Journal of Political Economy*, June 2015, 123 (3), 686–724.

**Ostrom, Elinor**, *Governing the commons: The evolution of institutions for collective action*, Cambridge university press, 1990.

**Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld**, "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management," *Science (New York, N.Y.)*, November 2010, 330 (6006), 961–965.

**Ryan, Nicholas and Anant Sudarshan**, "Rationing the commons," *Journal of Political Economy*, 2022, 130 (1), 210–257.

**Schlenker, Wolfram and David B. Lobell**, "Robust negative impacts of climate change on African agriculture," *Environmental Research Letters*, 2010, 5 (1), 014010.

**Seabright, Paul**, "Managing local commons: theoretical issues in incentive design," *Journal of economic perspectives*, 1993, 7 (4), 113–134.

**Sekhri, Sheetal**, "Public provision and protection of natural resources: Groundwater irrigation in rural India," *American Economic Journal: Applied Economics*, 2011, 3 (4), 29–55.

**Szerman, Dmitri, Juliano J. Assunção, Molly Lipscomb, and Ahmed Mushfiq Mobarak**, "Agricultural productivity and deforestation: Evidence from Brazil," Technical Report, Center Discussion Paper 2022.

**Tsuda, Shunsuke, Mari Tanaka, and Yoshito Takasaki**, "Human and Nature: Economies of Density and Conservation in the Amazon Rainforest," 2023.

**Wydick, Bruce**, *Games in economic development*, Cambridge University Press, 2007.

**Zhao, Chuang, Bing Liu, Shilong Piao, Xuhui Wang, David B. Lobell, Yao Huang, Mengtian Huang, Yitong Yao, Simona Bassu, Philippe Ciais, Jean-Louis Durand, Joshua Elliott, Frank Ewert, Ivan A. Janssens, Tao Li, Erda Lin, Qiang Liu, Pierre Martre, Christoph Müller, Shushi Peng, Josep Peñuelas, Alex C. Ruane, Daniel Wallach, Tao Wang, Donghai Wu, Zhusuo Liu, Yan Zhu, Zaichun Zhu, and Senthil Asseng**, "Temperature increase reduces global yields of major crops in four independent estimates," *Proceedings of the National Academy of Sciences*, August 2017, 114 (35), 9326–9331.