

The Challenge of Sustainable Development

Course number: SDEV W3300
Spring 2010
Mondays & Wednesdays 8:45-9:50 AM
IAB 417

Professor Jeffrey D. Sachs
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Office Hours: by appointment only
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We will generally meet three times per week: Mondays and Wednesdays in lecture and once a week in Section.

Teaching Assistants:
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Course Description

This course provides an introduction to the interdisciplinary field of sustainable development, drawing on the most recent developments in social and physical sciences. The course describes the interactions between physical ecology and economic development, and it stresses the ways in which they impact each other. Ecological constraints (climate, disease ecology, physical resources such as soils and energy sources, topography and transport conditions) significantly shape the patterns of economic development, demography, and wealth and poverty. At the same time, anthropogenic activities (farming, resource depletion, demographic stresses, and energy use) change the physical environment. The course offers a rigorous treatment of the field and aims to provide students with an understanding of economic development and its relation to nature's processes.

Evaluation and Grading

There will be a mid-term, one final exam, three problem sets, and short exercises based on the MV Sim.

The course grade will be based on:

Three problem sets	30%
SIM Exercises	10%
Mid-Term	25%
Final Exam	35%

Books to Purchase for the Course

Diamond, Jared. Guns, Germs, and Steel: The Fates of Human Societies. W.W. Norton, 1999.

McNeill, J.R. Something New Under the Sun. W.W.Norton, 2000.

Sachs, Jeffrey D. Common Wealth. Penguin, 2008.

(optional) Chivian, Eric and Aaron Bernstein. Sustaining Life: How Human Health Depends on Biodiversity. Oxford University Press, 2008.

*Other readings (including two more books) will be posted online for download.
In addition, note that all books are on reserve.*

Syllabus

** Readings marked with stars are optional

Topic 1: Resource Allocation

Wednesday, January 20: Lecture 1 – Economy, Ecology & Sustainable Development

Sachs, Jeffrey D. Common Wealth. Chapters 1 & 2.

Monday, January 25: Lecture 2 – How Markets Work: Supply & Demand

Lecture 2 Notes

Wednesday, January 27: Lecture 3 – Patterns of Economic Life: Agriculture, Industry Development

Lecture 3 Notes

Monday, February 1: Lecture 4 – Geography of Economic Life

Diamond, Jared. Guns, Germs, and Steel

Gallup, John, Andrew Mellinger and Jeffrey D. Sachs, “Climate, Coastal Proximity, and Development,” Oxford Handbook of Economic Geography, edited by Gordon L. Clark, Maryann P. Feldman, and Meric S. Gertler, Oxford University Press, 2000.

Strahler and Strahler, Introducing Physical Geography, Chapter 6

** "Geography and Economic Development," with John Luke Gallup and with Andrew Mellinger, *International Regional Science Review*, Vol. 22, No. 2, pp. 179-232, August 1999. (optional for students interested in a more formal economic model)

Wednesday, February 3: Lecture 5 – Division of Labor & Trade

Monday, February 8: Lecture 6 – Basic Concepts of Growth & Development

Sachs, Jeffrey D. "Chapter 9: Strategy of Economic Development" in Common Wealth

World Bank. World Development Report 2007. (Only data appendix at the back)

United Nations Development Programme. Human Development Report 2007. (Only data appendix at the back)

Wednesday, February 10: Lecture 7 – Poverty Traps and African Development

Chapter 10 "Ending Poverty Traps" from Common Wealth

Sachs, Jeffrey D., et al., "Ending Africa's Poverty Trap," *Brookings Papers on Economic Activity*, Issue 1, 2004.

Sachs, Jeffrey and Gordon C. McCord. "Extreme Poverty." New Palgrave Dictionary of Economics.

UN Millennium Project. Investing in Development: A Practical Plan to Achieve the Millennium Development Goals

Sanchez, Pedro et al. "The African Millennium Villages." *PNAS*. October 23, 2007.

Topic 2: Economic Policy

Monday, February 15: Lecture 8 – Concepts of Economic Performance

Wednesday, February 17: Lecture 9 – How Well Do Markets Deliver the Goods? Equity, Efficiency, Sustainability

Monday, February 22: Lecture 10 – Externalities and Pollution Control

Zeizima, Katie. "Maine Conservationists Reach Milestone in Plan to Buy 3 Dams." *The New York Times*, August 22, 2008.

The Economist, "Are You Being Served?" April 23, 2005

Jack, B. Kelsey et al. "Designing payments for ecosystem services: Lessons from previous experience with incentive-based mechanisms." *PNAS*. Vol. 15, No. 28. July 15 2008.

Liu, Jianguo et al. "Ecological and socioeconomic effects of China's policies for ecosystems services." *PNAS*. Vol. 15, No. 28. July 15 2008.

Turner, Pearce and Bateman, Environmental Economics: An Elementary Introduction. Chapter 10: "Using the market to protect the environment."

Turner, Pearce and Bateman, Environmental Economics: An Elementary Introduction. Chapter 11: "Charging for use of the environment."

Wednesday, February 24: Lecture 11 – Managing the Commons: Sustainable Fisheries and Forests

Sachs, "Chapter 3: The Anthropocene" in Common Wealth

Jackson, Jeremy et al., "Historical Overfishing and the Recent Collapse of Coastal Ecosystems." *Science* Vol 293 27 July 2001.

International Food Policy Research Institute, Fish to 2020, Washington, 2003

Roy, N. "The Atlantic Canada Resource Management Catastrophe: What Went Wrong and What Can We Learn From It?" *Canadian Journal of Economics*, Vol. 29, Special Issue, April 1996. pp. S139-144.

Pikitch, Ellen K., "The Gathering Wave of Ocean Extinctions," State of the Wild 2006, pg 195-201.

** Bjorndal, T. and G. Munro, "The Economics of Fisheries Management: A Survey," in T. Tietenberg and H. Folmer (eds.), *The International Yearbook of Environmental and Resource Economics 1998/1999*. (optional for those interested in the economics of management, article involves some calculus)

Monday, March 1: Lecture 12 – When Goods are Non-Rival: Science, Infrastructure, Public Goods

Nelson, Richard R. "Basic Scientific Research" in The Limits of Market Organization. Richard Nelson, ed. Russell Sage Foundation: New York, 2005.

Wednesday, March 3: Lecture 13 – Meeting Basic Needs and Providing Merit Goods (Health & Education)

Africa MDG Steering Group. Achieving the Millennium Development Goals in Africa. Summary Report. June 2008.

Monday, March 8: Lecture 14 – How Governments Finance Public Goods

Sachs, "Chapter 11: Economic Security in a Changing World," in Common Wealth

Wednesday, March 10 -- Midterm Examination

Monday, March 15 & Wednesday, March 17 – Spring Recess

Topic 3. Ecosystem Services

Monday, March 22: Lecture 15 – Introduction to Ecosystem Services

J. R. McNeill, Something New Under the Sun

Chapter 2 “Our Crowded Planet” from Common Wealth

Zalasiewicz, Jan et al. “Are we now living in the Anthropocene?” *GSA Today*. Vol. 18, No. 2. February 2008.

McCarthy, James J. “Reflections On: Our Planet and Its Life, Origins, and Futures.” *Science*. Vol. 236. 18 December 2009.

Wednesday, March 24: Lecture 16 – Energy

Lackner, Klaus and Jeffrey D. Sachs, “A Robust Strategy for Sustainable Energy,” *Brookings Papers on Economic Activity*, Issue 2, 2005.

Siemens. Pictures of the Future: The Magazine for Research and Innovation. Fall 2009.

Department for International Development. Energy for the Poor. May 2002.

International Energy Agency. Toward a Sustainable Energy Future. OECD, 2001.

Monday, March 29: Lecture 17 – Guest: Prof. John Mutter - Climate Change

Sachs, “Chapter 4: Global Solutions to Climate Change,” in Common Wealth

U.S. Global Change Research Program. Global Climate Change Impacts in the United States. Cambridge University Press, 2009. (Skim this report, reading through highlighted bullets. Focus on the “Climate Change Impacts by Sector” chapters)

Wally Broecker, “A Business Executive’s Guide to Global Warming.”

S. Pacala and R. Socolow, “Stabilization Wedges: Solving the Climate Problem For the Next 50 Years with Current Technology,” *Science*, Vol. 305, August 2004.

James Hansen. “Can we defuse the global warming time bomb?” *Scientific American*, March 2004.

Stern Review: The Economics of Climate Change (Executive Summary)

Heal, Geoffrey. Nature and the Marketplace, 2000. Chapter 5

Lovins, Amory. “More Profit with Less Carbon,” *Scientific American*, Volume 293, No. 3, Sept 2005

Wednesday, March 31: Lecture 18 – Guest: Prof. Upmanu Lall - Water

Sachs, Jeffrey D. “Chapter 5: Securing our Water Needs,” in Common Wealth.

Monday, April 5: Lecture 19 – Land & Habitat

Sachs, Jeffrey D. “Chapter 6: A Home for All Species,” in Common Wealth.

Godfray, H. Charles J. et al. “Food Security: The Challenge of Feeding 9 Billion People.” *Scienceexpress* 28 January 2010.

Millennium Ecosystem Assessment. Ecosystems and Human Well Being: Synthesis. 2005.

Stuart Pimm and Clinton Jenkins, “Sustaining the Variety of Life,” *Scientific American*, Vol. 293, No. 3, September 2005.

Geoffrey Heal, Nature and the Marketplace, 2000. Chapter 4.

Convention on Biological Diversity. Global Biodiversity Outlook. CBD: Montreal, 2001.

Wednesday, April 7: Lecture 20 – Will Natural Resource Depletion Limit Global Economic Growth & Development?

** Heal, Geoffrey. “Exhaustible Resources,” forthcoming in the New Palgrave Dictionary of Economics, Second Edition. (optional, involves calculus)

Topic 4: Human Development

Monday, April 12: Lecture 21 – Human Development, the Life Cycle, and Human Capital Accumulation

Wednesday, April 14: Lecture 22 – Population Dynamics: Size, Fertility, Age Distribution, and Urbanization

Joel Cohen, “Human Population Grows Up,” *Scientific American*, Vol. 293, No. 3, September 2005.

UN Population Division, World Population to 2300

Sachs, “Chapter 7: Global Population Dynamics” in Common Wealth

Sachs, “Chapter 8: Completing the Demographic Transition” in Common Wealth

Monday, April 19: Lecture 23 – Burden of Disease

WHO Commission on Macroeconomics and Health, Macroeconomics and Health: Investing in Health for Economic Development. Executive Summary. 2001.

Barry Bloom, “Public Health in Transition,” *Scientific American*, Vol. 293, No. 3, September 2005.

Laurie Garrett, “The Next Pandemic?” *Foreign Affairs*, Vol. 84, Issue 4, July-August 2005.

Wednesday, April 21: Lecture 24 – The Case of Malaria

Gebbie, Kristine M. “Public Health,” in The Limits of Market Organization. Richard Nelson, ed. Russell Sage Foundation: New York, 2005.

Sachs, Jeffrey D. and Pia Malaney, “Economic Burden of Malaria,” *Nature*, Vol. 415, February 2002.

Teklehaimanot, Awash, Gordon C. McCord and Jeffrey D. Sachs. “Scaling Up Malaria Control in Africa,” *American Journal of Tropical Hygiene*, December 2007.

Topic 5: Globalization

Monday, April 26: Lecture 25 – History of Globalization

Angus Maddison, The World Economy
Introduction, Summary, and Chapters 1-3 (pp. 17-167)

Easterlin, “The Worldwide Standard of Living Since 1800,” *The Journal of Economic Perspectives*, Vol. 14, No. 1, Winter 2000.

Pritchett, Lant, “Divergence Big Time,” *The Journal of Economic Perspectives*, Vol. 11, No. 3, Summer 1997.

Easterlin, Richard, “Why Isn’t the Whole World Developed?” *The Journal of Economic History*, Vol. 41, No. 1, March 1981.

Wednesday, April 28: Lecture 26 – Is Sustainable Development Feasible? The Great Challenges

Sachs, “Chapter 13: Achieving Global Goals,” in Common Wealth

Monday, May 3: Final Exam Review